Missouri Surveyor

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Missouri Society of Professional Surveyors

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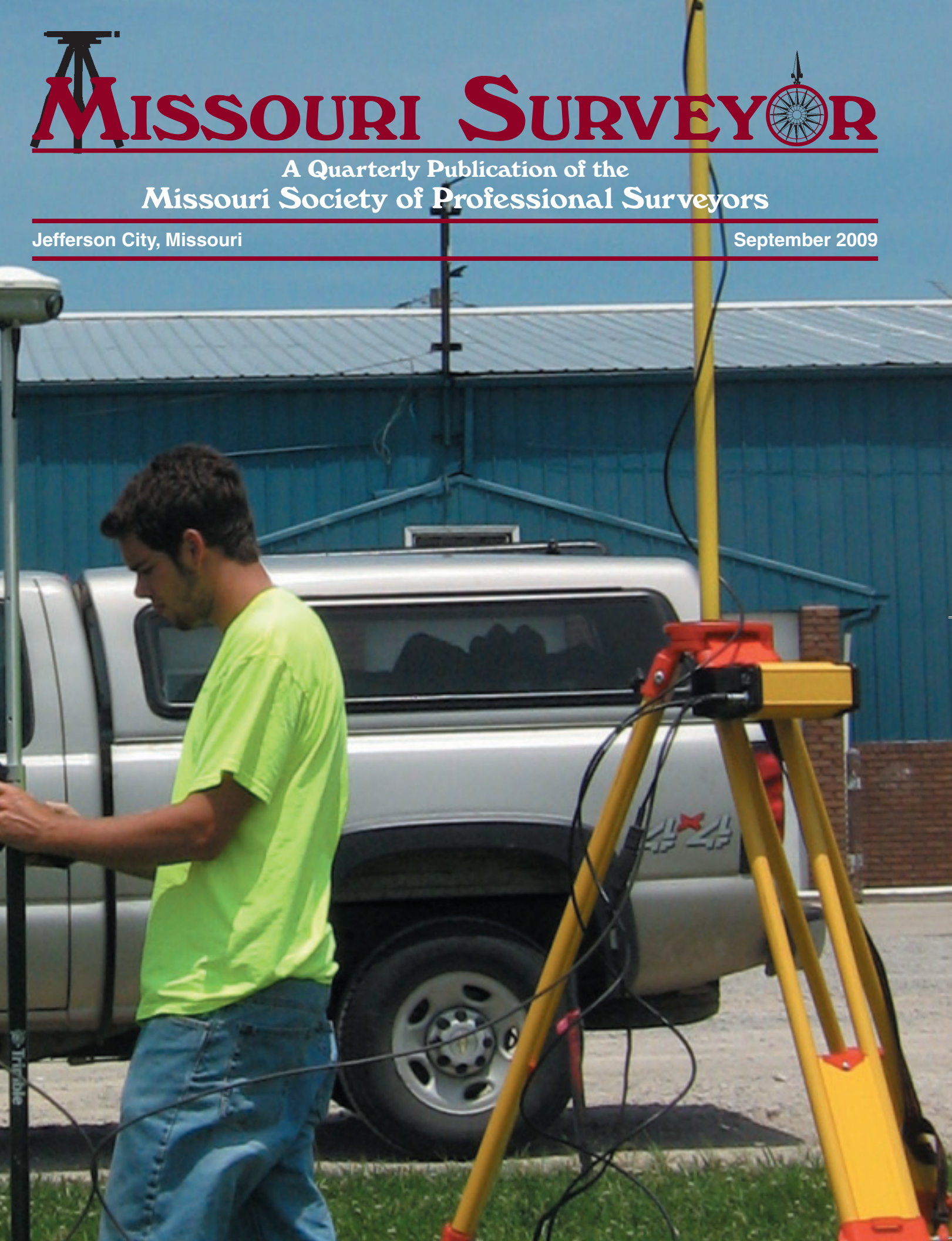

MISSOURI SURVEYOR

CALENDAR OF EVENTS

2009-2011

October 15-17, 2009
52nd Annual Conference
St. Louis Airport Marriott
St. Louis, MO

December 5, 2009
Board of Directors Meeting
MSPS Office
Jefferson City, MO

May 7-8, 2010
Spring Workshop
Lodge of Four Seasons
Lake Ozark, MO

October 7-9, 2010
53rd Annual Meeting and Convention
Tan-Tar-A Resort
Osage Beach, MO

May 6-7, 2011
Spring Workshop
Lodge of Four Seasons
Lake Ozark, MO

John Alan Holleck, Editor

Notes from the Editor's Desk

by John Alan Holleck

Hello everyone, I hope you are enjoying the pleasant summer as much as I am. As August draws to a close, I am reminded that it is election of officers' time. Historically, the September, and now our October meeting is utilized for the yearly business meeting and election. And, it is that time again. Pages 20 and 21 contain information on this years' outstanding slate of candidates. No time like the present to introduce the quarters' *Missouri Surveyor,* so on to the contents of the September issue.

Following our usual opening of "Notes from the Editor's Desk" and the "President's Message" comes "Thomas Jefferson's Survey for the University of Virginia," by Rob Firmin, Ph.D. Rob is the principal historical researcher for a sculpture firm. Next comes "Strategies for Tough Times – Weathering the Storm," which is a collection of three surveyors with at least 29 years business experience giving advice on survival techniques. In an article condensed from a keynote address presented by Curt Sumner, LS Executive Director ACSM/NSPS, Curt tries to discover whether "Surveyor's [are] Unsung Heroes, or Out of Touch." Dr. Andrew Kellie, from Murray State University follows with his own personal take of "Written Footsteps."

Following the candidate pages, is "Surveying in Downtown Milwaukee, Unique Procedures and Landmark Court Decisions" by Harold Charlier. The above is a little something for those of us who toil in an urban atmosphere facing our own unique problems. Next up to bat is an article by Donald A. Wilson entitled "Someone Else's Survey: Can You Trust It?" What an interesting question to pose, since it is nearly a daily occurrence to use someone else's work. "On Dangerous Surveying: The Union Pacific Railroad, 1865-1869" by Richard O. Spencer follows. The survey for the Transcontinental Railroad was quite an undertaking even if the final outcome was to make a couple of men incredibility wealthy. Dave Berg, from the great Northwest, adds his thoughts on a problematic subject, "Why Add more Iron to the Fire?" We have all run into the same problem, too many bars marking the same corner. Next is a short message on safety, entitled "Any of These Sound Familiar?" by Ronald Koons. Rounding out the September issue is "Curb Splits" by Charles "Dan" Church, a Nevada Surveyor. Hope everyone finds something to like in this issue. Talk to you in December.

Cover: Adam Emerick, of the Farnsworth Group, prepares to initiate a survey for a natural gas pipeline crossing the Whiteman Air Force Base (home of the USAF B-2 bomber fleet) near Knob Noster, Missouri. Adam is utilizing a Trimble R8 GPS receiver enhanced with the Global Navigation Satellite System (managed by the Russian Space Forces). Photograph by Eric Trentmann.

THE MISSOURI SURVEYOR

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Missouri Society of Professional Surveyors

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President's Message

by Darrell D. Pratte

August seems a strange time to be reflective, but this is my last President's message to MSPS. Ralph Riggs will be President when the next newsletter is published. This is my swan song, or gander groan, depending on perception. I have had a hard time putting my thoughts together for this message. I just cannot find the proper tone, the proper sentiment.

Serving on the Board of Directors, and being elevated to President of MSPS, is a high point in my career. It is a pleasure to work along side, and an honor to lead, such a dedicated group of people, with, at least, one thing in common, the advancement of the land surveying profession. Though I know I will continue to serve MSPS in the coming years, I will no longer be a part of the board. A richly rewarding experience, never to be forgotten.

Many of the challenges presented to MSPS over the last year will be on the agenda for next year. We were seemingly shut out by the Ninety-fifth General Assembly. The Surveyors Handbook still needs to be updated, and land survey standard updates are just getting off the ground.

I started this message August 17. I am glad I did not get it finished and submitted until August 26, though Sandy might disagree. Had I completed it on time, before working the MSPS booth at the State Fair, I could not have added my thoughts on the project, and my thanks to those who worked the booth. First, a big round of applause to Chris Wickern, Chairman of the State Fair Sub-committee of the Public Relations Committee. Chris was the MSPS liaison to the Missouri Department of Natural Resources (DNR). DNR owns the Women's Building, the grounds where the MSPS booth was set. Chris made sure there were enough tickets on hand to get the workers into the fair. He was there every morning to get the crew started, show the workers where the tent and prizes had been stashed. Chris ran the show. I have yet to talk to anyone who found the experience to be other than pleasant (I could have said fair). Thank You to the MSPS members who worked the booth and met with the public from the Kansas City Metro Chapter, the Southeast Chapter, the St. Louis Chapter, Central Missouri Surveyors, Missouri Association of County Surveyors, the Land Survey Program and those that wondered in from different areas. Spouses and kids were there to help, and two Executive Directors. Sandy Boeckman of MSPS and Mary Frye of MACS were on hand. Without your help and support there would be no show.

I guess that is it in a nutshell, "without your help and support there would be no show". Thank you to everyone in MSPS for allowing me the privilege to serve as President of this great organization. See ya in October at the annual meeting in St. Louis.

Thomas Jefferson's Survey of the University of Virginia

by Rob Firmin, Ph.D., Daub & Firmin Studios, LLC

On the morning of July 18, 1817, Thomas Jefferson, aged 74, rode his horse Bremo from Monticello to the site purchased for his planned national university. Accompanied by Edmund Bacon, his overseer, and James Dinsmore, a carpenter, he picked up locust shingles in Charlottesville to make stakes, and proceeded to the hill that would become The Lawn of the university. Jefferson set up his sophisticated theodolite that had been made by one of the most lauded instrument makers of the 18th century, and began his survey.

Thomas Jefferson played a critical role in the promotion of surveying as an indispensable tool in the development of the United States. This article summarizes his lifelong involvement with surveying, then focuses on his survey of the grounds of the future University of Virginia — the most consequential of the surveys he conducted personally. The article concludes with the story of the creation of a monumental sculpture commemorating this event, which was researched, designed and sculpted by the author and his two colleagues, and dedicated at the university on September 22 this year.

Jefferson specified that his tombstone should list his three greatest achievements: founding of the university, and authorship of the Declaration of Independence and of the University of Virginia Statute for Religious Freedom. His presidency did not make the cut.

Surveying Background

A polymath, Jefferson was fascinated by scientific instruments, acquiring a large collection over his lifetime. He was never a professional field surveyor, but made significant contributions to American surveying through appointments, directives and recommendations over the course of many decades. He received some instruction in surveying from his father, inherited his father's surveying equipment and maps when he was fourteen, and may have received a modicum more of surveying instruction while at the College of William and Mary.[1] The most important influence at college was his professor William Small, who invigorated his fascination with quantitative and scientific thinking.[2] Jefferson extensively measured, weighed and computed parameters for many of his endeavors, large and small, throughout his adult life.

He personally conducted field surveys of his own land, that of neighbors and nearby mountains. One such survey that has accompanying notes written by Jefferson in the first person, dates from October 15, 1793, and describes his reference point as lying midway between the front columns of Monticello.[3]

Contributions to American Surveying[4]

Jefferson was a tireless promoter of institutions and policies that would strengthen the intellectual foundations of his young nation, believing that a population that possesses firm grounding in all the arts, ranging from science and technology to the humanities, is best equipped to live up to the ideals stated in the Declaration of Independence. Jefferson's active promotion of surveying as a tool of public policy had profound consequences for the speed and orderliness of the country's expansion, and for the recognition and development of the field. The following summary is by necessity cursory — it is but an outline of some of Jefferson's contributions.

Sculpture & Photo © 2007, Daub & Firmin Studios, LLC

In 1780 and '81 he recommended the method for extending the Mason-Dixon Line to and along the western meridian (as specified in William Penn's original grant) to the Ohio River. While minister to France in the 1780s he made a map of Virginia by synthesizing several sources, and calibrated it to a prime meridian centered on Philadelphia. For the Land Ordinance of 1785, he advocated a system of rectangular surveys to be conducted prior to any sales or settlements, to enhance the fairness of land acquisition.[5] As Secretary of State he supervised surveys for the Residence Act of 1790 to locate the site for the nation's capital.

As President, he appointed Jared Mansfield Surveyor General of the Northwest Territory. "Mansfield was the only man, ... who had been appointed to an important public office solely on the ground of his scientific attainments," an action clearly reflecting Jefferson's understanding of and respect for science.[6] He created the office of Surveyor General of the Mississippi Territory, appointing Isaac Briggs in 1803. (He also recommended Briggs as surveyor of the Erie Canal in 1816.)

In 1804 his interest in the establishment of an American prime meridian led to its demarcation with the "Jefferson Stone," located near the Washington monument. At Jefferson's behest Meriwether Lewis received survey training in Philadelphia for the Corps of Discovery expedition. Jefferson even specified specific surveying equipment for the Corps (but it was too delicate to be taken along). In 1806 he proposed a Survey of the Coast, which was begun in 1816.[7] During the period between 1788 and 1819, and possibly longer, he purchased and tested odometers as an aid to map making.

His public-surveying concepts saw their final policy realization in the state lines of Colorado (1876) and Wyoming (1890), using his recommended principle of aspect ratios of latitudes to longitudes.[8] An unanticipated legacy is that the grid lines beginning in Ohio and laid out into the western U.S. are one of the man-made artifacts visible from Earth orbit.

Father of the University of Virginia

While Jefferson is known principally as the author of the Declaration of Independence, the period spanning his seventies constituted perhaps the most focused and consistently productive of his life. Virtually every aspect of the University of Virginia, including its secular mission, location, physical appearance, curriculum, and faculty was, for all

Thomas Jefferson's Survey (continued)

practical purposes, Thomas Jefferson's concept. It was also his final contribution to the development of the United States.

Jefferson wrote about inadequacies in American higher education and advocated corrective innovations as early as the 1760s, when Virginia's colonial governor asked him for expansion plans for the College of William and Mary. As Virginia governor in 1779, concerned about quality of education, he attempted to reduce the influence of clergy at the College.

Jefferson's desire to create a major university was stated as early as January, 1800, in a letter to the renowned English scientist Joseph Priestly.[9] His multi-stage plan was initiated at least as early as 1814 when he became director of the on-paper-only Albemarle Academy. That year he sketched his concept for what he termed an "academical village," integrating the design of many buildings, as opposed to the concentration of all functions in a single structure. In 1816 the Virginia Assembly transformed the academy into Central College — still existing only on paper, but by name emphasizing its importance.[10] He presented his 1814 drawings to the Board of Visitors (trustees) in May 1817, and gained their approval. The remaining nine years of his life were devoted to the establishment of his university.[11]

Theodolite

Jefferson owned more than one theodolite in his lifetime, but we know that the one used for his university survey is the one currently on view at Monticello.

According to Bedini, Jefferson purchased this theodolite from its maker, Jesse Ramsden in London on March 16, 1786, when he was visiting London while minister to France. (On the same day he purchased a telescope, hygrometer, microscope, thermometer, globe, protractor, dividers, and a draw-pen.)[12] Monticello's researchers believe this theodolite was not included that day — that he had purchased it from Reverend Andrews of Williamsburg eight years earlier.[13] Ramsden was an Englishman who gained international recognition as an inventor and maker of precision measuring instruments and optics, including theodolites. His most famous theodolite, used in the Principal Triangulation of Great Britain of 1790-1853, was 3 feet in diameter and could divide angles to 1 arc second. The invention for which he is most recognized by surveyors is his "dividing engine," which could mark angle-calibrations far more accurately than could earlier techniques. He was elected to the Royal Society in 1786 and awarded the Copley Medal in 1795 for his achievements.[14] Jefferson always tried to acquire the best.

Jefferson's Ramsden theodolite was a sophisticated instrument for its date of construction and remained relatively so for many decades. It has a large compass, two telescopes for sighting reference points, calibration for altitude and around the slanted edge of the compass body (to 3 minutes of arc) for azimuth. Four adjustment-screw knobs are placed vertically to level the instrument relative to spirit levels.

Survey of the University: July 18, 1817

Jefferson's notes from the day of the survey record that he planted his theodolite in a position convenient for taking multiple readings (see his survey notes, Figure 1).[15] He would not have to move it during the surveying session. Modern surveyors, if using the Ramsden instrument, would move it so as to be able to keep the seven points on each side of the field in a straight line, and then measure distances directly. But, a) Jefferson's love of computation may have led him to locate all of the points from a single position, for the sheer fun of the challenge; and b) his instrument enabled that approach because it could measure the southward drop in elevation of the hill and his azimuth measurements simultaneously. Trig computations would have been assisted by published tables. Edmund Bacon and James Dinsmore performed as rod men and point markers. Jefferson had a relatively soft voice, so communication with his assistants may have been through hand signals.

The first measurement could have provided a known distance for a reference-base line. Jefferson may have used a Gunter's chain with 100 links, equivalent to 66 feet in length, since he recommended Gunter's chains as a standard for American surveying while serving on the Public Land Act Committee from 1783 to 1785. A mile equals 80 chains, and 10 square chains equals one acre. But many Gunter's chains were 33 feet long — more convenient in hilly country — and the surviving one at Monticello is 33 feet.

There are no stadia hairs in the theodolite's telescopes today, and it seems likely that they had not yet been invented by the time it was made in the late 18th century.[16] Consequently, Jefferson and his crew could not have used stadia rods. Instead, Bacon and Dinsmore simply did their best to keep the rod vertical, possible with the aid of a plumb bob. The entire survey would have required at least several hours.[17]

It seems reasonable to assume that Jefferson would have taken his recently approved 1814 drawings (layout of the grounds on one side, architectural elevation of Pavilion VII on the other) to place his survey into perspective relative to the site.

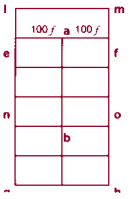
Survey Results and Consequences: The Rotunda

The schematic in Figure 1 is the author's simplified version of the rough sketch done by Jefferson the same day he completed the survey, depicting the "squares" he "laid off."[18] The text to the right of the sketch is an excerpt from his handwritten notes.

Figure 1. Jefferson's Survey Notes

1817 Operations at & for the College

July 18



a the place at which the theodolite was fixed being the center of the Northern square and the point determined for some principal building in the level of the square 1. m. n. o. the fall from a. to d. 18 f.

In addition, Jefferson's notes specified his assumptions about compass declination, and that locust stakes were driven at all points except d, which was marked with a pile of stones.

(continued on page 6)

Thomas Jefferson's Survey (continued)

The survey revealed that the field, which was aligned with the spine of a long hill that sloped gently to the south, was too narrow to accommodate his 1814 plans, so he had to reconsider. Sixteen days after the survey he wrote Benjamin Henry Latrobe, the architect with whom he worked on the original university buildings, that the "law of the ground" made the "principal building" (Figure 1) at the north end of the grounds necessary.[19] It is possible that the idea for the building occurred to Jefferson during the survey, later that day or the next day — in response to the need to rework his plans.

At least one source suggests he had received the idea for "some principal building" from Latrobe.[20] Certainly, the concept for a major building at the center of the north end of the grounds occurred to, or was confirmed in Jefferson's mind, at a date in close proximity to the survey of July 18.

Another consequence of the survey is that Jefferson decided to adapt to the southward slope of the hill by creating three terraces.

In a letter written to John Hartwell Cocke on July 19 Jefferson wrote "our squares are laid off, the brick yard begun, and the levelling will be begun in the course of the week."[21]

Central College received its charter as the University of Virginia in January 1819. The "principal building" mentioned in his survey notes quickly evolved into the famous Rotunda, which is considered one of the most significant architectural designs in America. Among other honors, it was designated one of eighteen architectural treasures in the United States by the UNESCO World Heritage Convention of 2001.

The Darden-Jefferson Sculpture: Jefferson Surveying the University

In 2005 alumni of the Darden Graduate School of Business at the University of Virginia sponsored a nationwide competition for a sculpture commemorating Thomas Jefferson's founding of the university, to stand at the north end of Darden's main courtyard. The author and his two colleagues won with their proposal to depict Jefferson, not only accurately, but in the act of creation. Rather than posing as if for a portrait, the Jefferson in our composition is dynamic, evocative of his character, and relates directly to his extraordinary efforts in his last years as he physically carried out his plans. Our 9-foot bronze sculpture captures Jefferson on the morning of July 18, 1817, having just completed his survey. He is standing on a sculpted grass field, wearing his riding clothes and holding his two-sided 1814 drawing. His Ramsden theodolite stands to his left, above the saddlebags used to carry the marking stakes.

We researched Jefferson's founding of the university, and uncovered as many details about his theodolite, personal appearance, clothing, and accoutrements as we could during a full-time three-month effort, consulting many published sources and Jefferson experts. The research was expanded after we won the sculpture commission.

The December 2008 cover of *The Old Dominion Surveyor* shows a view of the full sculpture. Jefferson is depicted contemplating the implications of the survey results as they relate to his 1814 drawing. He may be thinking that the idea for a grand building at the north end of the grounds should, in fact, be implemented. Or he may be struck for the first time with the concept for the principal building that became the famous Rotunda — thanks to his survey that made him rethink his plans.

Figure 2. The Darden-Jefferson Sculpture, Jefferson's Right Side

Figure 2. Sculpture & Photo © 2007, Daub & Firmin Studios, LLC

Figure 2 is a close-up of Jefferson's right side, showing the right pocket of his vest. The fan-like item in the pocket is his ivory-slat note pad, on which he wrote field notes in grease pencil, to be transcribed after returning to his "cabinet" (office). The other item in his pocket is his sunglasses, which he called his "goggles." His left pocket, behind the drawing in the photo, holds his watch and architect's rule. His seal stamp is tied to a ribbon looped through the top ring of his watch.

Figure 3. Jefferson's Ramsden Theodolite

Figure 3 is a photo of the sculpture's bronze theodolite, which, like the rest of the sculpture, is scaled to nearly 1 $^1/_2$ times actual size. While there are some uncertainties about its exact configuration as of 1817, we have followed Monticello's current interpretation.

Figure 3. Sculpture & Photo © 2007, Daub & Firmin Studios, LLC

The theodolite in the sculpture is based both on direct inspection of the actual instrument at Monticello, and many measurements and photographs taken for this purpose by Monticello staff. Consequently, the instrument and its tapered tripod legs are as accurate as we could make them without subjecting the original instrument to unnecessary handling.

The two telescopes are set at different angles to indicate recent completion of the survey. The tripod legs are spread at equal angles, which would have facilitated centering of the instrument.

Two details on the theodolite will be seen by few viewers. The compass needle is pointing in the estimated correct direction, as if the sculpture were standing on the spot where Jefferson conducted his survey, adjusted with an estimate for magnetic declination as of 1817. Two script inscriptions on the upward facing surface of the compass include identification of Jesse Ramsden of London and a label for angular calibration.

Creation of the sculpture, including: ongoing research,

Thomas Jefferson's Survey (continued)

composition, sculpting of several maquettes in clay, enlargement, resculpting at full size, multiple molds, adjustments for new historical data, modeling the theodolite, lathing the tripod legs, and months of foundry work, spanned nearly three years. The Darden Class of 1974 sponsored the project, and the approximately sixty people we worked with at various stages of the project all deserve credit. Special thanks to Lisa Jacobs, Executive Director of the Museum of Surveying and Jack Owens, Editor of the *Old Dominion Surveyor*, for their patient suggestions regarding surveying for this article.

Our hope is that the Darden-Jefferson will stand for centuries as an inspiration to young people, and not so young people, as the definitive older Jefferson: energetic, thoughtful, rational, ignoring conventional expectations of advanced age, realizing through his own hard work a significant, productive, forward-looking dream.

Thomas Jefferson's many accomplishments had a profound influence on the development of the United States. His Declaration of Independence became the permanent expression of democratic aspirations of all Americans. His fascination with science and technology, and his devotion to improvement of serious education, supported his unending drive to make the United States a leading modern nation as rapidly as possible. His role for nearly fifty years as champion of objective measurement through surveying (reinforced by his political power and moral authority), substantially accelerated the country's orderly development. His field survey of the University of Virginia now serves as a manifest tribute to Thomas Jefferson's foundational contributions to our country, and as a reminder of the foresight, energy and actions required of individuals to continue his work.

Jefferson's Saddlebags and Stakes. Sculpture & Photo © 2007, Daub & Firmin Studios, LLC

Author: *Rob Firmin, Ph.D., is one of three principals in the former sculpture team of Daub Firmin Hendrickson Sculpture Group, LLC, along with Eugene Daub and Jonah Hendrickson. The group is now Daub & Firmin Studios, LLC, located in Berkeley and San Pedro, California. Its work can be seen at www.dfsculpturestudios.com. In addition to sculpting, Rob conducts the historical research that supports design of its studio's monuments.*

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Notes

1 Bedini (1990) p. 27 [The most thorough single source on Jefferson's quantitative and scientific interests, as well as an excellent general biography.]

2 Linklater (2003) pp. 54, 55

3 Wheeler, Derek, Monticello archaeologist: Personal communication. The notes are from the N-196 series for surveys conducted between September 1793 and August, 1795. The map drawn based on these surveys is N-521-9, at the Massachusetts Historical Society.

4 Bedini (1990) [Referenced in addition to other cited sources in this section.] For surveying, see pp. 15, 21, 60, 84, 449

5 White (1983) p. 11

6 Dudley (1998) p. 235; quoting the *Personal Memories* of Mansfield's son Edward, p. 3.

7 Bedini (1999) entire work

8 White (1983), p. 172

9 Kock & Peden (1944), pp. 552, 553 for a transcription of the letter

10 Willis (2002), pp. 25, 48-53

11 Grizzard (1996), p. 2

12 Bedini (1990), p. 151

13 Taylor, Carrie E., Collections Manager, Monticello: Personal communication

14 *Encyclopedia Britannica On-line* "Ramsden, Jesse" http://www.brittanica.com/eb/article-9062618; "Jesse Ramsden" Wikipedia, the Free Encyclopedia; "Principal Triangulation of Great Britain" *Wikipedia, The Free Encyclopedia*

15 Owens, Jack, Editor, *Turning the Horizon*, Surveyors Historical Society: Personal communication

16 Owens, Jack, Editor, *Turning the Horizon*, Surveyors Historical Society: Personal communication

17 Jacobs, Lisa D., Executive Director, Museum of Surveying: Personal communication

18 Wilson et al (2005), pp. 14, 16, 30, 31

19 Grizzard (1996), p. 14; and note 48

20 Lasala (1992), p. 17

21 Grizzard (1996), p. 17

Reprinted from December 2008 *The Old Dominion Surveyor*

MO Colleges/Universities Where Land Surveying Coursework is Available

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

Longview Community College - Lee's Summit, Missouri
Contact: David Gann, PLS, Program Coordinator/Instructor - Land Surveying MCC - Longview, MEP Division
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Florissant Community College - St. Louis, Missouri
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314-595-4535

Missouri State University - Springfield, Missouri
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Southwest Missouri State University
901 So. National
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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

Missouri Western State University - St. Joseph, Missouri
Contact: Department of Engineering Technology
Missouri Western State University
Wilson Hall 193
4525 Downs Drive
St. Joseph, MO 64507
816-271-5820
www.missouriwestern.edu/EngTech/

St. Louis Community College at Florissant Valley
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St. Louis Community College at Florissant Valley
3400 Pershall Road
St. Louis, Missouri 63135-1499
314-595-4306

Three Rivers Communitiy College - Poplar Bluff, Missouri
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Ron Rains, Faculty
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573-840-9689 or -9683
877-TRY-TRCC (toll free)

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573-882-4377

Missouri Southern State College - Joplin, Missouri
Contact: Dr. Tia Strait
School of Technology
3950 E. Newman Rd.
Joplin, MO 64801-1595
1-800-606-MSSC or 1-417-782-MSSC

Strategies for Tough Times – Weathering the Storm

We asked some of our members, who have experienced previous recessions and survived to highlight some of their strategies for tough times. We hope you find their responses to be reassuring.

Bill Beardslee, PLS, PE, PP
(29 years in business)

The current financial crisis is the fourth "economic downturn" of my career. Each has been different and has had different effects on me. The first, in the late 1960's and early 1970's had little impact, other than to limit overtime. The second, in 1980, came just as I started my practice. As there were only three of us in the firm, coping with the limited amount of work was easier as our expenses were much lower. The housing market was very slow, as mortgage rates hit 16%. (Yes, that is 16 — NOT 1.6 or 6, but CD's, at that time, were at 14% also.) We spread our wings at that time to increase the number of clients we served so that no client was so important that the loss of his work would impale us.

When the savings and loan crisis hit in 1989, the economy hit the skids. We began decreasing size by attrition and then by layoffs. We downsized our facilities and became more electronic. (In 1989, we were 15% auto cad, 85% hand draft). We vowed at that time to become more electronic and to limit our total staff size to ten. We found that after about fifteen people, management spent more time on "human resource" issues that on production. If we had more work than the staff of ten could handle, we subcontracted it to local surveyors whom we knew and trusted. We worked out a "crew pool" with them. If we needed a crew for two days, we would schedule it with them and then owed them two crew days. They would "cash in" that chip when they were rushed or overburdened. It allowed us to limit the number of full time employees.

The downturn in 2000, with the collapse of the dot.com world, had little effect on us. When this current slow down began in 2007, we realized we had just experienced an unprecedented fifteen-year run of full employment and workload. Today, we have decreased staff and are merging with another office of the firm that acquired us in 2006.

Here in New Jersey, the state government has been as big a culprit on our loss of work as the economy. New environmental regulations over the last five years have taken over 600,000 acres of developable land out of play — 12% of the state. Remember that when you go to the poles next time.

The economy is always cyclical, prepare now for the coming upturn!!

Richard F. Smith, Jr., PLS
(29 years in business)

I opened by firm during the recession of 1980. The title insurance agents and closing attorneys ordered surveys for buyers as they do today. The "title surveyors" of that era felt that their responsibility was satisfied when they plotted the deed and plopped it down on a pipe or two. I did not share that view, but, expenses were low for me. I had one employee that I shared with a pharmacist.

In 1982 interest rates went to 19% and the real estate market died. Work got scarce for all surveyors. I searched for alternate work sources. I started servicing some architects and small engineers. I drummed up some work from the municipalities and the County. I found column layout work for steel fabricators.

Business increased as years passed, prices slowly improved. In 1985, I had eight employees. We did mostly title surveys, small subdivisions, construction stake out, steel and cemetery layout. Housing prices were soaring; spectacular tax breaks on rental property further fueled the frenzy. I hired a few more people and trained them.

Surveyors could not keep up with the demand. The real estate market reacted; banks began accepting ten-year-old surveys. The "No survey-survey endorsement" was discovered.

October 17, 1987 was Black Monday. In 1988 real estate followed Wall Street.

What did I do then? What can I do this time?

I cut back. I gave no raises, no bonuses, some employees left, I let some go. I diversified. I spent my new spare time looking into who was doing what. I found the names of closing attorney, the title agency and the surveyor on the recently recorded mortgages. A few surveyors were getting all the work. The surveyors with the most work were the ones that did not find any problems with the old deed or survey, the deal always closes, and the commission is paid. And they offer next day service. We know how they do it. It's very difficult to sell quality work. Most involved in these transactions know that the surveys are weak at best. They reply "It's insured" when questioned.

What can we all do now?

When you see a dreadful fake job that someone passed off as a survey, put it in the mail. Let the State Board deal with the problem. We are guilty of misconduct when we fail to report violations.

Strategies for Tough Times (continued)

What else?

I think that we are missing out on a lot of survey work because we have not been diligent in policing our own profession. Find out who's doing the surveying for your Town and your County. Who surveyed the stormwater outfall structures that the DEP required every municipality to locate? Who's doing the base mapping for the Town or the County GIS? Are they licensed surveyors? Find out. Get out and sell your work, start in your hometown. Is your firm more suited to offering these services?

The Obama Administration is spreading Stimulus Money all over the country targeting infrastructure improvements. Who is surveying the roadways? Who is surveying the highways for NJDOT? Was this survey work performed by licensed surveyors? Challenge them. Send the maps to the State Board.

What else?

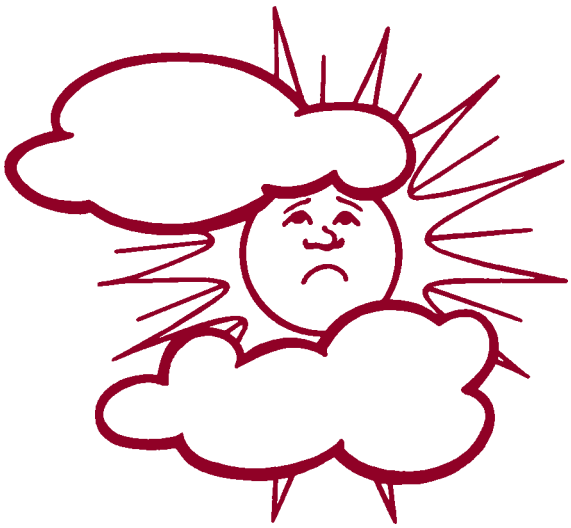
Layoffs? Who goes, who stays? If you are an employee, you should know that the multi-taskers stay. What professional and personal skills do you have? How many tasks can you cover? Are you pleasant on the phone, can you run an instrument? Data Collector? Do you know AutoCad? How about survey math, analysis and research? In a smaller firm employees need to be able to cover several tasks.

Joseph M. Dolan, PLS

(32 years in business)

As you read this, if you are starting to think about how to keep the wolf from your business door, I can only tell you that you are about five years too late!

What is a deepening recession for most of the country, is a 1930's style depression for many surveying firms. Particularly hard hit are the smaller firms that were solely dependent on the housing and real estate markets.



The evaporation of real estate sales coupled with the banking debacle and loss of easy credit has thinned the ranks of the surveying community. Why? Well the answer is relatively easy. Most smaller firms do not have a diversified client base. When the realtor or attorney stopped calling the cash flow dried up!

Some of the multi-disciplined firms have fared better simply because they serve a more diversified client base in the government and private sector. I would note that those two sectors tend to work on an opposite sine wave to each other. That maintains a consistent cash flow. A profitable business cannot exist without a sufficient cash flow. A business can't exist at all without it!

When the private sector is down as it is now, government projects seem to be on the increase. The federal stimulus package is and will continue to drive that sector.

What I find morbidly fascinating, is how the many surveyors have reacted to the problem. Many of us have responded by cutting already ridiculously low fees for a substantially lower volume of engagements. Most title survey fees were not profitable to start with. I know the old axiom "We lose money on every survey, but we make it up on volume" no longer applies because there is no volume! News flash! You never made it up!

Take a look at the realtors. They have also been negatively affected by the economy. Their standard contract is still basically 6% for residential and 10% for commercial properties. I haven't seen any rush to lower commissions by this regulated profession.

Attorneys haven't rushed to lower their hourly rates; neither has my doctor, stock broker or insurance agent.

Surveyors need to change their business plan. Another news flash! Most of us do not have one. Surveyors need to understand all the financial aspects of running a PROFITABLE business. We need to personally review and understand every expense. If you have not done that review of expenses and your door is still open, then do it now!

The biggest thing I think you must do is diversify your client base. I don't mean more realtors or real estate attorneys. Now is the time for surveyors to become involved in all the aspects of our profession that we have been ignoring. GIS, scanning technology, machine control (who should be advising our former clients about DTM's, Professional Land Surveyors or equipment salesman)? You are only limited by your imagination!

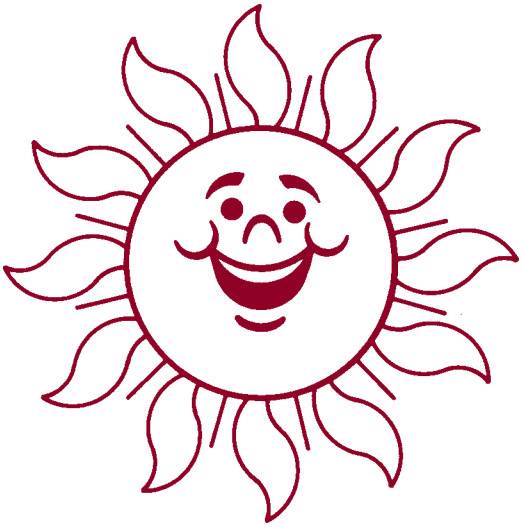
We are required to be licensed by every jurisdiction in the United States, in order to practice our chosen profession. The reason that we and all other regulated professionals must demonstrate "minimum competence", is so that the public is protected. We do not protect the public by offering less than a professional effort in furnishing service to our clients.

(continued on page 12)

Strategies for Tough Times (continued)

It is time that we view those we offer our services to as clients and not customers! We need to view what the value of our services are to our clients and stop valuing them as what we think they are to ourselves, as a day laborer would. If you do not believe that is the case, then I suggest that the next time a loved one is ill, price shop the surgery they need! I am sure you will be thrilled with the results!

We are the ones that are responsible for how our clients view us. Only we can alter that perception. In the recovery from these hard economic times the survivors can change that perception and build a strong, diversified business model for the future. A model that will be better able to weather the next poor economic cycle when it occurs and that will come as surely as the sun will rise tomorrow.



Reprinted from Spring 2009 *COORDINATE*

Surveyors: Unsung Heroes, or Out of Touch

An article condensed from a keynote address presented by Curt Sumner, LS Executive Director ACSM/NSPS

Recently, a fellow surveyor asked me the following question, "Why does no one ever ask who surveyed that new building, bridge, park, road, etc."

True enough, the public is often (if not typically) aware of the architect who designed a structure, or park, and the engineer who designed a bridge, scenic highway, or site plan. They are even likely to know the contractor who built it!

Meanwhile, the surveyor who provided the data for other professionals to design, and the contractor to build, remain anonymous!!!!!!!

Throughout history, the surveyor (with a few notable exceptions) has been in the background of the development of our country. All the while, being a vital component of the Backbone of Society!

Why is this the case?

Certainly, we surveyors don't have to tell each other of the importance of the work of our predecessors, and indeed of ourselves. We are proud of our heritage. We worship at the alter of Mount Rushmore where our surveying heroes Washington, Jefferson, and Lincoln are immortalized (along with that "other guy").

In fact, we revel in the self-share glory of considering ourselves to be the "Last of the Rugged Individualists". We consider ourselves to be that honest, and true, and selfless group of professionals who live by our own code of honor that can result in financial hardship to ourselves while we are in service to our fellow citizens.

> ***Throughout history, the surveyor (with a few notable exceptions) has been in the background of the development of our country.***

In our interaction with other professionals, we are often expected to correct their work (or at least bring errors to light), and to hold the hand of the contractor to avoid costly mistakes, or catastrophe!

Surveyors have traditionally been the buffer between an approvable (but not buildable) plan, and one that can be constructed. In my 40+ years of surveying, I don't recall ever being presented with a plan from an architect in which all of the incremental dimensions added up to equal the overall total dimension shown.

Likewise, rarely have I seen a design plan from an engineer that doesn't require some level of recalculation. It almost seems as though the better technology becomes, the more plans tend to be "cartoons" that look good, but are often not mathematically or geometrically sound.

In spite of the importance of the services surveyors provide to fellow professionals, and to the public at large, we are often held in low esteem by our fellow professionals and others with whom we must work, even those for whom we toil in apparent selflessness!

Why do we not get the respect that we think we deserve?

There are several schools of thought with regard to this question. Some say that it is due to the low requirement for the formal education necessary as a prerequisite by more than half of the 50 states to qualify for taking the examinations to attain licensure as a surveyor. Some even question the professionalism of surveyors due to a lack of formal education. While I understand that the title "professional" may be defined to be applicable only to those who have attained some prescribed academic requirement, I do not believe that formal education and professionalism are synonymous. Professionalism, as it is typically understood to be defined relative to the services one provides, is a personal achievement that is based on character and the manner in which individuals conduct themselves in the pursuit of their work. It is not based on the number or hierarchy of degrees one holds. There are many instances in which this is evident in society.

Still, the concept of aligning the title of professional with formal education is becoming more and more prevalent, and should not be discounted. It is certainly true that exposure to the broad opportunities in surveying practice is much more available to students in surveying-related college and university programs than it is to an individual who merely gains experience while working for a licensed surveyor whose services are limited to only one, or a few, of those areas of practice.

Others say it is because we bid our services against our competition to the ultimate lowest price. There is much evidence of this, also. Why would clients perceive that our services are worth more than we seem to believe them to be? When someone continues to lower the cost of services in order to "get the job", clients will think one of two things: 1) this person must not think his/her services are worth much; or 2) this person must have been trying to cheat me with the first price quoted since it has now been lowered.

Neither perception is a good one for the surveyor, and our profession in general. Even if one "bids" for work, it makes sense as professionals for us to understand the cost of doing business and the value to the client, and the public, of the services we provide.

Still other say it is because we don't present ourselves to the public in the same manner as do other professionals. Many believe it is a result of our relative inability to articulate well what it is that we do, and that our work is much more than simple applications of mathematics. Additionally, it is

Surveyors: Unsung Heroes, or Out of Touch (continued)

perceived that we do not dress appropriately for the situation at hand. An uncle of mine once stated that people are supposed to judge you based on what it is on the inside, not on your appearance outside. One of his sisters remarked, "If they don't like what they see on the outside, they may never bother to look at what is inside."

How many times have we heard it said, "We are our own worst enemies?"

There is some element of truth in all of these things regarding us as a whole. However, other professionals suffer from negative perceptions also.

Doctors get sued more often than we do. Lawyers are reviled constantly. Engineers are sometimes considered by some to be Nerdy. Some consider architects to be aloof and illogical.

Contractors are sometimes put into the category with those who are considered unscrupulous.

The list goes on and on!

So why are all of them more well-known, and in spite of the criticisms, much more prominent (and yes, respected) in the minds of the public, and young people who are planning for their futures?

What do they have that we don't have? What do they do that we don't do?

How many times have we heard the radio commercials extolling the virtues of the architect? How much press is there for EWEEK and MATHCOUNTS?

While personal, local and state efforts are critical for presenting ourselves as professionals, and our profession as a viable career option, without a national effort similar to those of doctors, lawyers, architects, engineers, and even contractors, our chances of gaining the recognition and respect due to us remain seriously hampered.

Why are organizations such as the AIA (doctors), ABA (lawyers), AIA (architects), NSPE and ASCE (engineers), AGC (contractors), and even MAPPS (professional photogrammetric surveyors) more effective than are our national organizations (ACSM and NSPS) in their efforts to influence legislation and policy, present the professions they represent as viable career options, and be well recognized by the general public.

I think a very important reason is because the practitioners they represent recognize that, while the registration laws governing their practice are state laws, and unity of effort at the state level is critically important, they will only have an impact on a national scale by acting collectively.

The reason that these other organizations are so effective isn't because they care more, or that they have more talented and persistent flag bearers than we do.

It is because their constituents support their national efforts to a higher degree. A higher percentage of potential members support all of these organizations than do those of our national organization.

I don't want this to come across as a sermon chastising those who are not members of ACSM/NSPS. While that would be a wonderful thing, in my opinion, the message here is that we must find a way to act together, not against each other.

It is a proven fact that what we seek will not just come our way. We have to work for it.

We must temper our desire to think of ourselves as rugged individuals with the reality that only by banding together will we be able to make a difference in our quest for more prominence and respect as a profession.

As we gather here tonight, Department of Labor Auditors in Maine are refusing to recognize surveyors (licensed or not) as professionals.

FEMA has decided to allow practitioners in Flood Determination companies to file Letters of Map Amendment using the online eLOMA option.

Surveyors are being cast by some as being irrelevant due to new technologies that allow almost anyone to gather geospatial data and integrate it into documents that appear to the public to have the same (if not higher) reliability than those prepared by surveyors.

Surveyors are being asked to bid their services to other professionals, although those professionals were selected using Qualifications Based Selection (QBS) criteria, commonly known as the Brooks Act.

What do they have that we don't have? What do they do that we don't do?

There is concern that our profession is dying because we cannot attract enough young people to sustain it.

These are but a few of the challenges that we face.

What form the collective effort will take to accomplish our goals is less important that the fact that it must occur.

So, are we unsung heroes, or are we out of touch with the realities that surround us?

I suppose it is a little bit of both.

Our contributions to the well-being of our fellow citizens are clearly under-recognized, if not unappreciated.

On the other hand, we must understand that only through substantial effort on our part will that recognition come.

These are tough economic times, and it is natural for us to look inward toward the sustainability of our respective businesses. I wish that I had a simple solution that would

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Surveyors: Unsung Heroes, or Out of Touch (continued)

restore the confidence necessary to overcome the situation.

Unfortunately, it appears that finding that solution will be difficult. All of the tenets on which I have always depended for a successful surveying business are still valid, but without consumer confidence, obtaining work will still be difficult.

Still, I am confident that you share my concern for the present, and future, well-being of our profession.

Now, at the beginning of my 11th year as the Executive Director of ACSM/NSPS, my resolve to address the challenges we face remains undeterred.

I trust that you will, if not immediately, then as times get better, join me in banding together through a stronger and more sustainable national presence that is not only desirable, but essential.

Some of you have heard me speak before, and therefore, you know that I often end presentations using advice from my Mom years ago when I asked her what I could say to a large audience that would leave the most positive impression.

She said, "Tell them you're done, they'll really like that. So, I'm done.

Reprinted from *George Land Surveyor*, Vol. 47, No. 6, May/June 2009

Questions That Haunt Me!

Can you cry under water?

How important does a person have to be before they are considered assassinated instead of just murdered?

Why do you have to "put your two cents in"... But it's only a "penny for your thoughts"? Where's that extra penny going to?

Once you're in heaven, do you get stuck wearing the clothes you were buried in for eternity?

Why does a round pizza come in a square box?

What disease did cured ham actually have?

How is it that we put man on the moon before we figured out it would be a good idea to put wheels on luggage?

Why is it that people say they "slept like a baby" when babies wake up like every two hours?

If a deaf person has to go to court, is it still called a hearing?

Why are you IN a movie, but you're ON TV?

Why do people pay to go up tall buildings and then put money in binoculars to look at things on the ground?

Why do doctors leave the room while you change? They're going to see you naked anyway.

Why is "bra" singular and "panties" plural?

Why do toasters always have a setting that burns the toast to a horrible crisp, which no decent human being would eat?

If Jimmy cracks corn and no one cares, why is there a stupid song about him?

Can a hearse carrying a corpse drive in the carpool lane?

If the professor on Gilligan's Island can make a radio out of a coconut, why can't he fix a hole in a boat?

Why does Goofy stand erect while Pluto remains on all fours? They're both dogs!

If Wile E. Coyote had enough money to buy all that ACME crap, why didn't he just buy dinner?

If corn oil is made from corn, and vegetable oil is made from vegetables, what is baby oil made from?

If electricity comes from electrons, does morality come from morons?

Do the Alphabet song and Twinkle, Twinkle Little Star have the same tune?

Why did you just try singing the two songs above?

Why do they call it an asteroid when it's outside the hemisphere, but call it a hemorrhoid when it's in your butt?

Did you ever notice that when you blow in a dog's face, he gets mad at you, but when you take him for a car ride, he sticks his head out the window?

Written Footsteps

by Andrew C. Kellie, Department of Industrial & Engineering Technology, Murray State University
Murray, KY 42071 andy.kellie@murraystate.edu

I was looking over some deeds the other day puzzling on how shabbily land has been treated by people who subsequently live their lives on it or make their living from it. Indeed, it's easy to see why Hallmark prints greeting cards instead of being in the surveying business. When it comes to describing land in such manner as to convey the same in a deed, there sometimes seems to be little concern about caring "enough to send the very best". However, my puzzlement did lead to some things that seem worth considering.

It all began a few months ago when a client stopped by with a deed for land acquired just a few years ago. Now, it is well accepted that the function of a boundary retracement is to "follow the footsteps of the original surveyor." Where the surveyor stepped is to be drawn from the writings that describe the property involved, and in this case the deed involved had been drawn in the late 1980's. The neatly printed legal form, the formal type font, and the signatures and seals all combined to give the deed an "official" appearance. The description set out the courses and distances on the lines and the monumentation at the corners in a typical, approved metes-and-bounds, manner. This was encouraging. It appeared that the retracement would involve carefully described land based on a recent, carefully drawn deed.

The description was lengthy, and I had to read it several times in order to visualize the boundaries and to form a mental picture of the tract being described. The first reading disclosed that there was a ridge involved. The second reading resolved the confused bearings and distances into separate series of bearings and distances describing the east, north, west, and south lines of the land. By the third reading I was becoming familiar with the corner monuments (generally trees) and I had identified the names of the adjoiners.

The bearings were described to the nearest degree (North 49 degrees East, for example). The distances were stated to the nearest pole (17 poles, for example), and the species of each tree called as a corner was stated (white oak or poplar, for example). This seemed to suggest that the description might have been prepared from a field survey. This was encouraging. It implied that if I were to have to "follow the footsteps of the original surveyor" there might be footsteps to follow.

Despite the recent date of the deed, the bearing and distances given seemed to suggest that the description of the land was of somewhat earlier date. Bearings to the nearest degree implied the use of a magnetic compass, and distances to the nearest pole suggested work done early in the last century — or earlier. This was discouraging. Even if the description had been crafted in the early 1900's, it implied that in the roughly three generations that had elapsed since that time, no one had felt the land valuable enough to survey. But... maybe some of those trees called as corners were still there.

That thought raised another question. It was apparent that at least some of the numerous corners called for in the description were trees of species often described by foresters as valuable hardwoods. Local knowledge of the area, however, suggested that the land definitely was not the place for squirrel hunting. I put two and two together — no squirrels, no nuts, no trees old enough to grow nuts.

That knowledge, in turn, raised the specter of (gasp!) logging. Logging potentially would affect the recovery of those corners described as being a "white oak" or a "red gum". This was discouraging. It implied that some of the corners marking the land to be surveyed might have been converted to furniture. The footsteps of the original surveyor might even now be gracing living rooms throughout America. But...maybe the loggers left the poplars.

Reflecting still further, I couldn't help noticing a statement at the end of the deed that excepted from the conveyance mineral rights previously conveyed to a certain coal company. The exception raised the specter of (gasp!) surface mining. This was discouraging. It implied that if I were to have to "follow the footsteps of the original surveyor" there might not be footsteps to follow after all. I gave up on the poplars. But...maybe the miners left the ridge.

To visualize the land described, a deed plot seemed to be in order. This disclosed a massive misclosure. Having had experience on numerous occasions in tracking down the location of mistakes in field work done by tired or distracted field crews, I couldn't help noticing that the closing line was almost exactly parallel to one of the calls of the locus. A field mistake often can be found in the measurement of the distance of a line parallel to the closing line. I was encouraged. If there was a simple mathematical mistake in the deed, I might be able to find it.

Reflecting further, however, I recalled that I wasn't checking my own field crew who might have had a single mistake in measurement. If there was a mistake in measurement (and that's a bit IF) it would have been made a long time ago. The misclosure might not have been the result of a single mistake; mistakes might have been made on two lines, or there might be an omitted line, or an extra line might have been included in the description. This was discouraging. It was clear that the next footsteps by this surveyor needed to be in the direction of the county courthouse.

Work at the courthouse showed that a previous deed to the locus, drawn in 1903, appeared to be the source of the description used in subsequent conveyances. The 1903 description, however, included some additional calls that were somehow omitted from the later deed. It also appeared that the distance in another call had been transposed. Additional

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Written Footsteps (continued)

trees (yes, valuable hardwoods) were identified at some of the corners. Even more important, however, was that the calls for the part of the south line described that line as "running along the slough." I was encouraged. There was another monument with which to work.

As I noted at the beginning of this article, some of the calls in the deed were for adjoiners. Such calls may simply describe the name of the neighbor next door, or they may imply the existence of a senior right. A call for an adjoiner may even constitute a call for a survey – as in a survey-for-a-patent. Investigating the senior rights involved means more work at the courthouse. But there is little alternative; a grantor can't sell to another land already conveyed, and obviously the junior grantee can only purchase whatever land is left to the grantor after earlier conveyances. So, if the adjoiner and the client are from a common grantor, who bought first (actually, who made it to the courthouse first!) must be determined. I was encouraged. I have always respected the manner in which an attorney makes precise use of English, and the term remainderman is particularly evocative.

Finally, it seemed appropriate to investigate the question of a patent. To determine the original patentee always seems to put one in touch with history. Also, you get to work with the state land office. That feels very official and important. I was encouraged. It was finally getting to the point where it would be possible to make footsteps to the field to "follow the footsteps of the original surveyor" — to the extent that such was possible, anyhow.

So, after all of this, just where are we, and what are the things worth considering that were mentioned at the beginning of this article? Very simply put, if a surveyor is to "follow the footsteps of the original surveyor" it is necessary to know where the first surveyor measured. Is the deed description on which the client relies correct, or has the description been passed down over the generations with gratuitous mistakes, transpositions, and omissions? Do previous deeds in the chain of ownership to the property describe the locus differently? Are there outsales from the locus not shown (oops!) in the client's deed? Is the adjoiner called for in the description senior or junior to the client, and which is the infamous remainderman? If lines were run with a magnetic compass, when was the work done? If a patent or patents are involved, how did those writings describe the line(s)? Field measurements are fascinating, and data collectors can record hundreds (nay, thousands!) of measurements in a day. Computers can process our data and yield a map. And all of our measurements are meaningless unless made where the first surveyor made his — as described in the writings.

Reprinted from *Kentucky Association of Professional Surveyors, The Interior Angle*

Nominations for 2009 Officers

President
Ralph Riggs, PLS

Ralph Riggs is a professional land surveyor licensed in Missouri, Arkansas and Kansas. He is president of Riggs & Associates, Inc. and has been a licensed surveyor since 1985. He is serving in his sixth term as the Howell County Surveyor, is a past president of the Missouri Association of County Surveyors and a past chairman of the Land Survey Advisory Committee.

President-Elect
Mark Nolte

Mark Nolte is the owner of Nolte Land Surveying in Higginsville, Missouri. He graduated from the University of Missouri in 1981 and received his registration in 1992. He has been the County Surveyor of Lafayette County since 1992 as well. The majority of the work he performs is Sectional work in the rural areas of Lafayette and Saline Counties. Mark is married to Carol. They have a 15-year-old daughter, Lily.

Vice President
Joe Carrow

Mr. Carrow is a Professional Surveyor at Zahner & Associates, Inc., in Perryville, Missouri. He became licensed in 1998 and has been an employee for many years. From 1994 to 1996 he worked for the Bureau of Land Management on projects in Missouri, Illinois, Minnesota and Texas. He has a Bachelor of Science in Industrial Management and a Bachelor of Science in Cartography/Surveying from Southwest Missouri State University. Joe resides in Fredericktown, Missouri with wife Kelly, and sons Jacob and Noah, where they raise cattle and Quarter horses.

Secretary-Treasurer
Sharon C. Herman

Sharon is the Office Manager at Govero Land Services, Inc. She has worked in the surveying profession for 15 years and obtained her Professional Land Surveyors License in 2004. Sharon graduated Magna Cum Laude from Jefferson College, with an Associate of Applied Science Degree in Architectural Drafting and Construction Technology.

She has been a member of MSPS for several years and is currently the Co-Chair of the Public Relations / Sales Committee. In the past Sharon has served as a mentor at the local community college for students pursuing a career in the surveying / engineering fields.

Secretary-Treasurer
Gary Bockman

Mr. Bockman is the chief engineer and chief land surveyor for Bockman Engineering Services, LLC in Springfield.

After obtaining a degree in Civil Engineering from UMR in 1970, he spent a short time with the United States Army and in the oil fields in the Gulf of Mexico before returning to Missouri. Once back in Missouri he worked for the Public Service Commission, during which time he became registered as a Professional Engineer, then entered the consulting engineering field as an employee of a Springfield firm where he was first assigned to subdivision design projects. After starting Bockman Engineering Services, he became registered as a Professional Land Surveyor.

In addition to serving as the chief land surveyor for Bockman Engineering Services, he has taught land surveying classes at Missouri State University for over 5 years, and is a member of the committee to review Missouri specific portions of the examination for Professional Land Surveyors. He has recently worked with fellow land surveyors in Springfield to conduct a surveying merit badge program for Boy Scout Troop 1 in Springfield.

As a break from business he volunteers as a referee for Missouri Valley Swimming committee of USA Swimming to judge swimming contests for youth from 4 to 18 years of age, and has helped judge the Missouri State Games swimming events for persons up to 81 years of age.

Nominations for 2008 Board of Directors

Gerald Bader

Gerald started in the surveying and mapping field in March of 1981. He was the supervisor in charge of the statewide tax reassessment maps for several counties within the state of Missouri, and two counties in Kansas. In 1986, Gerald started full time in the field as a survey technician, working up to instrument person and then to survey supervisor. In the fall of 1991, he continued his education by attending classes at St. Louis Community College-Florissant Valley and through the University of Missouri-Rolla. He received his license from the State of Missouri in January of 1996.

Bader Land Surveying, Inc. began operations in April of 1996. In the fall of 1996, Gerald was elected as Ste. Genevieve County Surveyor and is presently serving his 4th term. In addition, Gerald is active in several local civic organizations. His membership and leadership positions in professional organizations include: Missouri Society of Professional Surveyors, previously serving on the County Surveyors and Trig Star committee; Missouri Association of County Surveyors, serving as President from 2004-2005; and presently serving as President-Elect. Gerald coordinated MACS re-monumentation of the Tri-State corner in 2004 and the PK Robbins Memorial Bench in 2006. Gerald is the President of the St. Agnes Athletic Assoc. and coaches basketball for the school. He also coaches a traveling baseball team.

Gerald and his wife, Denise have two children, Brett; age 13 and Alina; age 6. They live in Ste. Genevieve. He appreciates the nomination and looks forward to serving MSPS and the surveying society.

Jerrod Hogan

Jerrod Hogan started his surveying career in Indianapolis where he worked as an instrument operator, CD technician and Crew Chief. He moved his family to Joplin in the summer of 2000. Jerrod finished his Missouri required coursework at Missouri State University in Springfield. He obtained his Missouri license in 2004 and is also licensed in Kansas, Arkansas and Oklahoma. He is a Vice President and Project Surveyor at Anderson Engineering and manages the survey department for Anderson's Joplin Office. Jerrod has been a member of MSPS since 2002. He was a charter member and founding president of the Southwest Chapter. Jerrod also served as Handbook Committee Chair for MSPS in 2008. Jerrod is active in his local Chamber, local politics, community and local chapter of MSPS. He resides in Joplin with his wife Melissa and three children, Shae (10), Miles (3) and Ava (1). Jerrod appreciates the nomination for director of MSPS and is excited at the opportunity to serve the Society.

Paul G. Dopuch

Paul G. Dopuch has 39 years experience in surveying and has been a Licensed Professional Surveyor since 1982. He owns Gasconade County Land Surveying and is the Gasconade County Surveyor. He has previously assisted neighboring County Commissions and has extensive experience in expert witness testimony.

Paul is a member of the Missouri Society of Professional Surveyors and serves on the Geographic Information Systems (GIS) Committee.

Paul is the Chairman of the Land Survey Advisory Committee to the Land Survey Program of the Department of Natural Resources, and is serving his third term on that committee. He was initially named to that Committee by Director Mahfood and subsequently by DNR Director Childers.

He is currently the president of the Missouri Association of County Surveyors.

Paul and his wife Linda reside on their farm in rural Gasconade County.

Bryan Ferguson

Bryan is the owner of Ferguson Land Surveying located in Greenville, Missouri.

Bryan first worked in land surveying in 1993 as summer help for an engineering and surveying firm, He made surveying a career in 1998, completing his professional education through the University of Wyoming and earning his license as a Missouri Professional Land Surveyor in 2004. He is the Wayne County Surveyor and is currently serving as Secretary of the Missouri Association of County Surveyors as well as President of the Southeast Missouri Chapter of the Missouri Society of Professional Surveyors. His MSPS duties include membership on the MoDOT Liaison Committee and the Legislative Committee. Bryan and his wife Joy live with their two sons, Owen and Evan, on a small farm near Patterson, Missouri.

Surveying in Downtown Milwaukee: Unique Procedures and Landmark Court Decisions

by Harold S. Charlier, **Reprinted from June 2009** ***Wisconson Professional Surveyor***

Surveyors are aware (at least ought to be aware) that experience and a familiarity with a particular neighborhood or a commercial area within a larger city are critical to performing a correct and accurate survey. By blindly and indiscriminately taking an order for a survey in an unfamiliar area, including offering a price quote and a time schedule, can lead to some serious problems, both for the surveyor and the surveyor's client. Such is the situation for anyone so bold and daring as to taking on a survey in downtown Milwaukee without having the experience and knowledge of its unique characteristics. These oddities may have contributed to Milwaukee having more than its share of boundary disputes going all the way to the Wisconsin Supreme Court.

First, let's take a look at where Milwaukee is situated. It's on the western shore of Lake Michigan, less than 40 miles north of the southern state line, and about 90 miles north of downtown Chicago. The Milwaukee River splits the downtown area as it winds its way from the north, intersecting the Menomonee River coming from the west and the Kinnickinnic River from the south, and there flowing into Lake Michigan. The Menomonee River is roughly the dividing line between the north and south sides, with downtown Milwaukee being a north side community.

> ***. . . blindly & indiscriminately taking an order for a survey in an unfamiliar area . . . can lead to some serious problems . . .***

The original government survey in the Milwaukee area took place in early 1835, at a time when settlers had already occupied portions of the public lands. A fur trader by the name of Solomon Juneau had already made claims to a large part of the downtown area and had built one of his trading posts on what is now the corner of East Wisconsin Avenue and North Water Street. The original government map of the township survey depicts various Indian trails paralleling the rivers, and even shows the location of Juneau's house, but the deputy surveyor (Wm. Austin Burt) spells the name as "Jenneux." By 1837 Juneau had platted what was later referred to as the Town of Milwaukee on the East Side of the River. There was nothing on the plat to indicate that monuments were set. It probably didn't matter, since the records show that grading of the streets required extensive filling in some areas and cutting down steep ridges in other areas.

Mr. Juneau encountered some competition for selling his lots when Byron Kilbourn came along to acquire and develop the land on the west side of the river. Interestingly, particularly for surveyors, Mr. Kilbourn was himself a deputy government surveyor. He had been sent north to work on the original survey of townships, but he was more interested in acquiring the land and developing it, than he was in measuring it. He too laid out lots, and had similar problems filling them in since a good portion of the land was swampy. No surprise that many of the large buildings today in downtown Milwaukee rest on wood pilings. And as long as the pilings remain wet, they will do the job – when the water table goes down, the piles are susceptible to drying out and rotting. Mr. Kilbourn managed to add a little spice to his competition with Juneau. Just to show his independence, and to preserve his boating and shuttle service, he deliberately platted his streets to not align with Juneau's on the east side of the river. That's why still today there are kinks in the streets and bridges crossing the river.

As to the direct relationship between the layout of the blocks and lots in downtown Milwaukee with the corners and lines of the government survey, there is none! The blocks, and sometimes combinations of two or three blocks may be locked together, but they are not tied in, nor can they be reconstructed by measuring from a section or quarter corner. However, they can be tied back into the government corners for the sake of locking into the city's GIS mapping system.

One of the very earliest ideas to promote trade and industry for the new city was to construct a canal that would run from the Milwaukee River some forty miles west to connect with the Rock River. The project extended but a mile or two before running out of cash and interest. Furthermore, railroads were coming onto the scene, making canals obsolete.

Milwaukee was fortunate to have an engineering department with enough foresight in the 1930s to conduct a complete resurvey of the downtown area. They spent several years measuring up and down every street and block, reconstructing the street lines as laid out and perpetuated as evidenced by the building locations and street improvements. That is, they made determinations as to where the angle points were in the streets, some being only one block long, while other street lines remained straight for several blocks. No attempts were made to "straighten out" the streets and creating chaos with building encroachments and street improvements. Established block corners were preserved by cutting vertical notches in brick buildings, sometimes on one or up to ten-foot offsets to the block corner. Crosses were chiseled into the walks where practicable. Maps were prepared and made available upon request by surveyors, depicting all of their measurements and results of their work in great detail. Those maps are still relied on today by surveyors. Unfortunately, there are some who have attempted to perform surveys in the area without being aware of these valuable and necessary maps. Examples of these maps accompany this article.

The width of East State Street is a rather interesting story. It was originally platted as 80 ft. wide. However, in the late

Surveying in Downtown Milwaukee (continued)

1800s and early 1900s several estates occupying the blocks were surrounded by stone walls and wrought iron fences. They unfortunately encroached substantially into the right-of-way, but there was a way to handle the problem. It's reasonable to believe that anyone having a property significant enough to merit a stone wall perimeter and a wrought iron fence atop, would be someone with a certain amount of clout with the city fathers. Problem solved: the city reduced the width of the street to make it as wide as necessary to remove the wall and fence encroachments, in most cases making the face of the walls as the new street line. Take note on the accompanying map the varying widths of East State Street.

There are two boundary/survey disputes in the downtown area that had to be decided by the Wisconsin Supreme Court. They were important and significant enough to merit the attention and recognition as landmark cases by two of the most prominent publications on surveying and property line disputes: Boundaries and Adjacent Properties by Ray Hamilton Skelton and Clark on Surveying and Boundaries. The first relates to PERELES v. GROSS, 126 Wis. 122, 105 N.W. 217, 110 Am. St. 901. Skelton describes it as follows:

> "While distances are held in low regard by the courts, they can not be ignored, and their significance be unheeded. Where a platter has definitely given a dimension to all the lots but one and has omitted that entirely or has qualified it as more or less, he has effectively expressed his intention to regard that as a

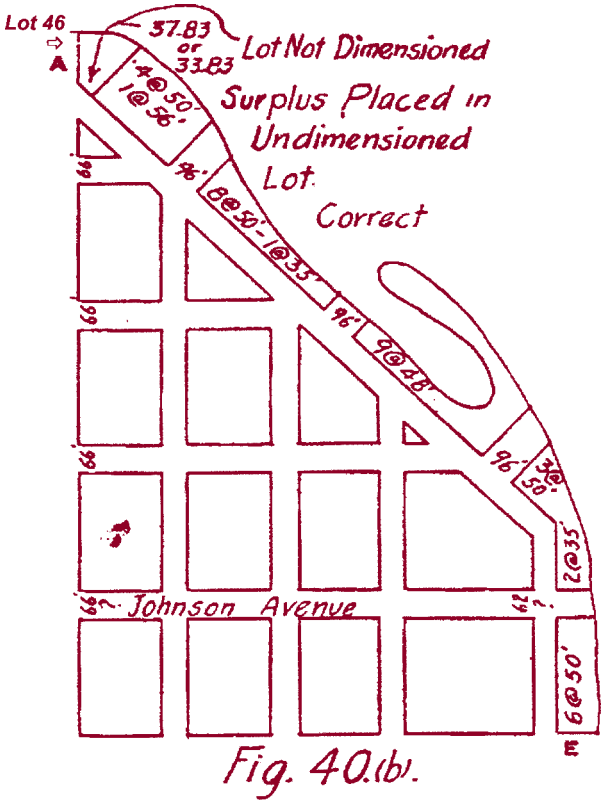


Fig. 40.(b).

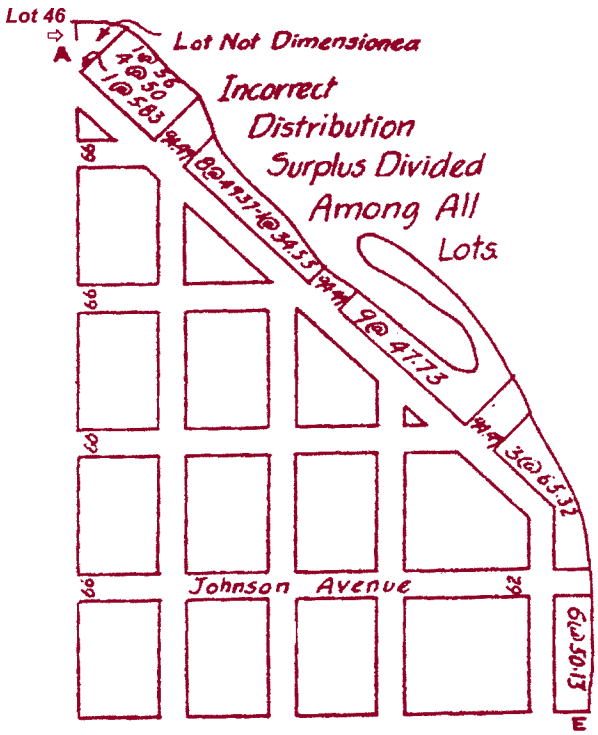


Fig. 40.(a).

remnant, and this overcomes the necessity of attempting an reapportionment.

There existed a surplus between points A and E of 33.83 or 37.83 feet depending upon whether Johnson Avenue was 62 ft. or 66 ft. wide. All lots but number 46 were fully dimensioned, and the proper procedure was to first determine the width of Johnson Avenue and then lay the plat off from E towards A placing the entire surplus in lot 46 as shown in Figure 40b. The city engineer, however, attempted to correct certain bad features of the street plan at the same time and arrived at the location shown in Figure 40a. To accomplish this end he changed the width of the streets so they were in line with the 66 ft. streets in back (sic) of the blocks involved. Skelton refers to the 'back' of the blocks involved, here noting that the subject blocks are along the Milwaukee River, and so refers to the river side of the blocks as their front. This created a deficiency in most blocks and in one case excess greater than the original surplus. These newly-established excesses and deficiencies he apportioned among the lots of the blocks according to their frontage, increasing the frontage of three 50 ft. lots 15.5 ft., approximately 30 percent, and decreasing the frontage of 22 lots by slight amounts.

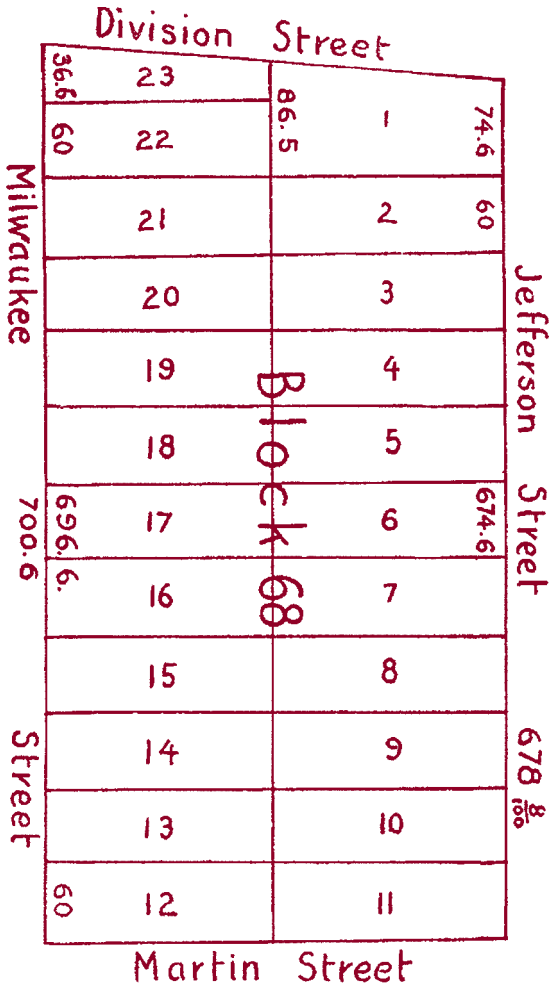
Establishing the street adjacent to the block with the undimensioned lot in line with the upland street, he left the dimensioned lots as they were and threw the balance, 5.83 ft., into the undimensioned lot. The court

(continued on page 24)

Surveying in Downtown Milwaukee (continued)

censured the engineer in regard to this dimension on the ground that it was determined by scaling a plat on a two hundred scale. If this was so, the court was right, for it would have involved making a measurement to 1/20,000 of an inch, but there is nothing in the record to clearly establish that this was not obtained in the field. It is true that the city engineer laid down a much superior street plan in apparent conformity with the attempted picture of the tract by means of a small plat, but such has little significance against stated angles, courses and distances which the original surveyor declared to have controlled his survey, and as the object of all surveying is to locate lines in their original positions, the presence of a discrepancy affords no authority for improving the plan."

This second downtown Milwaukee case is a classic example of when and why the shortage or surplus in a platted subdivision block should be distributed among the lots in proportion to their respective frontages. It dates back to November, 1890, PERELES ET AL. v. MAGOON ET AL. 78Wis.27, 46 N.W. 1047, 23 Am. St. Rep.389. (Note that the plaintiff Pereles appears to be the same party as the plaintiff in the first case cited — his attorney must have been doing very well.)



This dispute has to do with a claim by the plaintiff that the defendant was occupying a one-foot wide strip of his (Pereles's) land. The situation was this: Pereles owned Lot 5 in Block 68 in Plat of the NW ¼ of the NW ¼ of section 28. Magoon, the defendant, owned the North 31.5 ft. of Lot 6. See the accompanying map of the block which shows the platted lot dimensions as well as the recent measurements. Note that the east side of the block along Jefferson Street is platted at 674.6 ft., but now measures 678.08 ft., a surplus of 3.48 ft.; the west side of the block along Milwaukee Street measures 700.6 ft. compared to its platted length of 696.6 ft., a surplus of 4.0 feet.

Pereles contended that since the most northerly lot in the block was an odd shape and unlike the evenly dimensioned remaining lots, that all the surplus should be placed in that end lot. Magoon contended that the surplus should be distributed over all lots in the block in proportion to their respective frontages. By so doing Magoon's building on Lot 5 no longer encroached onto Lot 6 as Pereles argued. By distributing the surplus land, the lot line between Lots 5 and 6 was moved 1.86 ft. north.

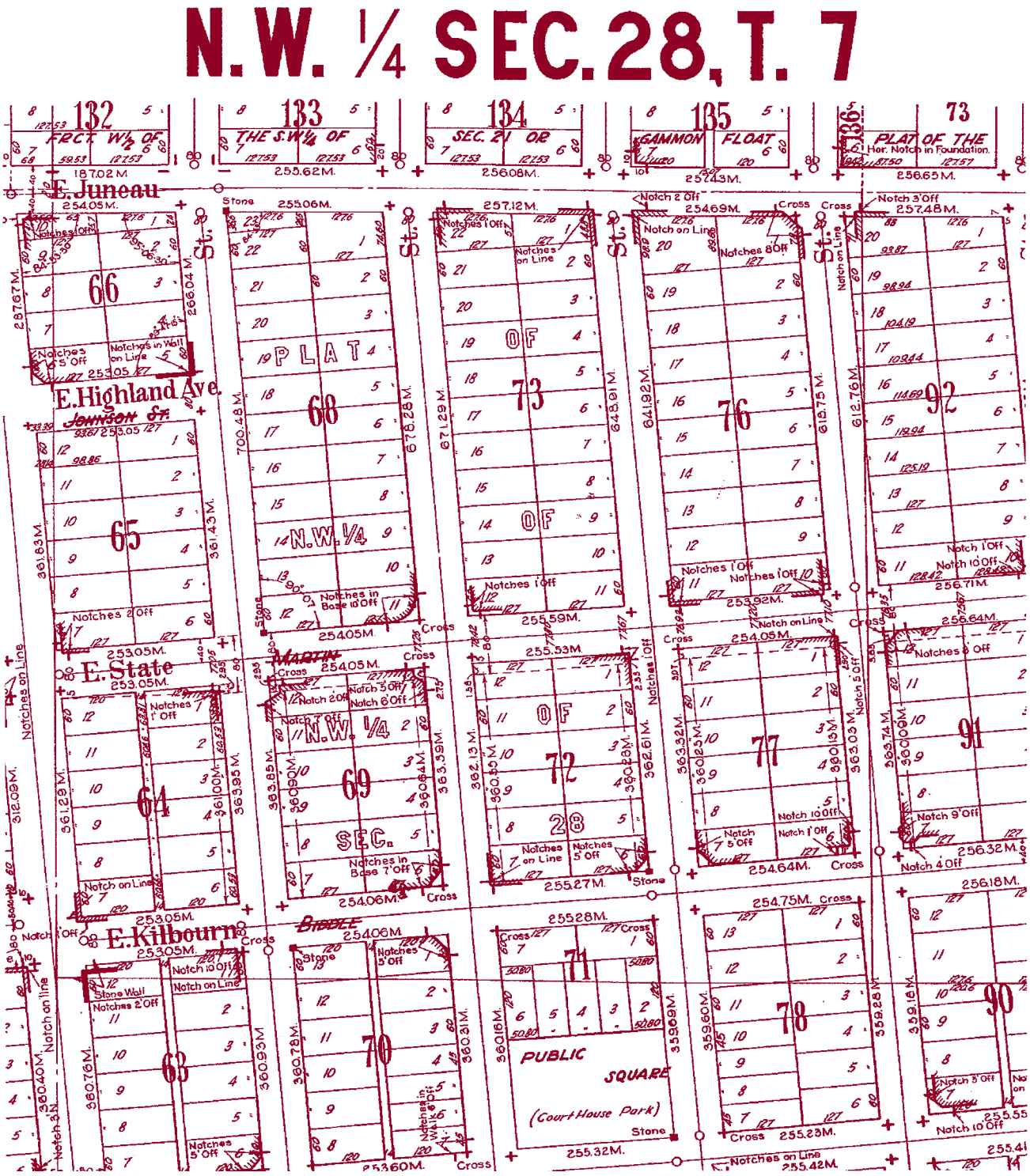
The court agreed with the circuit court, and cited several prior cases to support its findings. Among its references was the following from Miller v Topeka Land Co., 44 Kan 354, 24 P 420:

On a line of the same survey, and between remote corners, the whole length of which is found to be variant from the length called for, it is not to be presumed that the variance was caused from a defective survey in any part, but it must be presumed, in the absence of circumstances showing the contrary, that it arose from imperfect measurements of the whole line; and such variance must be distributed between the several subdivisions of the line, in proportion to their respective length.

Despite what courts have ruled, there remain situations existing today that defy the courts and standard surveying practices and procedures, but sometimes "straightening out" the problem would create far more mischief (the word used by Justice Thomas M. Cooley in his famous article on The Judicial Functions of Surveyors) and chaos than it would solve. Take Block 21 in The Plat of the Town of Milwaukee on the East Side of the River, located between East Wells Street on the north, East Mason Street on the south, North Jackson Street on the east and North Jefferson Street on the West. We just cited a case that had to go all the way to the Wisconsin Supreme Court to get settled, but here we have a platted city block, just three blocks away from the disputed case that went to the Supreme Court, ending up totally contrary to the court's findings.

The original plat indicated a block width of 254 ft. from Jefferson to Jackson Streets and 360 ft. from Wells to Mason. However the block along Jackson Street measures 366.91 ft, and long Jefferson Street, 364.90 ft. So how was the surplus pro-rated? It wasn't. The lots coming north from Mason Street were laid out at their exact platted widths of 60 ft. and the entire surplus given to the lots fronting on Wells Street. Any tampering with this layout at a later date would disrupt an entire city block of expensive office buildings. So

Surveying in Downtown Milwaukee (continued)



Note that Juneau platted the north-south streets at an angle of 5 to 6 degrees westerly of north. It might have been his attempt to have the streets parallel the Milwaukee River. This map is one of those prepared by the Milwaukee engineering department in the 1930s. Note the circles at various points along the street center lines, each indicating an angle point in the street. Note also the revised dimensioning of the width of East State Street to accommodate the once-encroaching wall and fences on abutting properties.

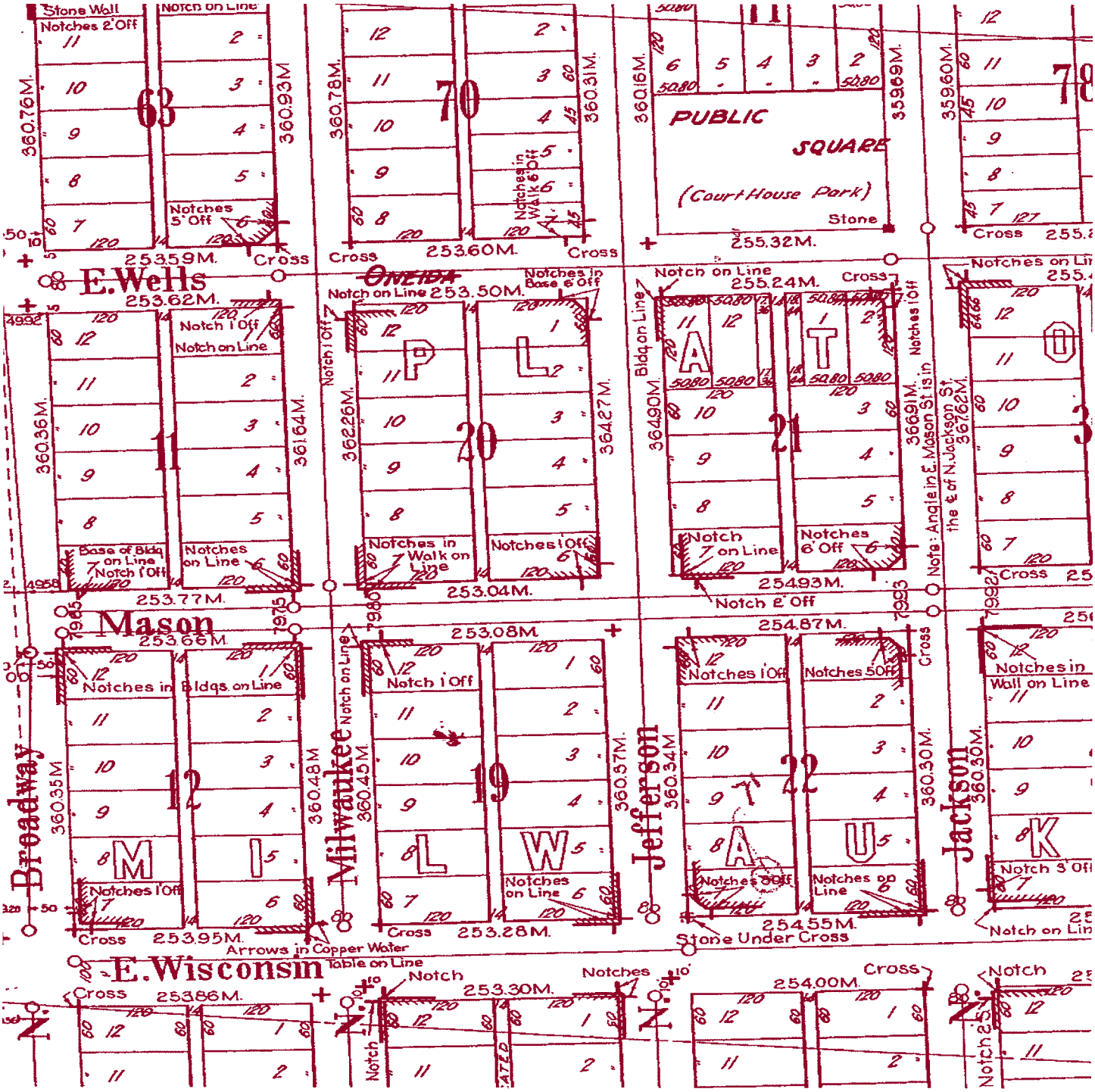
(continued on page 26)

Surveying in Downtown Milwaukee (continued)

here we have an existing situation that defies the judgments cited in the above cases. Perhaps the “damage” (buildings already up) in this block had been done prior to the cited cases, and any “corrections” thereafter would have caused more harm than good.

So there’s something to be said for surveyors venturing into unfamiliar territory. It behooves them to first make sure they become familiar with all available background information and be skeptical of any conclusions that would disrupt an entire neighborhood.

Reprinted from *Wisconsin Professional Surveyor,* June 2009



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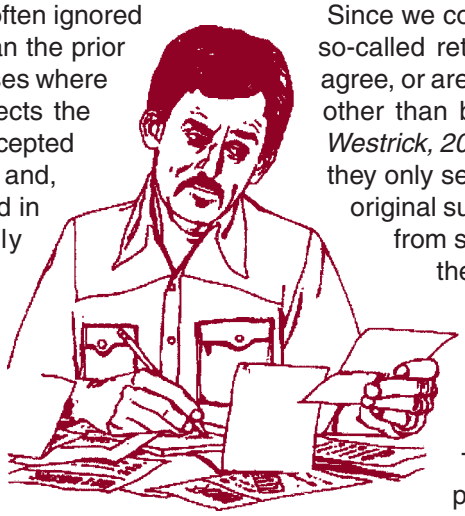
Someone Else's Survey: Can You Trust It?

by Donald A. Wilson, LLS, PLS, RPF

There is no rule that states one must honor someone else's survey, other than the original survey, but previous surveys are accepted by other surveyors and others (mostly the unaware) on a regular basis for a variety of uses. Some owners have a perimeter survey by one surveyor, and then ask a second surveyor to subdivide the property based on the previous perimeter survey. Naturally, the client does not wish to pay again for work on the perimeter, but how can the second surveyor know if the previous survey is correct without considerable checking? In fact, that just might be why the landowner sought the second opinion as well as other possible very worrisome reasons.

Often surveys are encountered for abutting tracts, and differences, whether gross or minor, are often ignored or merely accepted on no other basis than the prior surveyor was there first. Particularly in cases where the second surveyor knows and/or respects the previous surveyor, the first work is often accepted at face value. This practice is risky at best, and, based on what various courts have stated in the following cases, is probably unprofessional, perhaps even unlawful.



The case of *Ivalis v. Harding, 496 N.W.2d 690, 173 Wis.2d 751 (1993),* had to do with a section line incorrectly located by a country surveyor. The line was originally surveyed and marked (established) between 1859 and 1863 and was erroneously located in 1915. The title documents for both parties to this action were drawn based on the 1915 survey, which parties believed to be the dividing line between government lots 8 and 9. The error was perpetuated by a surveyor in 1971. This surveyor was later found negligent for erroneously locating the correct line, despite the fact that he pointed out that other surveyors commonly relied upon the monuments set in the 1915 survey, including the opposing surveyor in this case on other occasions. The court suggested that those surveyors may also be negligent in their activities but such was irrelevant in this case.

Revisiting *Rivers v. Lozeau, Fla. App. 5 Dist., 539 So.2d 1147 (1989),* the court stated, "The sole duty, function and power of the retracement surveyor is to locate on the ground the boundaries, corners and boundary lines established by the original survey. The following surveyor, rather than being the creator of the boundary line, is only its discoverer and is only that when he/she correctly locates it."

Also revisiting *Racine v. Emerson, 85 Wis. 80, 55 N.W. 177 (1893)*, the highway case discussed in an earlier article, the court stated that, "the east line of the street was where the original surveyor placed it, not where it should be according to resurveys or subsequent surveys." The court made the following statement: "The fact, generally known and quite apparent in the records of courts, is that two consecutive surveys by different surveyors seldom, if ever, agree; and the greater number of surveys, the greater number of differences and disagreements will occur." (Quoting *Erickson v. Turnquist, 77 N.W.2d 740 Minn.*) When two surveys disagree, the correct one cannot be determined by still another survey. It follows that resurveys are of very little use in such a case, except to confuse it." The bottom line, according to Racine, is that "great care must be used in reference to resurveys since surveys made by different surveyors seldom wholly agree."

Since we commonly encounter these "resurveys" and so-called retracement surveys with which we do not agree, or are in reality incorrect, of what effect are they, other than being, as the court stated in *Johnson v. Westrick, 200 Wis. 405 (1930)*, "worse than useless for they only serve to confuse unless they agree with the original survey"? Previous articles and quotes taken from several of the leading cases have hinted at their lack of effect.

One case in point is *Hagerman v. Thompson, 235 R2d 750 (Wyo., 1951)*, wherein three plats were presented to the court, each purporting to depict the same mineral survey, with no two in agreement. The court stated in this case that "the purpose of a resurvey is to ascertain lines of the original survey and original boundaries and monuments as established and laid out by survey under which parties take title to land, and they cannot be bound by a resurvey not based on survey as originally made and monuments erected."

In this case the three surveys were presented to the court, which, after evaluation, said, "The three surveys in question here were resurveys, binding on no one, unless one of these perchance should ultimately in a proper proceeding be found to be correct. Which one of these resurveys is correct is a question of fact." Another important decision is that of *Williams v. Barnett, 287 R2d 789 (Cal. App. 1955).* This was a situation where two parties agreed on a common boundary, which a surveyor later found in disagreement with the true line. While the parties argued that the true line was unknown to them, the court unsympathetically stated that the true line could be found by retaining a surveyor; therefore it was now unknown since the means to locate it were within reach. The court further stated that "resurveys in no way affect titles taken under a prior survey."

(continued on page 30)

Someone Else's Survey: Can You Trust It? (continued)

Both this case and the earlier case of *Myrick v. Peet, 180 R574 (Mont. 1919)* stated that titles in reliance of erroneous surveys are void. "In the absence of a real dispute, an agreement purporting to establish the boundary between the lands of adjacent proprietors, at a line known by both to be incorrect, and the result of which if it be given effect must be to transfer to the one lands which both know do not belong to him, is without consideration and within the statute of frauds, and consequently void."

Furthermore, in Williams, the court stated that since the agreement was contrary to the Statute of Frauds, it was inappropriate and therefore unenforceable. It is treated both in law and in equity as a mistake, and neither party is stopped from claiming to the true line. The boundary is considered definite and certain when by survey it can be made certain from the deed.

One of the most important decisions on the subject is *US v. Doyle, 468 F.2d 633 (1973)*. In this case, the court recited three familiar principles: The original survey as it was actually run on the ground controls; it does not matter that the boundary was incorrect as originally established; and a precisely accurate resurvey cannot defeat ownership rights flowing from original grant and boundaries originally marked off. The court concluded with "the generally accepted rule is that a subsequent resurvey is evidence, although not conclusive evidence, of the location of the original line."

Since the sanctity of titles is of utmost importance to the court systems, surveys that interfere with them do nothing except confuse or cause disruption to peaceful enjoyment. The Montana Court stated in the previously cited case of Myrick v. Peet that most boundary disagreements are attributable to poor descriptions and faulty surveys:

"That the subject of disputed boundaries has been a fruitful source of litigation since property rights were first recognized finds proof in the prodigious mass of literature to be found in the books upon the subject. The difficulty is not to find authority, but to select cases which best express the rule to be applied to the facts in issue. Innumerable cases involving boundary lines can be traced to loose description, faulty surveys, and excessive areas created in marking off governmental subdivisions — the bane of all tribunals called upon to reconcile discrepancies in the surveys of the public lands."

One might argue that unless a surveyor's work properly locates the title, or the boundaries as originally established, it is not a survey, technically or legally. One might then think about the contractual relationship whereby the agreement is that a survey be performed, but in reality wasn't.

Caution should be exercised before accepting any kind of evidence, and Doyle has stated that a resurvey is evidence. Yet is only evidence, which can be erroneous and misleading or can be correct and supportive. The bottom line is that it is only someone else's opinion. Franklin Delano Roosevelt is quoted as stating, "There are as many opinions as there are experts." Bernard Baruch stated, "Every man has a right to his opinion, but no man has a right to be wrong in his facts."

Bad surveys do not destroy good titles since they apparently have no effect, "other than to confuse." As an attorney-friend once stated in a seminar, "when you discover a problem and ignore it, you become part of the problem." Apparently that is just what happened in the Ivalis case.

Don Wilson is president of Land & Boundary Consultants, Inc.; part owner of and the lead instructor in Surveyors Educational Seminars, a member of the Professional Surveyor! Red Vector Dream Team providing online courses for continuing education; and a regular instructor in the University of New Hampshire Continuing Education System for 25 years. He is also co-author of several well-known texts.

Reprinted from *Georgia Land Surveyor*, Vol. 48, No. 1, July/Aug. 2009

On Dangerous Surveying

The Union Pacific Railroad, 1865-1869

by Richard O. Spencer

"The country is one vast green ocean. The soil is very rich, and the mind falters in its attempt to estimate the future of such a valley, or its immense capacities. The grain fields of Europe are mere garden patches beside the green oceans which roll across the Great Plains."[1]

These were the comments of some of the travelers as they moved west across Nebraska in the year 1866. Traveling in a wagon enabled one to see the country down in the green. Other travelers were interested in traversing it as rapidly as possible on their way west. This was the time of the great expansion of railroads. The concept of a transcontinental railroad had been contentiously debated in the congress four years before. The bill, known as the Pacific Railroad Bill, was finally passed and signed by President Lincoln in 1862. The president was a strong advocate for a transcontinental railroad. The Civil War and his death delayed the beginning of the railroad's construction until 1865.

The building of the Union Pacific Railroad across Nebraska and beyond required men of great vision, leadership, organizational skills, ambition, and daring. In 1867, no project other than the Civil War had required these attributes in greater quantities. And it was the Civil War veterans that provided many of the leaders that possessed these skills and the thousands of laborers for that enterprise. The building of the railroad also required men with special skills such as engineers and surveyors. They were the ones that selected the route, out in front sometimes 200 miles ahead of the graders and track layers. The names of some of these adventurous and skilled professionals are a matter of history.

Arthur Ferguson was a surveyor whose name is found in nearly every detailed history of the building of the Union Pacific Railroad. Ferguson was a graduate of the University of Iowa where he had studied the law. Between 1865 and 1869, he worked spring, summer, fall, and on one occasion through the winter for the Union Pacific Railroad as a rodman and assistant engineer.[2] What sets him apart is that he kept a detailed journal of his activities and those of the survey party laying out track alignment and doing reconnaissance through much of Nebraska, Wyoming, and Utah. There were times and events that precluded his diary writing, but there is an exciting and rich description of activities and events as the "Road" progressed westward.

There are few surveying activities of the 21st century that require the daring and exposure to danger of those men working on that railroad construction. A great danger was the threat of attack by the "savages", usually the Sioux, Cheyenne or Arapaho. There was enormous resentment among the Indians toward the railroad construction because it was progressing through land that they perceived as theirs. Accidents sometimes caused serious injuries. And there were drownings. There was rarely anyone available that had more than the most rudimentary medical training. Crossing rivers was particularly dangerous during rainy periods and, when the survey crews left the plains to go on to more rugged terrain, there were more injuries caused by falls. Here is a sampling of entries from Ferguson's diary concerning these dangers:

"May 12, 1868. This has been a fearful day." (He had begun by running the line west of the North Platte River, but found that he had lost the tape line and started back over the river to search for it. Everyone piled into the wagon, but the driver didn't know the ford.) "The first thing we knew was that the water was floating in the wagon box, and our mules were out of their depth and being swiftly carried downstream by the terrific violence of the current." The wagon box capsized and all the men were floundering among the waves. Ferguson retained the leveling instrument in his hand, but he got tangled up in the wagon box, which was pressing him down. "Immediately I saw that it was for me a struggle for life or death and therefore dropped the instrument." Eventually he got out, but two of his companions were drowned. He said he would never forget "the look of awful terror and despair that had settled on their countenances."[3]

"June 2, 1867. This morning, shortly after sunrise the camp was aroused by the cry of 'Here they come boys' and then we saw the Indians charging down upon us from the northern bluffs. One of the engineers captured from the Indians a white woman's scalp, which was quite green having been killed but a few days.

(continued on page 34)

On Dangerous Surveying (continued)

The Indians threatened to put the railroad out of existence. What the construction crews had, the Indians wanted: livestock, rifles, ammunition, hats, jackets, food in cans. Much of it could be easily captured by a raiding party. Then there were scalps. Most of all there was the land, which the Indians regarded as theirs. One quick dash on the working gangs, one pile of rails or ties set over a completed track, could bring riches such as never before known on the Great Plains. There for the taking. The soldiers seldom if ever could detect, prevent, or defeat an Indian raiding party. On May 18, 1867, Ferguson saw an Indian war party sweep by as it "pulled up one mile of Railroad stakes in sight of the party."[5] The Indians cantered away without loss.

Percy Browne, another surveyor with a crew, was looking for the Continental Divide, west of Nebraska, but he found that he was in a great basin five hundred feet lower than the surrounding country. He and his party set off across it in search of water flowing west. The Sioux caught them. A long skirmish followed. Browne was hit by a ball in the abdomen. He staggered a few hundred feet before falling.

He begged his assistant to 'Shoot me first,' before riding off. But his men would not abandon him. They let the horses go, hoping the Sioux would follow. They did, and Browne's men improvised a litter by lashing their carbines together. They trudged down a ridge. Browne never groaned or complained. A half-hour after reaching a stage station, he died.[6]

"July 11, 1868. One of the workmen was killed within five feet of me by the falling of a bent. In falling he was struck on the head and then fell through the work into the water and was drowned before my eyes. This evening another man was shot and killed, which was occasioned by some personal difficulty."[7]

A survey party often consisted of abut fifteen men. There was the chief surveyor, assistants, cooks, teamsters for the mules or horses, two or more wagons for provisions, equipment, wooden stakes, and instruments. Members of the party generally carried no substantial amount of ammunition. So small a party was easy prey for a large and determined war party — large being maybe 40 or more. Also, the Indians were very stealthy and were able to steal into camp at night and make off with the horses or mules. An entry in his diary: "we passed the new-made graves of some twelve men who had recently been killed by the savages." From time to time Ferguson noted comments on the terrain and gave insight as to the loneliness of the work. "This is a terrible country," he wrote, "the stillness, wildness and desolation of which is awful. Not a tree to be seen ....not a sign of man to be seen, and it seemed as if the solitude had been eternal."[8] There were numerous crews working along the line, but usually miles and miles apart.

The sequence of the construction of this railroad went like this. A reconnaissance party of engineers and surveyors would explore to determine the general track of the future railroad.

Instructions for the increment through Nebraska might have been:

"From Omaha proceed west about 20 miles to the Elkhorn River, cross it and run west more or less parallel with the Platte River some 300 miles to where it branches into the North Platte and South Platte. Follow the South Platte to Lodgepole Creek. Then continue with Lodgepole Creek on into Wyoming territory. Further instructions will follow."

The alignment survey crews would then stake the tangents and curves that would guide the "graders" that followed and who made the cuts and embankments. Following the "graders" would be the crews that set the ballast to grade and installed the ties. Then along came the rail setters. The supply train proceeded along the new track as it was set. As previously noted, the surveyors worked hundreds of miles out in front of the main construction effort. They were, to a man, especially self sufficient. They were small team leaders, enjoyed the independence of small unit leadership and the working in the great outdoors. "In later years most of the surveyors would look back on their time laying out the line of the first transcontinental railroad as the most exciting chapter of their careers. It was also the best work they ever did. Every citizen of the United States, from that time to the present, owes those surveyors a debt of gratitude that can never be repaid. . . . anyone can see for himself in the twenty-first century by driving Interstate 80 from Omaha to Sacramento that, nearly all the way, the automobiles will be paralleling or very near the original grade that the surveyors laid out."[9].

This essay is taken primarily from Stephen E. Ambrose' **Nothing Like It In The Whole World: The Men Who Built The Transcontinental Railroad 1863-1869**. Quotations from surveyor Ferguson's diary are as Mr. Ambrose presents them in his book. Some are in combination with Mr. Ambrose' words. All credit is to Mr. Ambrose.

1 Ambrose, Stephen E. Nothing Like It In The World: The Men Who Built The Transcontinental Railroad 1863-1869, Pg. 169.
1 Ibid. Pg. 134
1 Ibid. Pg. 263
1 Ibid. Pg. 215
1 Ibid. Pg. 215
1 Ibid. Pg. 216
1 Ibid. Pg. 264
1 Ibid. Pg. 143
1 Ibid. Pg. 326

Short essay written by VAS member Richard O. Spencer, BS, MA, LS #696-B.

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Why Add More Iron to the Fire?

by Dave Berg

We have all traversed through heavy brush to set a corner only to find another surveyor has been there and left his or her cap. Often we find two or more surveyors have been there and left their caps. In the latter case, the delight of finding evidence of the corner is quickly smothered by the question "Why?" Why is there more than one cap at this location, and should another cap be added? These are questions we shouldn't have to be faced with in most cases. Read on.

A 1977 Record of Survey shows ¾" iron pipes and plugs set for corners of a tract on tidal water. The tract was segregated by deed from the original tract less than a month following the date of the Record of Survey.

Many years later the owner of the original tract elected to subdivide the remainder of his holdings. He retained a second Professional Land Survey. The second surveyor proceeded to perform a boundary survey following the description furnished by the title company. He researched the record and found the 1977 survey. His field crew then found the ¾" iron pipes of record, missing all of them by some 0.4'. It must be noted that though the second surveyor no doubt used more modern equipment for his work, his crews still had to slog through the same dense undergrowth on the steep west slope as did the crew in 1977. What did the second surveyor do? Yep! You guessed it! He set bright, new capped rebars 0.4' west of the iron pipes set in 1977.

There are more than a couple of things troubling about this situation. Judging from the length of the traverses and the number of angle points both surveyors found necessary to set the corners, and the nature of the terrain, the iron pipes conservatively each had an error ellipse of somewhere around an estimated 0.3'. The second surveyor used more modern equipment, so let's give him or her a break and say the error ellipses around each of his or her rebar in the area of the iron pipes was 0.2'. Those areas of uncertainty must certainly overlap. Statistically, both pieces of iron are at the same point, not 0.4' apart if our estimates are close to being accurate (it may well be necessary to subject both traverses to a least squares analysis to determine the true magnitude of the error ellipses).

I find it troubling that so many surveyors will dutifully hold sacred the position of a stone or brass cap (in their minds, "Monuments"), while not giving original tract corners the time of day (read that "time of research"). What history is attached to the found points? It is a question that must be addressed in every survey, isn't it? The record is chock full of wrong assumptions. For an example, that 2" iron pipe with the mushroom top may have been originally pounded into the ground to brace a long-gone fence corner; if you find no record of how it came to be set, it may well be just that, a brace and nothing more. A stone with a cross with no record other than being rejected as being a monument by a county surveyor 55 years ago is not a "monument of record" unless you make it one. Then what?

I find it troubling that so many surveyors will dutifully hold sacred the position of a stone or brass cap (in their minds, "Monuments"), while not giving original tract corners the time of day (read that "time of research").

Another troubling thought: would it be a stretch to assume that most party chiefs or crew leaders today are not fully aware of relative accuracy or the weight original corners carry? To be sure, some of our leading field technicians have developed a rather cavalier attitude toward points set by others. They seem to fall back into the comfort zone afforded by their electronics; production is everything and "my truck is more shiny than yours." The other surveyor is just plain, wrong.

As for the double irons in the above example, there they exist today for all to scratch their heads over. And left alone for a few years, there no doubt will appear a third set with a third surveyor's identification number on a shiny new cap. An "iron bouquet", "pin cushion", "stake orchard", whatever, it signals the property owners that the surveyors do not have their "poop in a pile." Not good public relations, not to mention just plain wrong in the first place.

It is up to each individual, both field and office, to eliminate most of these problems. It boils down to education. The seminars and workshops overflow with licensed surveyors seeking to maintain their tickets, which is a good thing. We could easily make a good thing even better by demanding that the rest of the workplace take advantage of the educational opportunities that abound in our organization. It can only improve our product and our image.

Reprinted from *Evergreen State Surveyor*, Winter 2008.

Any of These Sound Familiar?

by Ronald E. Koons, RoSaKo Safety

I have always felt that one of the keys to education is studying what others have done previously to see how we can improve. (I believe that may be called History!) Even when we observe something that appears on the surface to be "nearly perfect"; we still might find a better way to perform the task. I would like to look at a few examples of actual situations we have found while traveling across the United States this year. While some may be good, if not great, examples, others may have a great deal of room for improvement.

In our first situation we were traveling on an interstate highway. The traffic was moderate and the flow of traffic was around 75-78 mph with a posted speed limit of 65 mph. The sky was sunny and it was a crisp winter day. I began to notice orange signs ahead at each side of the road in our direction of travel. As we got closer I saw they read "Survey Crew Ahead". I touched the brake to get off cruise and shortly noticed two more signs with the same wording. Shortly thereafter, amber flashing lights caught my attention in the center of the median. There was a pickup truck with internal strobes and a light bar. All were activated. Just beyond the truck there was a survey crew member standing at a station and I noticed a rod person about 200 feet away, also in the median. Both were wearing high visibility vests (Class III) and high visibility knit caps. There was no mistaking there were two people there with the shape and visibility. Just after the work crew I noticed a set of signs on the opposite side of the interstate, and then, a short while later, another set of signs. This kind of dedication to safely protecting crew members is a model for everyone to follow. There is no question that surveying is a dangerous profession. When crews are given the tools and knowledge to safely perform their job, there is an even better chance they will go home each day at the end of their shift.

Our next experience was on a two-lane state highway during the summer months. Temperatures were quite warm, in the upper 80's. Traffic was light and wasn't going too much faster than the posted 55 mph. There was an occasional speedy driver, but not many. As we rounded a gradual curve that had trees on the inner circumference, I noticed something ahead, partially in the roadway. I wasn't certain if it was a wreck or a broken down vehicle, so I slowed down very quickly. As we got closer, I noticed it was a pick-up truck with a cap, and the rear door was open. There were no emergency lights and the four-way flashers weren't even activated. The truck was about three feet onto the roadway since the berm was very narrow and then there was a deep ditch off the right side. I concentrated so much on the vehicle in the roadway that, all of a sudden, just in front of me, I noticed two workers. One was just beyond the truck inside the roadway about a foot. He had an instrument set up and was looking toward a rod person over the fence row on what appeared to be private property. Neither of the crew members had on any type of high visibility clothing.

I guess we could say they did have one thing correct in putting their vehicle as a barrier between them and the oncoming traffic. That is certainly the only thing they were doing correctly. One of the crew members was wearing shorts and a tank top, while the other was wearing jeans and a tee shirt with some type of printed graphics. Whenever I see a situation this egregious I always wonder if the crew members had received any safety training. You would think that if they had received even minimal training they could have gotten a few things correct.

Our next occurrence was in a small town around 45 miles from the downtown of a very major U.S. city. Most of the town folks worked in the big city or suburbs and commuted. We had just completed a safety audit for a surveying firm. Several of us were in the parking lot across the street from the office, looking over their field vehicles. As we looked to the corner, there was a two-person crew from another surveying firm removing the lid of a sanitary sewer manhole. Both crew members were wearing Class II high visibility vests. There was one 28" safety cone setting next to the crew. One of the workers was on his knees looking into the manhole and a rod was inserted also. The other crew member was looking at a portable data acquisition device. There was no signage, no one was watching for traffic, no one was flagging traffic...they were just counting on motorists to avoid them and, hopefully, not even get close enough to knock the worker who was on his knees into the manhole opening. Not only were we looking at several traffic safety issues, there were definitely some confined space concerns also. When it comes to traffic safety we can't just say that because there is low traffic count we have no risk. At least minimal precautions must always be taken. In this case, one safety cone and two vests while in the middle of an intersection just don't cut the mustard.

The old adage "You can lead a horse to water, but you can't make him drink" doesn't work when it comes to safety. OSHA doesn't just require you to train your employees, you have to train them adequately to recognize hazards and be able to take corrective measures. Your only defense in the event an OSHA Compliance Officer observes negative safety efforts by your employees is if you have done an adequate job of training, have reinforced the training, and have offered discipline when needed. If you are missing any of these elements, you will receive a citation and most likely won't get out of it during a hearing.

While we had two not-so-good and one really good example, any of the work places could lead to serious injuries. Just because you are doing everything correctly doesn't always mean someone won't get hurt. However, doing everything correctly sure gives your employees a better chance at coming home each night and greatly reduces the potential for serious injury. Have a safe day!.

Reprinted from the *Hoosier Surveyor*, Fall 2007, as seen in *The Kansas Surveyor*

Curb Splits

by Charles "Dan" Church, PLS

A call comes in from your field crew — they are working on a boundary survey in an old neighborhood and not finding any property corner monuments in the block; so you get on the phone and instruct them to "split the curbs."

We've probably all done it, and why not; it's a standard procedure for resolving boundaries in old neighborhoods where practically all of the original evidence has been destroyed. But is that really what we mean, or perhaps better yet, it that really what the law intends?

Recently I have come across several problems caused by essentially two different scenarios involving this principle. First, there are those who understand the principle, but whose field personnel don't; and second, those who never fully understood the principle.

What is the principle?

BOUNDARY CONTROL AND LEGAL PRINCIPLES
(Boundary Control and Legal Principles, 2nd Edition, John Wiley & Sons, Inc. 1969, by Curtis M. Brown, p. 169)

5.21 Establishment of Streets by Improvements
Principle. In the absence of natural monuments or evidence of lines actually run by the original surveyor, improvements, such as curbs and paving, which were installed in accordance with the original survey monuments are presumed controlling.

"The duty of the surveyor is to relocate lines as the first surveyor originally ran them; curbs located properly when the original stakes were available are the best evidence as to where the original lines were run, and as such are controlling."
Orena v. City of Santa Barbara, 91 Cal 621

When the reason for the principle ceases, i.e., the improvements were not built in accordance with the original stakes, so does the principle.

EXAMPLE #1

A few years ago I received a call from a gentleman in Carson City who was very alarmed that a surveyor, hired by his neighbor, had set property corners indicating that his fence and garage were encroaching onto the neighbor's parcel. The neighbor was planning to develop the parcel and insisting that the offending structures be removed. I drove to the site to find that the newly set property corners disagreed with fences and improvements that had been in place since the 1940s. I told my client that I thought that there must be some kind of conflicting documents or a simple misunderstanding, and that I would contact the other surveyor and discuss the issue.

When I spoke to the other surveyor, he assured me that there was no mistake; that was where the property line was. I inquired how he had established the property line, and he explained that there were not found monuments in the block, so he had his crew split the curbs to establish the street and therefore the block boundaries. When I suggested that this solution couldn't possibly be correct, he assured me that they had spent a lot of time coming up with that solution and he did not see any alternative.

I sent a crew to the site with instructions to locate the curbs, sidewalks, fences, and any other evidence of lines of occupation. What we discovered was that the curbs were not centered between the sidewalks. Therefore, if you established the street centerline utilizing the curbs, it did not agree with the street centerline established utilizing the back of walk. If the back of walk was relied upon to establish the block it fit with the existing improvements that had been in place for about 60 years, and the supposed encroachment went away. With the curb split solution, my client's garage was encroaching 1.7 feet into the neighbor's parcel, but with the walk split solution, it was 2.8 feet clear of the parcel line.

I then scheduled a meeting with the owners, their attorneys and the other surveyor and showed them our findings. The other surveyor agreed with our solution and agreed to file a revised Record of Survey showing the solution based on the back of walks, All threats of legal action were dropped.

The surveyor had applied the "when all else fails" principle of having his crew split the curbs, but he had not made the effort to corroborate his resolution with other evidence, and thereby created a situation that could have ended up in court. The split of the curbs is no magic solution; it is only applicable when the curbs were installed in accordance with the original survey, and other evidence such as sidewalks, fences, etc., corroborates the position.

EXAMPLE #2

For another recent survey, we were working in a block where the west end could be determined from a previous map. On the south side of the block, the split of the curbs and the split of the walks agreed. On the east side of the block, the split of the curbs and walks produced lines that were parallel but separated by about 2 feet, and on the north side the splits produced non-parallel lines.

To resolve the discrepancy on the east side of the block, additional measurements were made to found property corners and lines of occupation in the next block to the east, and it was determined that the split of the walks fit the lines of occupation in our block as well as the block to the east. Relying on a split of the curbs would have resulted in erroneously shifting the lot lines 2 feet off of the lines of occupation.

Along the north side of the block a split of the curbs indicated that the block narrowed on the west end, requiring that the north/south dimension of the lots be shortened. But a split of the walks indicated full record dimension. Again,

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Curb Splits (continued)

additional evidence was checked, and the split of the walks proved to be the correct solution.

The split of the walks alone was not sufficient evidence to elect one solution over the other, but when compared to existing fences, building locations, etc., the intent became obvious.

EXAMPLE #3

On another occasion, we found a block where on three sides of the block, the split of the curbs matched the split of the back of walks, but on the fourth side, there was a 2 foot separation between the two. Additional checks of lines of occupation in our block and the neighboring block to the north confirmed that the split of the walks produced the correct line.

WALKS

Walks are often part of the original street improvements and should be located along with the curbs to determine if the curbs were constructed in the center of the right-of-way. In many neighborhoods, the split of the curbs and the split of the walks are in reasonable agreement. But in cases where they are not in agreement, the surveyor has to determine which, if either, most accurately represents the true location of the street. This will generally require locating additional improvements, such as alleys, fences, buildings, etc.

I instruct my crews to look for and locate any buildings that appear to be zero setback and about the same age as the subdivision. We don't necessarily document the exact construction date of the buildings (although I have), but if by its appearance it is evident that the structure is of long standing and it appears that the intent was that it be built on the property line, we locate it. Just like with the curbs and walks, if the building was built at a time when the original subdivision stakes still existed, chances are that it is in its correct location and represents the true location of the property line.

Obviously, walks are not the "silver bullet" solution any more than splitting the curbs, but if the curbs (or walks, for that matter) are split, having made no other comparisons, then we are not correctly applying the principle.

> "improvements, such as curbs and paving, which were installed in accordance with the original survey..."

There must be some corroborating evidence that the curbs we are splitting were installed in accordance with the original survey. One simple and often overlooked method of doing this is to locate the back of walk and compare the split of the walks with the split of the curbs.

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