Missouri Surveyor

A Quarterly Publication of the
Missouri Society of Professional Surveyors

Jefferson City, Missouri — March 2015

What's in this issue...

MISSOURI SURVEYOR

CALENDAR OF EVENTS

2015

May 8-10, 2015
Board Meeting, Golf Tournament
37th Annual Spring Workshop
Lodge of Four Seasons,
Lake Ozark, MO

July 18, 2015
Board Meeting
Jefferson City, MO

August 26-28, 2015
Review Course,
Best Western Capital Inn,
Jefferson City, MO

October 8-10, 2015
58th Annual Meeting and convention
Tan-Tar-A Resort, Golf Club, Marina and
Indoor Waterpark
Osage Beach, MO

December 5, 2015
Board Meeting
Jefferson City, MO

Donald R. Martin, Editor

Notes from the Editor's Desk

Donald R. Martin

Ah, the March edition of Missouri Surveyor. It is one of those anxiously awaited harbingers of spring – a publishing milestone akin to the flowering of the crocus and the popping of the morel. This year let it mark an end to all of the late season snow, ice and freezing temperatures. The weather has been so inconsistent that I have banned my pard Tripod the tree-legged groundhog to his hole for a time out. Regardless of his February 2nd predictions, the weight of the weather woes we've worn these weeks were and will be wrought upon our winter weary woodchuck.

Now, edition talk. As we commence the bicentennial year of the establishment of the Initial Point of the 5th Principal Meridian you will find writings published within these pages to honor this anniversary. Look for They Went Where Only Indians Had Been by Deidra Morgan. This history of surveying the Missouri-Arkansas territory was written as a high school project in 1982. Printed in a landmark publication, Bittersweet, Inc. it was part of a project to preserve Ozark lore along with being a class curriculum at Lebanon High School. Taught, edited and founded my Missouri award winning author Ellen Gray Massey, her students' chronicled Ozark history which in this case including surveying! For a brief history of Initial Point surveyor Joseph C. Brown please read the enclosed letter from History Committee Chair Stan Emerick. While chronicling some of Brown's accomplishments, Stan's letter is an announcement of efforts to memorialize the final resting place of this historic surveyor. It is also a call to our members to help; please consider donating. For another article honoring our surveying history see Bilby Tower Dedication Honoring Jasper Sherman Bilby. It reports last year's dedication of a fully intact tower commemorating the designer of these structures which were crucial to pre-GPS geodetic surveys. In a piece I call "surveyors to the rescue", check out Homeowners drowning in flood insurance bills over FEMA map errors by Jenifer Girdon. This story highlighting FEMA mapping errors costing homeowners thousands of dollars garnered national media attention and featured the necessary role of surveyors in protecting the welfare of those harmed by this government agency blunder.

For MSPS member specific content, enjoy Career Day for Local Students Hosted by Govero Land Services. Now there is outreach for surveying's future! Look for an interesting piece from NGS – its a new elevation measurement for the Washington Monument!. Then there are Missouri Surveyor features entitled Meet Our Members, In Committee, Capitol View and a new item called Direct & Reverse. A kind of point/counterpoint for surveying issues, this editions features Jerry Anderson and Mark Wiley pondering education and experience requirements for surveyors.

Enjoy this edition and remember Missouri Surveyor is your voice; I welcome that which you may have to say or write.

Donald

THE MISSOURI SURVEYOR

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Missouri Society of Professional Surveyors

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*The **Missouri Surveyor** is published quarterly by the Missouri Society of Professional Surveyors, to inform land surveyors and related professions, government officials, educational institutions, contractors, suppliers and associated businesses and industries about land surveying affairs. Articles or opinions appearing in this publication do not necessarily reflect the viewpoints of MSPS but are published as a service to its members, the general public and for the betterment of the surveying profession. No responsibility is assumed for errors, misquotes or deletions as to its contents. Articles may be reprinted with due credit given.*

President's Message

Adam Teale

Although winter can be a slow season for some, I hope it has or is shaping up to be a busy season for surveyors across Missouri. While I send my best wishes to all MSPS members that their businesses are booming I can certainly attest that it has been an active time for MSPS. Since our Annual Meeting we have had two Board of Directors meetings, sponsored a legislative gathering and held our annual Capitol Day. I want to thank all members who have taken the time to participate in these events and show their support for the Society. I would also like to thank all of our committees for their active participation and highlight the efforts of some.

Our History Committee is working on many worthwhile endeavors, one of which is the Joseph C. Brown memorial monument. Joseph C. Brown was a Deputy Surveyor contracted by the General Land Office and was responsible for establishing the Initial Point of the Fifth Principal Meridian and its Baseline. He later surveyed the western line of Missouri, the original northern line of Arkansas, Mississippi River islands disputed by Missouri and Kentucky, the original boundary of St. Louis, and the Osage Treaty boundary. He was not only a land surveyor, but a soldier, sheriff, state senator, and county engineer. Through some diligent research of Mr. Bob Myers and our History Committee his final resting place has been located at Bellefontaine Cemetery in St. Louis, Missouri. Additional information on this project can be found in this edition of Missouri Surveyor along with the opportunity to donate your time or money.

The Legislative Committee has two main bills they are following which you might be interested in along with a few minor ones. SB499 introduced on February 25, 2015 due to the efforts of the Association of Missouri Electric Cooperatives concerning easements. They are seeking legislation to assure they may write easement descriptions. They wish to have descriptions for their easements exempted from that is required in statue 327.272, the *Definition of Surveying*. It is the MSPS position to oppose their efforts and preserve the laws requiring surveyor oversight of easement measurements and descriptions. It is the law, we are the only profession uniquely qualified to do these things, and we best protect land owner interests and the public welfare. I ask members to stay on top of this issue and make your State Senators and Representative aware of your concerns and our position. Let's keep critical land matters in the hands of Missouri land experts; the professional land surveyors of this state and the members of MSPS. The other bill is HB1000, commonly referred to as the education bill. Similar bills have been sponsored by MSPS in recent legislative sessions with no victories. MSPS is working with Rep. Bart Korman to craft a bill that would be agreeable to all parties but still maintain the integrity of the profession.

Let's keep working together to take care of our profession, serve our client's and fellow citizens well, protect the boundaries and section lines we locate and measure, and preserve our own history. It is my honor to serve as President and stand alongside MSPS members.

Cover Photo: *Courtesy of Ralph Riggs, Riggs & Associates, West Plains, MO.*

What's Happening in MSPS Committees

Annual Meeting Committee - Dan Govero and Susanne Daniel, Co-Chairs
Related to the 200th anniversary of the founding of the Fifth Principal Meridian and the work of the History Committee, the 2015 MSPS Annual Meeting will feature a conference focus on Joseph Brown surveys and establishment of the 5th PM. The committee has drafted an agenda and is lining-up speakers and proceedings.

Education Committee - Dan Govero and Susanne Daniel, Co-Chairs
The Committee reports the MSPS Spring Workshop will be "The Surveyor in Court". They are compiling exhibits and still searching for participants for the featured attorney and a surveyor to complete the cast for the trial. They've also announced a 2-hour minimum standards session will be held.

History Committee - Stan Emerick, Chair
Busy, busy, busy! This group is working hard on a number of projects which they are doing in conjunction with the Annual Meeting Committee and the Sales/PR Committee. Centered on the 5th PM Bicentennial they have joined in developing the Annual Meeting agenda and are working on an enhanced publishing of materials to accompany participation in the learning session of the October meeting. Another important matter for our historians is establishing a memorial to Joseph Brown. Chair Stan Emerick has a detailed message in elsewhere in this edition so take care to read and please consider answering their call to donate to this worthy effort. This committee has also working on a commemorative "coin" to be sold through our Sales/PR Committee recognizing the 5th PM Bicentennial.

Membership Committee - Bob Anderson, Chair
Still in the midst of our annual renewal/enrollment period, the Committee reports we're rolling along with a Regular Membership count of 348 and Total Membership standing at 470. These numbers are a little over 50% of anticipated memberships (as well as last year's count). Reminders for members to renew are being sent.

MoDOT Committee - Earl Graham, Chair
The Committee plans to meet soon. Members have been discussing concerns associated to the destruction of survey monuments and PLSS corners due to highway construction and maintenance.

PAC Committee - Jim Anderson and Rich Barr, Co-Chairs
Considering a unique fund raiser this summer; a Virtual Fishing Tournament. Also wish to remind members to consider donating at any time.

Public Relations/Sales - Rich Howard and Charles Quinby, Co-Chairs
Working with the History Committee, they hope to market a commorative coin recognizing the 5th PM Bicentennial. The Committee also reports they are bringing back bring back denim shirts as well as camouflage and denim caps. Survey couture!

Scholarship/Trig-Star Committee - John Stevens, Chair
Scholarship applications have been emailed to the schools; the deadline for the applications is March 31st. They also report two members will be sponsoring Trig-Star sessions.

Standards Committee - Chris Wickern, Chair
Last year the Committee had completed draft revisions. This coincided with the move of the State Land Survey Program to the Department of Agriculture. This has delayed the promulgation of the revised standards as rule making authority will have to be transferred to the Ag Dept. Ag and the Licensing Board recently signed a *Memorandum of Understanding* opening-the-door to the process to implement changes to the state regulations. Additionally, this legislative year utility companies and cooperatives are seeking exemptions from RSMo 327. The requested exemptions are very broad and could bring back authority for them to use blanket easements. In an effort to be prepared to testify before hearings, MSPS and the Standards Committee seek real world examples of how the preparation of descriptions by these non-licensed groups and individuals has harmed the public. MSPS Members are asked to send examples to chris.wickern@gmail.com. The information will be consolidated and used to present the reasoning that the public is protected when the preparation of new descriptions is performed by a Licensed Land Surveyor.

Greetings Fellow Surveyors and History Buffs

by Stan Emerick, History Committee Chairman - semerick@f-w.com

As you are probably aware, this year marks the two-hundredth anniversary of the establishment of the Fifth Principal Meridian network within the United States Public Land Survey System. This network contains more than two hundred million acres of land and forms the basis for property descriptions over roughly forty percent of the Louisiana Purchase. The area encompasses all of Arkansas, Missouri, Iowa and South Dakota as well as parts of Minnesota and North Dakota.

The surveyors principally charged with establishing the axes of this network were Joseph C. Brown and Prospect K. Robbins. Both men served with distinction as Deputy Surveyors for the United States General Land Office. One has been honored with a memorial, the other has not. That oversight will be corrected later this year.

For many years Mr. Brown's final resting place had remained a mystery. It was known that he had passed away before fulfilling his appointment as principal surveyor for the final line in the boundary dispute between Missouri and Iowa. A Supreme Court decree that effectively ended the quarrel commonly known as the Honey War. Originally he had been laid to rest in a cemetery in northern Saint Louis County. After its closure, his whereabouts slipped into obscurity.

Mr. Brown had achieved distinction as the preeminent surveyor in the territory, completing hundreds of surveys over his thirty year career. Among his many accomplishments were:

- Running the Baseline for the Fifth Principal Meridian network.
- Surveying some of the first townships in the military bounty lands in Arkansas.
- Running the Osage Treaty boundary from Fort Clark (Osage) on the Missouri River to a point near Fort Smith on the Arkansas River.
- Surveying the Santa Fe Trail from a point near Fort Osage to Taos (New Mexico).
- Surveying the western line of Missouri and the original northern line of Arkansas.
- Performing the first GLO surveys in Saint Louis including its original boundary.
- Surveying many colonial-era Spanish Land Grants and New Madrid Certificates.
- Executing surveys for the congressionally mandated School Lands.
- Surveying Mississippi River islands for the dispute between Missouri and Kentucky.
- He also served terms as a soldier, sheriff, state senator and county engineer.

Fortunately for those of us that hold him in high regard, that obscurity has ended. Due to the diligent efforts of Bob Myers, Missouri's first State Land Surveyor, the site of his repose has been discovered. Mr. Brown's remains are resting in an unmarked grave within Bellefontaine Cemetery in Saint Louis. How ironic it is that such a distinguished surveyor, known for setting thousands of monuments, resides in a grave without one of his own.

Validated by the list above, one can easily see that this man belongs on any list of notable historical figures. Disregarding his tenure in the other professions, Mr. Brown's accomplishments as a Deputy Surveyor alone warrants a tribute of the highest honor. In cooperation with the Friends of Bellefontaine Cemetery, the Missouri Society of Professional Surveyors and its Saint Louis Chapter, have taken on the task of correcting this oversight.

We are in the process of designing a monument befitting Mr. Brown's status. The monument will display the full extent of the Fifth Principal Meridian network that he helped to establish. It will also highlight his more important surveys and his contributions to public service. The dedication ceremony for the memorial has been set for Saturday, October 17, 2015. This ceremony will emphasize Brown's extraordinary surveying career along with his dedication to serving his fellow citizens. Proclamations from federal, state and civic authorities will accentuate the historical significance of his contributions. When completed, this memorial will become part of the cemetery's tour of historical figures. Mr. Brown will take his place among the prominent individuals that helped shape this state and influenced the settlement of the West. A list that includes such dignitaries as William Clark, Edward Bates and Thomas Hart Benton.

Planning for the memorial and the event are well under way. But there is still a lot of work to be done. We have many tasks to accomplish and are seeking the assistance

(continued on next page)

Greetings Fellow Surveyors and History Buffs *(continued)*

of the entire surveying community, as well as any others that share our ardent appreciation for history. Please feel free to share this article with any others that you think may have an interest in this project. And if you or they would like to offer your services or financially contribute to this endeavor, we can be contacted at either address listed below.

We see this event as an excellent opportunity to further enhance the public's awareness of our profession and the significance of our role in the community. Please join us in our quest to pay homage to this most distinguished individual. Please show your support by making a contribution to this memorial. Tax deductible contributions can be made to the Missouri Society of Professional Surveyors Foundation for the Joseph C. Brown Memorial, 722 E. Capitol Avenue, Jefferson City, Missouri 65101.

Why We Do This

In cooperation with the Friends of Bellefontaine Cemetery, the Missouri Society of Professional Surveyors along with its St. Louis Chapter are planning to memorialize the final resting place of Joseph C. Brown. To successfully achieve this goal, we need your financial support. When complete, this memorial will become part of the cemetery's tour of celebrated figures that shaped the history of Missouri and the nation. Please help us accomplish this task by making a contribution.

Please send donations to:
Missouri Society of Professional Surveyors Foundation
for the Joseph C. Brown Memorial
722 E. Capitol Avenue
Jefferson City, MO 65101

Donation Level	Amount
❒ Surveyor General	$1,000.00
❒ Deputy Surveyor	$500.00
❒ Survey Party Member	$ _____
Total	$ _____

Name _____

Address _____

_____

Phone _____

Method of Payment

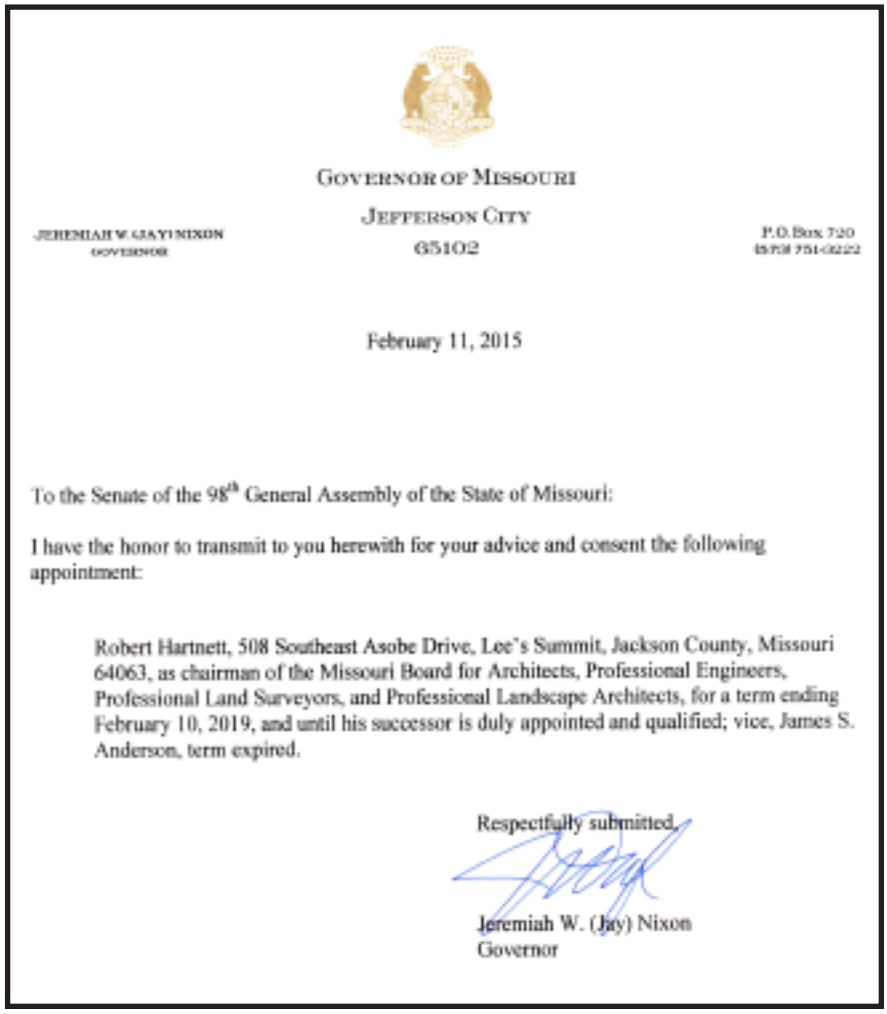
❒ Check ❒ Visa/MasterCard/Discover

Card # _____

Exp. _____ Signature _____

MSPS Foundation is a 501(c)(3) organization and all donations are tax deductible.

The *Missouri Society of Professional Surveyors* congratulates Mr. Hartnett and commends his leadership of the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors and Professional Landscape Architects.



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February 11, 2015

To the Senate of the 98th General Assembly of the State of Missouri:

I have the honor to transmit to you herewith for your advice and consent the following appointment:

Robert Hartnett, 508 Southeast Asobe Drive, Lee's Summit, Jackson County, Missouri 64063, as chairman of the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors, and Professional Landscape Architects, for a term ending February 10, 2019, and until his successor is duly appointed and qualified; vice, James S. Anderson, term expired.

Respectfully submitted,

Jeremiah W. (Jay) Nixon
Governor

Meet Our Members!

Associate Member
Carol Payne
Rolla, Missouri

Position:
Repository Section Chief,
Missouri Dept of Agriculture.
Land Survey Program

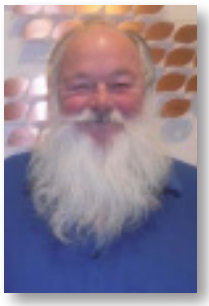
Focus of survey practice:
Maintaining and indexing a database of plats/surveys from all of Missouri's counties for use by the surveyors and mappers of Missouri charged with locating and marking the extents of land tenure within our State.

Most memorable project:
My most memorable project is two-fold: 1) I had the privilege of being at the helm of the Repository as we began offering **"online"** plats/surveys, effective October 3, 2012, and (2) I worked with *Recorders of Deeds* and *County Surveyors* to obtain plats/surveys in digital format or extra hardcopies. In so doing I eliminated bygone expenses which I redirected to special projects and services.

Likes about surveying:
Although I'm not a surveyor I have served the Land Survey Program for 20 years; I have a passion for helping the men and women of Missouri surveying. I pride myself as a database facilitator managing the archiving and retrieval of our State's precious land records.

Why a member of MSPS:
I became an associate member of MSPS when I began serving Missouri citizens as the Repository Section Chief in the Land Survey Program. As an Associate Member of MSPS, I stay closely connected with the surveyors in the State of Missouri. The fellowship and interaction experienced within the surveying community of MSPS provides me with the feedback needed to best serve Department of Agriculture clients. This fulfills my goals as a keeper of Missouri's land archives, which enables my department to better serve their needs.

LS Member
Chris Wickern
Sedalia, Missouri



Position:
Land Surveyor
Engineering Surveys & Services
MSPS Board of Directors

Focus of survey practice:
Cadastral and engineering design surveys throughout Mid-Missouri and all locations served by our clients.

Most memorable project:
A 6,000 acre survey in Arizona lying across Township line, Range line, and Spanish Land grants. While all surveys pose challenges, the sheer scope of such an expanse was intimidating!

Likes about surveying:
Boundaries are like the people who own them. No two are ever the same. They may be similar, but each boundary and each description stands on its own. At the same time, a boundary and its description coexist with all the others around it. It makes the world a 3 dimensional, 1:1 scale puzzle. The puzzle pieces are the chain of title, the field evidence, and those surveyors whose footsteps we follow. We are the ones who restore, reestablish, and establish where these puzzle pieces all fit together. That's why the recording of boundary surveys that restore, reestablish and establish corners *are so important*. How do we "follow the footsteps" when they were never documented and placed into the record?

Why a member of MSPS:
The goal of a professional organization whose members are licensed to protect the public should be to enhance the profession's ability to protect the public. That is our Society's stated purpose. ***It is important!*** Surveyors must balance their business goals with the protection of the public wellbeing and sound public record. Each one of us needs to be actively involved. It is our opportunity as professionals to pave the way for all those who will follow us. Our work today will enhance their efforts to protect the public into an ever changing future.

Career Day for Local Students Hosted by Govero Land Services, Inc.

A group of 20 sixth and seventh graders from Antonia Middle School in Imperial, MO had the opportunity to learn from professionals on Friday, November 14th when the school held its Annual Career Day event organized by their Teacher, Ms. Jarvis.

The students visited Govero Land Services, Inc. office located in Imperial, to learn about careers in Civil Engineering and Land Surveying. All of the students have a strong interest in science and mathematics. Their visit was part of a school program allowing the students to explore different professions that relate to their interest.

Dan Govero, Tom Ruble, and Sharon Herman, all PLS's and Gabriel Novak, PE, gave presentations to the students related to their education, training and careers. Raymond Menard, Drafter, showed students various CAD and mapping programs on the computer, and reviewed plan sheets for an expansion of their school campus.

Dan explained what the surveying profession is and why it's so important, and about owning and operating a business.

Sharon discussed how she got started in her career and the steps going from drafter, to surveyor, to President of the MSPS. Sharon also discussed the 250th Birthday of St. Louis and showed the students a video of the making of the 250th Birthday Cake on the Arch Grounds (July 2014).

Gabriel discussed engineering and how to develop site plans and subdivisions. He also showed the students how Govero Land Services designed their schools' walking track.

Tom gave a hands on demonstration of the use and operation of a Trimble Robotic Total Station. Each student was given the opportunity to view through the eye piece of an instrument at the prism.

The students showed a high level of understanding of the profession and asked many questions of the professions, ranging from "What is a typical day of work like?" to "What are typical benefits of this company?"

Direct & Reverse
Surveying Topics, Differing Opinions

This is a forum of open expression on matters of importance to Missouri's surveying community. In this edition two members with differing points-of-view share their thoughts regarding education and experience needs for those seeking entry into the professional practice of surveying.

Mark Wiley, PLS of St. Louis.

Would you support legislation to change the education qualifications for future surveyors?

There are a number of changes to the required education I support. Increasing the requirements for writing tops my list. If the Surveying Profession is going to continue to be the respected group of individuals I think we are and want to be, we must sound like it in writing. We all know what we are talking about but we need it to resonate when we put those words on paper. In the past we could talk the client through the surveying process and there may be those cases where that is still a good idea. But those circumstances are the exception rather than the rule in my practice. Even within my firm the written word is vital with field and office staff communicating by text and email.

The second most important educational requirement for the future surveyor is historical element. New surveying candidates come from different places and do not have the historical lore of the counties in which they may practice. They must fill their knowledge gap by mastering the needed history – it is how they will find the tracks left by the original surveyor. Without it we are asking them to replace common sense and historical logic with technical wizardry which will not prepare them for the challenges ahead.

I also support mathematical requirements which instill computation skills, not software program or calculator usage. New surveyors need the ability to solve the problem, not just get an answer.

Please see Wiley, p.11 & 12

Jerry Anderson, PLS of Brookline.

Would you support legislation to change the education qualifications for future surveyors?

The only change I would support is a reduction of formal education requirements.

If a perspective surveyor is serious, he or she will seek sufficient education to prepare themselves for the profession. Classroom attendance is not the only way to attain knowledge. Requiring a specific venue, format or course does not assure professional competence and it does defeat personal freedoms, responsibility and initiatives.

Many members of MSPS point to a low passing rate for the professional surveyors' exam. The solution to that problem lies with the applicants. Instead of having them take more classes they must take the responsibility to prepare for the exam.

Requiring ALL prospective surveyors to obtain more classroom time is punitive to many, and will exacerbate the problem of too few replacement surveyors joining the ranks of the current crop of ageing gray-beards!

Please see Anderson, p.10

Direct & Reverse *(continued)*

Anderson, continued from p.9

Missouri requires a path to licensure of education, experience and testing. Is any one of those more important than the others?

I believe that experience, in the form of increased mentoring, is the most important. As Professional Surveyors, we have been guilty of almost criminal neglect in our efforts to supervise, train and mentor our employees who have a desire become Professional Land Surveyors.

Testing is critical, but may not provide a true picture of a candidate's suitability to perform the tasks they are likely to encounter.

What knowledge, skills and abilities are most important for those with the desire to become a surveyor?

They must learn that mere numbers and new technologies can be the enemy of proper boundary surveying. It is so much more and up and coming surveyors need to be grounded in core areas of expertise. Increased knowledge of history, common law, statute law, local customs and public relations is indispensable for the boundary surveyor.

Technology has brought us to the point where an individual can no longer be proficient in all areas of surveying. Like the medical, legal and engineering professions we must select a specific area of practice. No one can devote the time and dedication necessary to be all things to all people. If your desired field of practice is to be boundaries, focus on its guiding principles. Know the math and the technologies, they will be your tools. But the boundary, surveyed well, will be your masterpiece.

As an example of a core principle which must be understood, consider the simple yet complex differences between "lost" and "obliterated. I am absolutely appalled at the number of supposed professional surveyors who have no concept of the difference between lost and obliterated corners.

Is the surveying profession attracting sufficient numbers of new surveyors and what role does education and/or experience play?

I have been sounding the alarm for forty years that the Land Surveyor is an endangered species. We have been engaged in a race to the bottom of adequate compensation for our services. The education/experience requirements for surveyors in many states are identical to that of engineers.

Compare the entry-level salaries for a newly licensed surveyor to that of an engineer! The relationship is laughable, and we should be ashamed. I cannot, in good conscience, recommend the profession of Land Surveyor to a young person today. Compare the number of new engineer licensees to the number of new surveyor licenses each year. Who can blame them? Does anyone really think that making it more difficult to qualify to take the exam will increase the number of successful applicants?

Describe a current weakness in practice of surveying; how may education and/or experience remedy this?

I think I have covered the issue fairly well in answers to the previous answers. Surveyors seem to loathe charging a fair price for their services. This prevents them from taking the time and effort to properly train/mentor new employees. Most members are sent immediately to the field or placed in front of the CAD station with instructions to "get 'er done". Supervision and training are almost non-existent – we can't afford any non-billable time.

Encouragement and leadership is effective. More rules and constraints are not.

Wiley, continued from p.9

Missouri requires a path to licensure of education, experience and testing. Is any one of these more important than the others?

I have heard many talk about what it takes to make better surveyors and the truth is experience makes a better surveyor. So I think experience has to stay at the top of the list when it comes to licensing someone. You can read books and watch movies but the only way you learn to ride a horse is to grab a saddle and get on. We can educate and test to determine competence but unless new surveyors can climb the next hill, debate the irate neighbor or deal with the elements, education and testing can become dangerous because they promote an atmosphere of getting around the physical work.

With my personal quip aside the question wasn't "what makes a better surveyor?" but what is more important on the "path to licensure". As much as we will not want to admit it, it is testing. Just as life is a test where each day we get up and meet the world in what becomes a painful pass fail kind of way testing is how we determine if they are ready for the task. I've spoken to a number of individuals who having failed the licensing test was ready to blame that failure on a personal tragedy. Personal issues can keep us from concentrating causing us to fail and how true is that in the work environment? Family, health, bills - life is filled with challenges posing continual tests yet we must be able to concentrate and move ahead. Those who can't put their personal trials aside to deal with a formal test are going to face disaster as they battle it on the job, at home, for life.

If you can't deal with what you will confront in the everyday setting how are you going to deal with the threats from the neighbors who are not pleased with you being in their yard? The Sherriff who is tired of coming out to your survey site because you have shown up again and yes the neighbor has called again? We cannot change the testing to fit all circumstances. But we can use it as a fair measure of competency and surveying candidates must pass tests to demonstrate they are qualified.

What knowledge, skills and abilities are most important for those with the desire to become a surveyor?

The next generation surveyor is going to need to be a better manager than we have had to be in the past. While a technician may be great at collecting data, another can make a Cad program sing or someone else will relish digging through the archaic archives of the public record, the future professional surveyor is the one who will make all of those pieces work together while protecting the public welfare and still turning a profit. Managing time, tools and technologies all while complying with OSHA regulations, community development boards, and tiers of plat standards trying to delivering quality services that meet the clients' needs.

I have heard how all of the work is going to be done by one man shops that use equipment worth thousands of dollars, while some may achieve successes I think they will be few and far between. A business person cannot afford to buy equipment that costs what it does and use it one piece at a time in the hands of that one person. I think the logical outcome will be buying equipment that one person uses in the field daily; purchasing hard and software used by the office to produce drawings; and with someone else doing administrative tasks. In the middle of this three ring circus will be the surveyor discussing what the client needs, writing proposals, managing those skilled operators and helping them complete their tasks, preparing billing and seeing that the work has been done as specified. To do this will require more management skills than we have ever had to have. This is an area which we should look at expanding our requirements.

Is the surveying profession attracting sufficient numbers of new surveyors and what role does education and/or experience play?

I don't think we are attracting half the individuals we need. Surveyors have embraced the new technologies and we should embrace more. We have tried to blaze a trail that makes it easier for new professionals to follow. So, what role does education or experience play and how can it be used to encourage young people? Very little in my opinion.

Wiley, continued on next page

Direct & Reverse *(continued)*

Wiley, continued from p.11

Instead, we must think higher of ourselves if we want to encourage others to be part of our profession. When we say (and I have heard) "I've discouraged my children from being a surveyor" we are saying something very loud and very clear to all young people. What we do is not easy and there are times when it isn't profitable but those are two of the requirements that keep us from being a trade or just another business. Not all professions are profitable 100% of the time. Not all of the work is pretty but it is honorable, especially when we think about our charge to bring peace and harmony to the neighborhood. A challenging task yes, one with no dignity at times yes, but something we should be proud to do all the time.

Describe a current weakness in the practice of surveying; how may education and/or experience remedy this?

I think we can all be guilty of building a fiefdom for ourselves, those places where others should be cautious as they tread. To truly be working for the betterment of the people of Missouri there cannot be a realm where we are Lord and Master. Don't misunderstand what I'm saying Surveyors will always be needed to establish and reestablish property lines but they are not our lines, we typically don't live on one side or the other of the lines we mark. They are the lines of and for the people of Missouri that we mark and preserve.

We do that for money since most folks now go to the store to get their chicken. For more detail on that statement you have to understand my Mother in Law thought surveyors were still working for extra produce and the odd livestock found around the farm warning my wife "he will never amount to anything".

In some ways she was spot on with her assessment of my abilities but the truth is surveyors are learned professionals who work for the betterment of the community. If good fences make for good neighbors then understanding and establishing good boundaries becomes critical. We will always be needed to set the line between owner "A" and owner "B". We know the original surveyor of a subdivision is the authority in that subdivision but we do not own those lines.

Mark Your Calendar!

May 9-10, 2015
37th Annual Spring Workshop
Lodge of the Four Seasons, Lake Ozarks

"The Surveyor in Court"

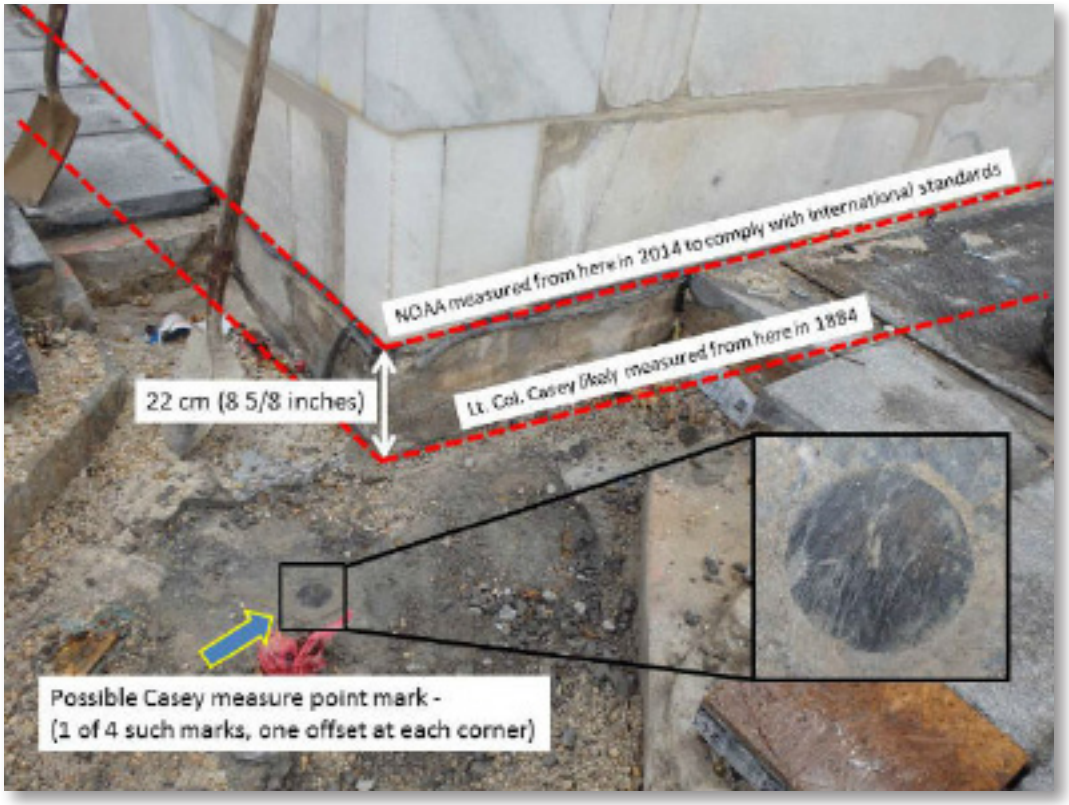
NOAA's National Geodetic Survey Study Uses Latest Technology to Compute Updated Washington Monument Height

News from the National Geodetic Survey, Monday, February 16, 2015

Using new international measurement standards and technology not available in the past, NOAA's National Geodetic Survey has calculated the official architectural height of the Washington Monument to be 554 feet 7 11/32 inches--a highly precise measurement that makes it eligible for inclusion in official registers of the world's tallest structures. NOAA's NGS provides the framework for all positioning activities in the nation.

The NGS measurement was made using measuring certification standards of the Council on Tall Buildings and Urban Habitats (CTBUH) and was finalized in December 2014. The final results were reported to the National Park Service in a report that will be available online beginning February 17.

Although the newly established architectural height differs from the historical height of 555 feet 51⁄8 inches, neither the starting point nor the so-called "standard deviation" used for the original 1884 measurement is known, making comparison of the two measurements difficult. The new architectural height provides baseline documentation that can be easily reproduced for comparison with future measurements and investigations to determine if the height of the monument is changing in any way.



This photo with overlay shows the measuring points likely used by USACE's Lt. Col. Thomas Casey in 1884 and the international standard measuring point used by NOAA in 2014. (Credit: NOAA)

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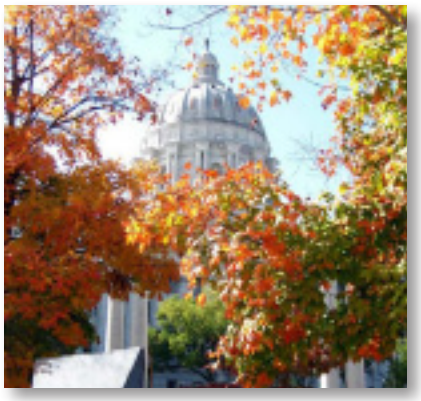
St. Louis Chapter Meeting

January 21st installation of officers, MSPS St. Louis Chapter banquet. State Land Surveyor Darrell Pratte administers the oath to (from left); Vice President Brian Higgins, Secretary/Treasurer Ryan McDowell, Director 1 Jim Exler, Director 2 Jay Haas, Director 3 John Taylor, Director 4 Chuck Quinby and President Philip Grout.

Capitol View
A Look at Surveying Legislative Matters

Members of the Association of Missouri Electric Cooperatives (AMEC) are seeking exclusion from the changes enacted last session to RSMo 327.272. Those changes amended the definition of the practice of professional land surveying to include *the preparation of property descriptions, the surveying of rights-of-ways and easements*, and work involving design surveys. Wanting to preserve their practices of writing "as-built (as-installed)" easements for distribution lines, AMEC wishes to "1) "carve out" utility easements when prepared directly by the utility; and 2) insure that any easements filed for recording directly by the utility since August 27, 2014 (the day before the effective date of SB 809), if any, are valid…".

MSPS lobbyist Mo McCullough reports that Missouri's surveyor legislators (Korman, Miller and Ross) as well as other surveyors have been actively working on this matter. Their top priorities are keeping 327.272 intact as is and the protection of private property owner rights. This may become a daunting challenge due to AMEC's strong position of political access and influence.



McCullough advises MSPS members be prepared to contact their representative and especially their senator when asked to do so on this issue (watch for "Legislative Alert" via email).

In conjunction with this, the MSPS Standards Committee is collecting real world examples of how the preparation of descriptions by non-licensed groups and individuals has harmed the public. Members are asked to send examples to chris.wickern@gmail.com. The information will be consolidated and used to present the reasoning that the public is protected when the preparation of new descriptions is performed by a Licensed Land Surveyor.

Who Knew...
Song: All the Surveyors

On September 16 2014 a rock band by the name of *Shellac* released the LP Dude Incredible. The LP included three songs with a reoccurring theme – surveyors! They are; *All the Surveyors, Mayor/Surveyor* and *Surveyor*. Shellac singer/guitarist Steve Albini shed some light on *All the Surveyors*:

"We first got into a surveyor kick when, I can't remember if it was [a bandmate] or me, we noticed that quite a few of the founding fathers of our country, the United States of America —were in fact, surveyors. Meaning that they took a chain and a pole and paced off the physical dimensions of our new country. They physically measured the place they were living in and that was part of their definition of where they were living. How much more could the borders of that place mean to you and its identity as a nation than that you had physically measured it?"

"A lot of the founding fathers were surveyors, including George Washington. But if you think of the word "survey," that means that you're assessing something from a distance and measuring it. There are a lot of circumstances where there's an external observer surveying what's going on. It doesn't even necessarily have to be a person these days. It could be a satellite or a drone or a surveillance camera."

They Went Where Only Indians Had Been

Surveying the Missouri-Arkansas Territory

by Deidra Morgan, Photography by James Heck, Lisa Goss, Cherie Burns and Deidra Morgan, Illustrations by James Heck and Deidra Morgan

To commemorate the Bicentennial of the 5th Principal Meridian in this edition of Missouri Surveyor we present *They Went Where Only Indians Had Been*. A high school writing project to preserve Ozark history and lore by Deidra Morgan she first recounts the historic surveying events of 1815 and then proceeds to tell a compelling narrative of surveying practices and people in the 19th century Missouri Territory.

It was an early November day in 1815, when the drizzle that had been holding the surveyors up for four days turned to a steady downpour. Although it was raining steadily, the surveyors would have to go on, for they had a deadline to meet. Prospect K. Robbins, the surveyor of the Fifth Principal Meridian in the Missouri-Arkansas territory, told his men that they would have to continue the best they could. Although it was raining, they could still see enough to survey. Sometimes seeing very far was hard in the wild lowlands where they were surveying in east-central Arkansas. The land that Robbins had to cross was all swamp land covered with cane, sweet gum, cottonwood and other lowland plants. They had to face the wild animals, wade through vast areas of swamps and now contend with the weather which had turned bad, further inundating the land.

Robbins' party was to meet another surveying party headed by Joseph C. Brown, the surveyor of the base line in the territory. They were to meet him sometime around the first of November, but with the weather they were now facing, they would probably meet him around the middle of November instead.

Brown's party, also having problems covering the ground, did not know what kind of time Robbins was making. They themselves were about five days behind, for the terrain was more difficult than they had expected. Right in the line of survey they had run across still another almost impenetrable forest section on slightly higher ground. They had to run their line through it, but the forward progress was slow. The men with the axes were having trouble cutting a path. Wet and cold, the flagman started out to sink almost to his hips into a hidden hole. Fearful of an injury out in the territory miles from any help, Brown decided to proceed very slowly, even though he was already behind schedule.

Brown had a shorter distance to go, but not being aware of it, he passed what was to be the intersection on November 2 and kept on two more days before returning to look for Robbin's party. Robbins reached the base line on November 10, set a post for the initial point and marked two gums as witness trees. The initial point was the point from which all surveys north, south, east and west in Missouri, Arkansas, Iowa, Minnesota and parts of North and South Dakota were taken.

Both parties had begun from points on the Mississippi River in present day east-central Arkansas. Robbins' party began at the mouth of the Arkansas River on October 27, 1815, and headed north on the Fifth Principal Meridian to intersect the base line, which Joseph C. Brown was running. Though Brown started the same day as Robbins did to survey the base line, he surveyed west from the mouth of the St. Francis River, some seventy-five miles north.

The two parties camped near this point for a while before Robbins' party continued north, on November 16, reaching the Missouri River on December 28, a distance of 317 miles, 35 chains and 76 links. That was as far as Robbins went. Later surveyors extended the line on north. Brown departed to continue west on November 25, reaching the Arkansas River on December 5.

Though this description of weather conditions is dramatized, all the facts in the surveys of these two parties are based on historical information. The work of Robbins and Brown was necessary so that the huge expanse of land the United States had recently acquired in the Louisiana Purchase could be opened to American settlement. There was great pressure to survey the lands to satisfy military bounty requirements. Thousands of acres of land were needed for warrants given veterans from the Creek Indian wars and the War of 1812. Soldiers were given land instead of pay.

The two lines run by these men, and the subsequent township and range lines surveyed from these lines, subdivided many hundreds of thousands acres of land. The initial point where the two lines intersected in Arkansas was located 55 miles, 60 chains and 50 links north of the Arkansas River and 26 miles, 20 chains west of the mouth of the St. Francis River. It is the point where present day Lee, Phillips and Monroe Counties join. (A chain was a measuring device surveyors used until about 1900 when the steel tape replaced it. A chain, composed of 100 links each 7.9 inches, is 66 feet long.)

(continued on next page)

They Went Where Only Indians Had Been *(continued)*

This map shows the territory that Robbins and Brown had to run. Robbins surveyed north on the 5th Principle Meridian and Brown surveyed West on the Base Line.

This stone marks the base established November 10, 1815, from which the lands of the Louisiana Purchase were surveyed by United States Engineers. The first survey from this point was made to satisfy the claims of the soldiers of the War of 1812 with land bounties. (Photo courtesy of Robert Elgin.)

Robbins and Brown going as quickly as they could in a straight line probably ran seven or eight miles a day. They marked every half mile corner at 40 chains and mile corner at 80 chains by setting stones or wooden posts and marking witness trees.

In the 1820s and into the 1850s, later surveyors crisscrossed the whole region, dividing it first into townships and then further dividing the townships into sections. By 1850 all of Missouri and northern Arkansas were subdivided.

Township lines ran east and west from the Fifth Principal Meridian surveyed by Robbins, and range lines ran north and south from the base line established by Brown. These lines, running every six miles formed townships which were approximately six square miles. One-half and one mile corners were set completely around each township. From the mile points, section lines were run east and west and north and south, cutting the township into thirty-six approximately one mile square sections of 640 acres each.

The surveyors who accomplished this mammoth task were contract surveyors following laws set by Congress and the orders of the Surveyor General. It was the Ordinance of May 20, 1785, which stated that the land was to be subdivided into townships and sections. There were laws establishing the personnel, their duties, the manner of surveying and how the land was to be sold or disposed of.

The surveys in Missouri and Arkansas were made under the direction of the General Land Office. The surveyor generals of various states were appointed by the President. They then appointed the deputy surveyors, clerks, draftsmen and other workers. These men, who actually did the work in the field were hired on contract.

The wages of the head surveyor in the field, who had the title of Deputy Land Surveyor, were set by the President of the United States with the provision that the entire expense of the surveying did not exceed $3.00 per mile for every mile that was actually surveyed. The average pay for a surveyor was about $2.00 a mile for running townships and section lines. This amount included the wages of his helpers, chain carriers, markers, cooks and all other expenses.

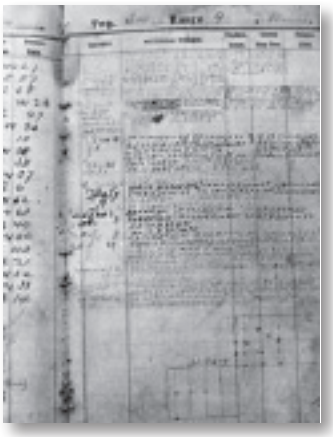
The surveyor had a great responsibility and many duties. Besides running the lines, he was obliged to keep records of all sorts of information about the land they went through. He had to note all creeks, settlements, roads, mill sites, any show of iron or any sort of mineral. He noted all salt springs and licks, mountains, drainages and any remarkable and permanent land marks as well as the quality of the land.

The surveyor kept these records, in a small handbook he carried with him while surveying. Following is a sample taken from one of these books. “A post oak 6 inches in diameter bears north 22° west, 88 links, and a post oak 10 inches in diameter bears north 11° east, 82 links.” It also reads, “At 25.23 chains, we hit a black jack 5 inches in diameter. At 27.96 chains we hit a post oak 3 inches in diameter. At 40 chains we set a post for the one-quarter section corner from which a post oak 9 inches in diameter bears north 50° west, 39 links and a post oak 9 inches in diameter bears south 60° west, 357 links.”

The surveyor also described the land. “Land rolling, barren, very stony soil, third rate, unfit for cultivation. Timber young growth of black jack, post oak and hickory, but scattered. Undergrowth the same. At 71.65 chains we hit a branch (creek) 10 links wide that runs west.”

After noting all this information about the land, he recorded his work. “At 80 chains we set the corner of sections 25, 26, 35, 36, Township 39 North range 6 west, fifth principal. Set being a sandstone 20 inches long, 13 inches wide, 5 inches thick and 8 inches in the ground. Edges facing north and south of which a black jack 4 inches in diameter bears north 17° east, 120 links and marked with section 25 and a post oak 5 inches in diameter bears north 29° west, 74 links and a post oak 10 inches in diameter bears south 36° west, 364 links.” The records were thorough and detailed.

The notes and plats were very important to the actual surveying and for later settlers. In many cases the surveyors were the first white men there.



Since surveyors were required by law to record every measurement and every little detail about the land, they carried these little pocket books called field books. They came in different sizes and shapes, but most were small enough to fit into a pocket. (Robert Elgin)

Besides having to note the precise length of every line that was run, including all the offsets they might have had, they had to record the kind and size of all trees on the course that they were following. They recorded the kinds of earth or stone materials that they came across, and all landmarks they saw.

They had to tell whether the land was level, rolling, broken or hilly, whether the soil was first, second, or third rate, whether the bottom lands were wet or dry, and if subject to flooding, whether there were any springs, and if they were fresh, saline, or mineral and the sizes of all ponds and lakes, and whether they were pure or stagnant.

They also had to record any improvements they came across. These were such things as fields, cabins, houses, Indian villages or other signs of habitation such as roads and trails and their directions.

The surveyors recorded all streams, any rapids, cataracts, cascades, or waterfalls and the height of their fall in feet, any caves, sink holes, cliffs and ravines. They noted any evidence of minerals such as iron and lead and stone quarries and the kind of rock they were.

All these notes had to be written down on the spot, for nothing was to be left to memory or the imagination.

Though most of the land they surveyed was uninhabited, they did run across some previous settlement. There were claim jumpers or squatters who preceded the surveyors, and since the land had been owned previously by the Spanish and French governments, the surveyors encountered several land grants which were already in existence.

Written on one survey plat are the words, “Survey 3120 to Pascal Cerre.” This early settler was given a grant of 3,000 arpents, a French measurement of about 0.85 of an acre.

This grant was surveyed out at an earlier date on the lines of the section lines and township section lines. All of the old grants were eventually tied into the township section lines.

DIVIDING THE TOWNSHIPS

Townships bordered on the north and south by township lines and on the east and west by range lines were then divided into thirty-six sections.

The numbering of the sections began with section one which was always in the northeast corner of the township. The numbering continued west to section 6, dropped down one tier of sections for number 7 and continued east. The other sections were numbered using this same back and forth snake-like manner.

There was a standard method of subdividing townships into sections. The surveyors began at the southeast corner of the township on the corner of section 36. They first ran a blank line north along the east line of section 36 to get the direction of the range line and the compass variation at which the section lines would be run. That line was known, already surveyed meridian line. Then they returned to the southeast corner of the township and went along the township line to the south corner of sections 35 and 36 (which was already set) to start the survey.

They ran north 40 chains (1/2 mile), set a marker, marked witness trees and then continued north another 40 chains (1/2 mile) 80 chains in all, and set a corner. This would be the northwest corner of section 36. Then they ran a random line eastward to hit the range line and tied into the corner of section 25 and 36 which had already been set. They knew there was a corner there, but didn’t know the exact direction to run to hit it. The random line might have missed the true corner a few links or maybe a chain

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They Went Where Only Indians Had Been *(continued)*

(66 feet) or more. They would then change their compass variation to the true line and run west from the east corner of section 25 and 36, marking the true line and setting the quarter corner between section 25 and 36 at the mid point.

This completed the surveying of section 36. They would go back to the northwest corner of section 36 and 25 and run north on the true line, setting a half mile stone, and then survey section 25 in the same manner. They continued surveying each section in this way up the eastern range of sections to the south corner of sections 1 and 2. They then ran north until they intersected the township line, set the north corner of section 1 and 2 and noted their falling from the nearest section corner on the township line.

This map shows a land grant to Pascal Cerre of 3000 arpents or 2,550 acres. An arpent is a French measurement of about .85 an acre. This grant was surveyed out before the township and section lines were run. (Robert Elgin)

Then they would come back to the south township line on the south corner of sections 35 and 34 and repeat the process on that north-south range of sections.

They would go through the township until they got to the westernmost range of sections at the south corner of sections 31 and 32. From here they would continue as before by surveying section 32, but instead of going on north to section 29, they would run west on a true line until they intersected the range line on the west side of the township and set the west corner of sections 30 and 31. They would note their falling with the already set corner of section 36 and 25 of the next range to the west. In this way they surveyed two tiers of sections on the last northern advance in the township.

After all the surveying was completed down to the sections, the land was ready for settlement. However, not every section in a township could be acquired by the public. Under Ordinance of 1785, section 16 of every township was to be set aside for a school. Approximately 80 million acres of public land was set aside for public education. This was one of the most remarkable laws of surveying.

Although they could not legally get title to the land, people started moving west of the Mississippi about 1800. This meant, of course, that there were squatters.

Most of the land in the early years in Missouri and Arkansas was patented. In other words, it was purchased from the government at about $1.25 per acre. The Homestead Act did not come into effect until about 1862. This act allowed a setter to prove up land by occupying it and by living on it. The setter would pay a certain amount of fees for office work and maybe surveying. Then he acquired the title to it.

LIFE OF A SURVEYOR

There were several men who affected the outcome of the Missouri surveys. Prospect K. Robbins and Joseph C. Brown ran the Fifth Principal Meridian and base line. Daniel Dunklin was in charge of all Missouri and Arkansas surveys in 1823 or 1824. Other persons who had a hand in the Missouri-Arkansas surveys were William Rector, the first Surveyor General of Missouri and Arkansas, whose office was located in St. Louis, and in Missouri, William Ashley (1778-1838), an explorer and fur trader, who later became a Missouri congressman from 1831-1837.

All these surveyors were men skilled in surveying. Although some colleges at the time of the Missouri surveys had courses on surveying, such as William and Mary College in Virginia, from which George Washington graduated, most surveyors learned by being apprentices to other more experienced surveyors. Even today, although there are many courses taught on surveying, a great deal of the training comes from working in the field.

Robert Elgin, surveyor and engineer for R. L. Elgin & Associates, is shown here holding a leveling rod. This picture was taken on September 5, 1934, when he first started surveying. (Photo courtesy of Robert Elgin.)

The life of the early surveyors was a very hard one, for they had to face all kinds of dangers and were exposed to heat and cold, dry conditions and to diseases and accidents in an unpopulated area. They had to travel across land where there were no roads, only an occasional Indian trail. They had no cabin to come home to, only a tent in which they lived with their fellow workers.

They had to carry all their supplies with them. For a party of six for approximately four months, they would need about 8 barrels of flour, 3 barrels of clear salt pork, 3 or 4 bushels of white beans, 10 pounds of tea, 60 pounds of coffee, 150 pounds of good dry sugar, 2 bushels of dried apples, pepper and salt, 25 pounds of rice, 25 pounds of oatmeal, 5 pounds of castile soap, and any other articles the head surveyor thought he could afford, for he had to pay for all supplies from his salary.

The life style was a very primitive one. Their shelter was a large soldier's tent. Their covers were mackinaw blankets. They carried their water from the nearest creek in a tin pail and washed in a small basin. Other utensils were knives, forks, spoons, frying pans, matches and other little necessities. What they brought along depended on the country they were surveying.

To carry the supplies they used one or two pack mules, packsaddles, and a quantity of good bags for packing provisions. They obviously had to carry everything with them.

They used very simple equipment so they would have a lighter load to carry. The surveying equipment they needed was a compass or a transit, tripod or Jacob staff, a flag of some sort, range pole, chain and chaining pins.

Sometimes the surveyors took along an extra compass in case the main one got broken since they were pretty easy to break. The main thing that might be injured was the pivot that the needle turned on. When the pivot got dull the needle swung very slowly and might not return to the same point all the time. For that possibility they had an extra pivot or some sharpening stone to sharpen the pivot. Although compasses did tend to break, they did not break as easily as transits.

For their records they needed some kind of drafting supplies for drawing up their plats, which were drawn to some extent in the field, a notebook and a pen or pencil. A pencil was preferred as it was easier to handle than a pen and a bottle of ink. They also needed scribing knives, for marking trees, axes and hatchets for clearing lines, shovels for digging holes to set posts and stones, and, of course, camp equipment. The camp equipment would probably include a tent, some sort of ground cloth, blankets or buffalo robes.

When they moved into a township, for instance, if they were going to subdivide a single or several townships, they would move into a central location and set up camp. The cook would stay in camp while the survey group would start working out of that camp, coming back to it every night. As they got further and further away, the camp would move right with them. Robbins, while running the Fifth Principal, running six, seven and eight miles a day, probably had his pack train travel right with him. The men would hardly live off the country at that time, for there were not enough settlers. Some of the older records indicated that the surveyors lived mostly on salt pork, beans, coffee and wild life, such as deer, as they would kill it. They probably had a pretty rugged existence.

On an average day surveyors might run from four to eight miles, depending on the type of land. Some might have gotten ten. Robert Elgin, engineer and surveyor for R.L. Elgin & Associates in Rolla, Missouri explained the procedure. "They had to go north forty chains and set a corner and take at least two witness trees. That takes a little while. Then they had to continue north another forty chains, set a corner, take two or four witness trees, then turn east and run a random line and at forty chains set a temporary post. Then they would run on into the next corner, find out how much they had falling off of it and figure how much they had to move this temporary post to get it at the mid-point. Then when they got that calculation, they would probably take two witness trees to it and go on. That is probably what they did without actually running the line back. Some have run it back and blazed it. But that takes quite a little time.

"Today on a corner search if we can run two to three miles, we are doing awfully well. We're running a good deal slower because we're looking for the old markers. Sometimes if we run twenty or forty chains, we might have to make a search area that might be 150 feet in diameter. We might spend an hour just looking for a corner. But they were punching lines through the country first."

Since the surveyors had to follow straight lines regardless of the topography and measure on the level when traveling through the country, they used short chains, so the surveyor would not be tempted to stretch a chain across ravines, causing a place for error. (A short chain is 50 links or 33 feet).

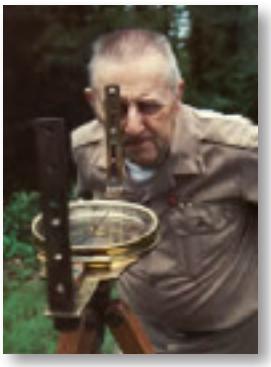
Surveyors also had to blaze the trees as they went along. If they hit a tree on the line, they were supposed to put a long blaze on the face of it. If they passed trees on the right, they would blaze on the right side of the tree; if on the left, they would make a blaze on the left side of the tree.

(continued on next page)

They Went Where Only Indians Had Been *(continued)*

They marked the trees near the mile and half-mile corners differently. They called these trees witness trees for they were more evidence of the location of the corner. The witness tree is a tree to which the corner is tied. As a surveyor went north, he would tie his corner to about four trees. "For example," Elgin said, referring to an old plat he had, "this surveyor set a stone for the corner. He then tied it into a black jack 4 inches in diameter which was north 17 degrees east, and he had a 5 inch post oak north 29 degrees east, and a Post oak 10 inches in diameter south 37 degrees west, and black jack 8 inches in diameter south 45 degrees east 218 links. So with these four witness trees, if this corner marker was lost, you could come back and reset it from any one of the trees or a combination of them."

At about chest height the surveyors would rake a blaze on at least one tree in each section. On a big blaze, scribed with a marking iron, one might find the words, "Section 26, township 39, range 6." They didn't usually burn the words in it because it would be too time consuming to heat an iron to do that each half-mile.



This 1850 Gurley is a brass vernier compass. Mr. Elgin explains how the surveyor would look through the first sight and line the second sight up with the flag pole. This compass is just one of the many instruments that Mr. Elgin has.

"They used the same marking irons we use today, sort of awkward looking knives," explained Elgin. "There are several models of these, some of which will cut circles, though that is hard to do. But with these irons you can cut a pretty good cut in the tree with it. It was a wicked looking knife."

Crossing big rivers was another problem for the surveyors. Streams like the Gasconade in Missouri, really presented some problems. Therefore, many of the surveys ran into the river and stopped. Then the survey would be run in from the other side. This practice makes problems for surveyors today because the lines usually never line up, causing jogs along the river.

This practice and other inaccuracies in surveying have caused the wording in many deeds to say so many acres "more or less."

"They said this because it's awfully hard to tie down exactly, unless you use very, very precise methods. And in the old days they didn't," said Elgin. "When using the chains and compasses they had, the precision was a great deal less than it is today. Matter of fact, when they were subdividing the country, a township was supposed to close within five chains (330 feet) and individual sections with one chain (66 feet). This is quite a little difference. That is pretty rough work. So that's why they put in the stipulation 'more or less' because the accuracy or precision was not too great."

Today surveyors often have to go back and retrace most of the old lines that the surveyors ran back in the 1815s to 1850s. When retracing the steps they took in that time, modern surveyors must do quite a bit of detective work to search it out. Bob Elgin has done a lot of this type of work.

"You have to put yourself in their place," he said. "You really have to follow the footsteps of the old surveyor when you're doing retracement work. Usually we start on an old corner we know is good and then we'll start running a line. Then when we tie into an old corner, we'll adjust our variations just as they did and also their measurements, because our measurements would differ from theirs. After we've worked in an area for so long a time, we can work out a proportion between our measurement and their measurement. Then we can change our measurement so that we'll be fitting theirs. If we're over-running, why take a little off, and if we're under-running, add a little on. We adjust the measurements, to make ours coincide with the old measurements, since everybody measures a little different. And, of course, these old guys were going fast. Since they were getting two fifty to three dollars a mile, they had to punch lines through the woods in a hurry. Their precision was a little less than desired, but it wasn't bad for that day. We find when we're retracing old lines, if we're a little bit sloppy, we'll balance."

This scribing knife (right) was similar to ones used to mark witness trees such as this mark found in a cut tree (top of next page). The drawing shows an example of what might be scribed on the bark of a tree. The knives were very effective, allowing the workers to cut about a quarter inch deep into the tree.

HOW THEY SURVEYED

In the actual surveying of the Missouri-Arkansas territory, a surveyor had to have a thorough knowledge of the equipment and the methods of using the equipment.

To begin the survey, the first thing they would do was to set up their compass. Most surveyors preferred to use a tripod to set the compass on, though they could use a Jacob staff. The Jacob staff was harder to get to stay when they reached the rocky ground of the Ozarks because it is just a sharpened pole that is stuck in the ground. A tripod gave better stability.

With the compass ready and sighted in the correct direction, the flagman would head out along the line that they were surveying. He would go out as far as the compass man could see him. It generally depended on the ground cover and the weather how far away he could see the flag with his compass. The flagman would then wait for the compass man to signal him which direction to move the flag.

Next, the compass man would look through his sights to the flag. He would motion to the flagman to move the pole right or left. After the compass man had the flag sighted in, he would tell the front chainman to run out the chain. There were two chainmen, the front chainman and the back chainman. The front chainman would pick up his eleven chaining pins, which are used as markers and to hold the chain in place, and he would start walking toward the flagman, dragging the chain behind him. Before heading out, though, he would throw down one chaining pin as the zero pin to mark the beginning point and then he would start dragging the chain along the ground on the line. The back chainman would hold the other end, while the front chainman pulled his chain tight and laid it on the ground.

When the front chainman got to the end of the chain, the back chainman would yell "chain." The front chainman would stop and move over in line with the flag. Pulling a pin from the loop of chaining pins he carried, he stuck in a pin at the handle of the chain and yelled "stuck." The back chainman would release his end of the chain, remove the pin and put it on his loop. The front man would go ahead dragging the chain while the back man would move up to the pin just stuck and hold the end of the chain as before. The two continued this measuring, the front man putting in the pins, the back man pulling the pins as he came to them and putting them on his own loop as they progressed on.

When the front chainman would run out of pins, he would yell "out." That would mean for the back chainman to come up and give the front chainman the ten pins on his loop in exchange for the front chainman's empty loop. There were only ten pins on the loop, because the eleventh pin would still be stuck in the ground holding the chain. Using all the pins would mean they had gone ten chains or 660 feet. After the front chainman would run out of pins again, they would start all over. Surveyors use the same method of surveying today, except they use a steel tape instead of chains. However, they still call them chains.

The jacob staff is a wooden pole with a pointed end to stick in the ground. Most of the earlier surveyors used a Jacob staff because it was easier to carry than a tripod. However, it was not used as much in the Ozarks because of the rocky ground. Jacob staffs were used mainly for cruising timber in forestry work. This particular jamb staff came equipped with a foot bar to help surveyors stick it in the ground.

The purpose of surveying was to run accurate lines and measure the distances. The major piece of equipment for measuring was a chain. Chains, composed of links, could be folded up for ease in carrying or storing. A standard chain was 66 feet or 100 links, though most chains were 33 feet or 50 links. Surveyors used the shorter chains in rough country to avoid stretching the chain across a ravine.

(continued on next page)

They Went Where Only Indians Had Been *(continued)*

Most chains were commercially made. A surveyor working in the rural area of Missouri who could not afford to buy a chain made his own. He was a good craftsman, but each link being different made a larger margin for error.

The chain was replaced by more accurate steel tapes around the turn of the century. It became impractical because every place that the links fit together there was a wearing surface. The more they used the chain, the longer it got.

Many times if the surveying was going across rough country, the chainman probably could not go a full chain without having to break chain. This is where they would be going across the country, and would come to a place where the compass man would have to pick up his compass and start over. By breaking the chain the surveyor's measurement might read 5 chains and 36 links, instead of 6 full chains.

As the surveyor proceeded along the line, he obviously had to record how many chains he had gone, for his purpose was to measure as well as mark the line. He recorded this by seeing how many complete chains he had gone by counting the pins missing from his loop. If the measurement was less than a chain, in other words, if he had to break chain, he recorded the measurements by reading the tally markers on the chain.

A tally was attached to the chain every 10 links. These tally markers came in different shapes and sizes and had different ways of indicating whether it was the first, second, third, etc. tally. Some tallies had numbers on the markers, some had holes or little prongs cut out of the markers.

Then when the front chainman reached the flagman, he would yell, "set a point," or he might just wave a hand over his head, which meant set a point. The surveyor would then set a point by pulling up his compass, moving up and setting over that point. Then they would start the whole process all over again with the flagman moving on. After they had measured a half mile, the early surveyors would usually set a stake or something to mark the half mile. Today on ordinary surveying surveyors set stakes closer than that.

When the early surveyors went through, they were required by law to set corner and half mile markers. They set some temporary ones made out of wood and some more permanent ones by using sandstone.

Some of these old corners are still in existence, while many have rotted away or disappeared. Today, surveyors go back to do corner searches, which requires some detective work, but they do find some of these old corners.

"They usually recovered about fifty-seven percent of these old corners." Mr. Elgin explained. "It takes a lot of detective work and a bit of archaeological work to do it. It's not easy, but you can do it if you're very careful and know what you're doing. We find a lot of them. There's still an original witness tree standing at what would be the southeast corner of Gasconade County. It was one of the 1816 witness trees."

Then when all of the surveying job was done, the surveyors would pack up their equipment, pull up the stakes of their tents and head home. They would probably go home to their families to rest up and get ready for their next assignment.

The efforts and troubles of the early surveyors are not written up in history books nor celebrated in stories as are the hardships and trials of the early explorers and settlers and the heroic efforts of lawmen to make settlement possible. Even the exploits of very early trappers and Indian traders are better known to modern readers. But before any true settlement could occur, before anyone would get legal title to any real estate, even before anyone knew much about the natural geographic and ecological particulars of any area, the surveyor and his team of about six workers on a total budget of about two dollars a mile, quietly, efficiently and bravely crisscrossed every square mile of thousands and thousands of wilderness acres. Alone and heading into territory where only Indians had been, these skilled and krafty men, using inferior and sometimes homemade equipment, ran lines which have a direct bearing today on every plot of land, every building and road in a six state area west of the Mississippi River. It all began on that wet November day in 1815 when Prospect K. Robbins and Joseph C. Brown established the Initial Point.

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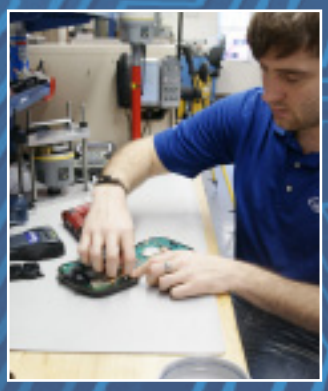

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Homeowners Drowning in Flood Insurance Bills Over FEMA Map Errors

by Jennifer Girdon, Published December 31, 2014, *FoxNews.com*

Homeowners across the country say they are drowning in unnecessary flood insurance bills -- due to errors in the Federal Emergency Management Agency's redesigned flood maps.

In 2012, FEMA began updating its outdated paper inventory of maps with new digital ones. Millions of homes ended up in newly drawn high-risk flood zones, including houses built on high ground and away from water. As a result, homeowners with mortgages from federally regulated or insured lenders within these high-risk zones were required by law to carry additional flood insurance.

San Diego resident Laura Clemons is just one of thousands of homeowners who got the surprising news last year, when she was told that her home, on top of a hill, had suddenly moved into a high-risk flood zone.

"I got a letter from my mortgage company, telling me I was going to have to pay flood insurance, which was a joke because I live across the street from a canyon," Clemons said. "They gave us three months to notify them or they were going to start charging me $2,000 a year."

She got in touch with local land surveyor Michael Pallamary, who had been working on similar cases in the San Diego area.

Pallamary learned quickly that the problem had been affecting people all across the country.

"The maps are all in error," he told Fox News. "And because of the erroneous maps, they're requiring these homeowners to purchase very, very expensive flood insurance and this is absolutely absurd. These are not flood-prone properties. They're high and dry and safe and secure."

Pallamary said some of the new high-risk flood zones include homes perched high above the water that are now drawn into the ocean, while other maps show homes at risk from rivers and creeks that have been dried up for years.

FEMA has admitted that some maps contain topographical errors and said it is working to correct them. However, to avoid the extra insurance premium, homeowners cannot wait for a FEMA fix. Instead, they need to prove it themselves by submitting for a FEMA "letter of map amendment" -- to get a revision.

"That letter map amendment is a process that a homeowner can use to demonstrate their property is on a local area of high ground and obtain a letter from FEMA that recognizes that," FEMA spokesman Ed Curtis said. "It removes them essentially from the map as far as being in the high-risk zone."

This means, though, that a resident whose home was drawn incorrectly on the map needs to hire a surveyor like Pallamary, which can be pricey. Pallamary said this can create a headache for homeowners.

"People have had a lot of challenges with this economy over the last few years," Pallamary said. "Can you imagine getting a demand bill that you have to pay $3,000 or more in flood insurance when you're sitting on top of a hill?"

Clemons was eventually able to get her situation resolved, but problems still exist for many other homeowners, including nearly a dozen of her neighbors.

FEMA said it will continue to work with local officials in areas where problems are reported, and the primary focus is to make sure people's homes are protected against the next big storm.

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Bilby Tower Dedication Honoring Jasper Sherman Bilby

by Renee Shields

June 14, 2014 was a perfect sunny Saturday in Osgood, Indiana, where many people gathered to dedicate the last known complete survey tower and honor Jasper Bilby, the USC&GS reconnaissance man who had designed it. They included surveyors from more than a dozen states, current and retired employees of the United States Coast and Geodetic Survey [(USC&GS, now known as the National Geodetic Survey (NGS), part of the National Oceanic and Atmospheric Administration (NOAA)], and numerous local citizens interested in their town's history, as well as seven of Jasper's own descendants, there to pay their respects to their ancestor, and honor his contribution to the nation.

The Surveyors Historical Society (SHS) had been looking for a complete Bilby Tower that they could preserve, so when they heard of one still standing in St. Charles Parish, Louisiana, they decided to rescue it. With the help of Ralph Gibson, president of the Louisiana Society of Professional Surveyors, members of the SHS, and other volunteers, in 2012 the tower was recovered, dismantled, and brought to Osgood. In 2013, with additional help from volunteers from NGS and support from the Reynolds Foundation of Osgood, it was erected in Osgood Trails Park, over a survey mark that was set in concrete and bears the name "Bilby." The town of Osgood was chosen because it was where Jasper Bilby lived and raised his family through most of his career with USC&GS.

Jeff French, Ripley county surveyor, and his wife Susan, organized the day's events, which began with a morning of presentations at the Osgood Grub Company, attended by about 60 people. Dave Doyle, retired chief geodetic surveyor of NGS, began the day with a brief history of the Coast Survey/NGS, explaining the importance of the agency's mission and the challenges early surveyors like Jasper faced. Bart Crattie, licensed surveyor from Tennessee and member of the SHS board of directors, presented on the history of survey towers, including the story of the recovery and relocation of the tower being dedicated in Osgood. Jerry Price, a former USC&GS employee, continued with a discussion of the nomadic life of the agency's survey crews during the years of the towers. After presentations, lunch was available before the dedication event at the park.

Convening for the official dedication at Osgood Trails Park at 1:30 in the afternoon, Jeff French served as master of ceremonies for the dedication. Following the National Anthem, comments were given by Doug Thayer of the Reynold's Foundation; Osgood town council member DeDee Holliday; Ralph Gipson, president of the Louisiana Society of Professional Surveyors; Rich Leu, president of SHS; and Dennis Hoar, representing NGS. Following these remarks, the descendants of Jasper Bilby unveiled the historical interpretative marker. At the close of the ceremony, a GPS antenna was mounted on the top of the tower, over station Bilby. GPS observations were collected on the tower and the azimuth mark by NGS employees Dave Rigney (Michigan state advisor), Denny Hoar, and Charlie Geoghegan. In time, the coordinates will be computed from the data collected and made available online.

Denny Hoar of the NGS places an antenna on the top to collect GPS data overnight.

The USC&GS, originally called the Survey of the Coast, was established by President Thomas Jefferson in 1807. This first scientific federal agency was tasked with surveying the coast of the new nation so that accurate maps and charts of the coastline could be created to support the national and international commerce needed for the nation to thrive and grow. As the country grew in size, the scope of the mission of the USC&GS grew to include surveys of the interior as well as coastline, and over the past 207 years, the agency has had the responsibility to establish a reference frame and network of survey points to which all manner of federal, state, and local maps are connected, from transportation and navigation to flood plain maps. The technology used, until recently, required line-of-sight observations, which meant slow going in areas where obstructions like trees and hills made it difficult to see from one point to the next. For the first 100 years of the Survey, wooden towers were constructed so instruments and signal lights could be mounted high over survey marks to see and be seen by towers at other distant marks.

The reconstructed tower on site during the dedication.

Jasper Bilby, born July 16, 1864, was hired by USC&GS at the age of 20 and over time rose to the prestigious position of chief signalman. He saw the need for a better way to get the job done, so in 1926 he developed a plan for a steel tower that could be built, broken down, and reused in different places over and over. The design provided for two unconnected towers: an internal tower on which to mount the instrument and an external tower where the surveyor would stand. The first tower, soon to be called the "Bilby Tower," was erected in 1927. Using these towers over the next 10 years saved the federal government an amount estimated at over $3 million, the equivalent of $40 million in 2014. Bilby Towers were used by the USC&GS (renamed National Geodetic Survey as part of NOAA) until 1984, when GPS technology replaced terrestrial survey methods within the agency.

Bilby was commended by secretary of commerce Herbert Hoover in 1927. Jasper continued to work for USC&GS until his retirement in 1937. During his service he traveled more than 511,000 miles and measured nearly 48,000 miles of line. Jasper Bilby died at his home on July 18, 1949, and rests in the Washington Park East Cemetery in Indianapolis, Indiana.

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