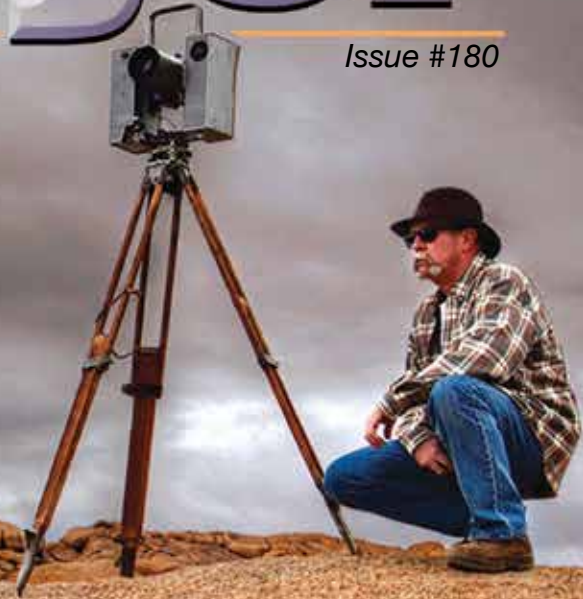


# SURVEYOR

*California*

Spring 2015

Issue #180



## Summers in the Sierra

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The Reluctant Surveyor

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## Big Boy Rolls Again

Surveyors Help Bring a Piece  
of History Back to Life

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Professional Land Surveyors Act  
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# Surveyor California

The quarterly publication of the California Land Surveyors Association, Inc. and is published as a service to the land surveying profession of California. It is mailed to all Licensed Land Surveyors in the State of California as well as to all members of the California Land Surveyors Association, Inc. The California Surveyor is an open forum for all Surveyors, with an editorial policy predicated on the preamble to the Articles of Incorporation of the California Land Surveyors Association, Inc. and its stated aims and objectives, which read:

“Recognizing that the true merit of a profession is determined by the value of its services to society, the California Land Surveyors Association does hereby dedicate itself to the promotion and protection of the profession of land surveying as a social and economic influence vital to the welfare of society, community, and state.”

“The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of land surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in Land Surveyors and their work.”

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Steve Shambeck at Joshua Tree Natioanl Park.  
Photo by Steve Shambeck, PLS.





*By: John P. Wilusz, PLS, PE - Editor*

*John works for the California Department of Water Resources in Sacramento, CA.*

## From the Editor

# Galt High School B.E.S.T. Academy



*Galt's 3D printer*

In November, my friend Rob McMillan, PLS, and I attended a career coach luncheon at a local high school. It was an “icebreaker” meeting between students and local professionals sponsored by the Galt High School B.E.S.T. Academy. The B.E.S.T. Academy is a program that prepares students for careers in Biomedical, Engineering, Science and Technology. It is affiliated with the National Academy Foundation (NAF), a non-profit organization that promotes partnerships between the business and education communities to provide opportunities to underserved students. Galt High School, with its B.E.S.T. Academy, is one of six NAF Academies

of Engineering in California. It is funded through school district general funds and grants, and curriculum comes from Project Lead the Way, a nonprofit organization that provides K-12 STEM programs nationwide. (STEM is an acronym for Science, Technology, Engineering and Math education.) There are 232 students in Galt’s program; 124 students are in the engineering pathway and 108 students are in the biomedical pathway.

We were invited to the event by Debra Crane, Galt High School instructor and academy director. She invited us because she was looking for mentors to help students become comfortable speaking and interacting with adults in a professional manner. “Our students need to be prepared with career and college readiness skills,” she said. Another important goal of the event was to give students the opportunity to ask professionals about the work they do. By this they gain insight into what it’s like to work in a given career, and can thereby make informed choices about their education and professional path. During the November icebreaker, coaches and students met in a shop classroom at the high school during regular school hours. There were 17 coaches and about 60 students. The coaches came from various fields, including: mechanical engineering, computer science, communications, quality engineering, marketing, civil engineering, land surveying, and industrial technology. Debra and several other Galt High School teachers kept us organized and on task. I noticed the classroom had a 3D printer; this is a good place to attend high school.

The teachers broke us into groups of 3 or 4 students per coach. Each group shared a table. I had three students at my table; one planned to become a civil engineer, another planned to become a software engineer, and the third was undecided but had narrowed her interests to biomedical science and transportation engineering. The event started with a series of questions intended to help students and coaches get to know each other.

### **My students asked me questions like these:**

- What do you do for work?
- What does your typical day look like?
- What do you like about your job? What do you not like about it?

*Continued on next page*

### **I asked my students questions like these:**

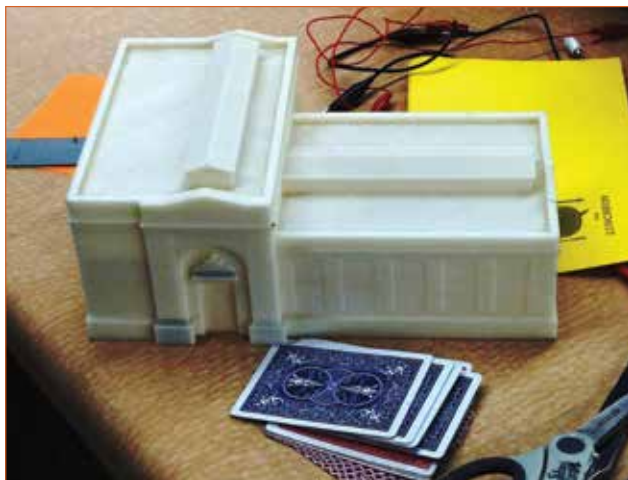
- What are your goals?
- What are your strengths?
- What are your interests?

Rob told the students about land surveying/geomatics engineering as a career option, and he talked about the various educational programs around the state. He also told them about the generous scholarships provided through the CLSA Education Foundation, and the availability of student internship opportunities.

After the coaches and students got to know each other a bit, we engaged in a team-building activity. It was a competition between the groups to design and build a tower using playing cards and masking tape. Students and coaches at each table put their heads together to try and build tallest tower. The winners won applause and chocolates. After the competition, students and coaches enjoyed a sack lunch together and continued their conversations. I was truly impressed by how bright and focused the students are. I was equally impressed by the commitment of their instructors. The future is in good hands. If only such things were happening in every high school in the United States.

I didn't think of it at the time, but this would have been a great opportunity to distribute the CLSA DVD *Choose Your Path... Make Your Mark*. I'll remember to bring a copy next time. Future B.E.S.T. Academy events for coaches and students will focus on the themes *Dressing for Success, Job Catching Resumes, and Preparing for an Interview*.

If this kind of professional outreach appeals to you, then get involved. In fact, consider getting your whole Chapter involved. You can find the B.E.S.T. Academy nearest to you by going to the NAF website at [naf.org](http://naf.org). ❖

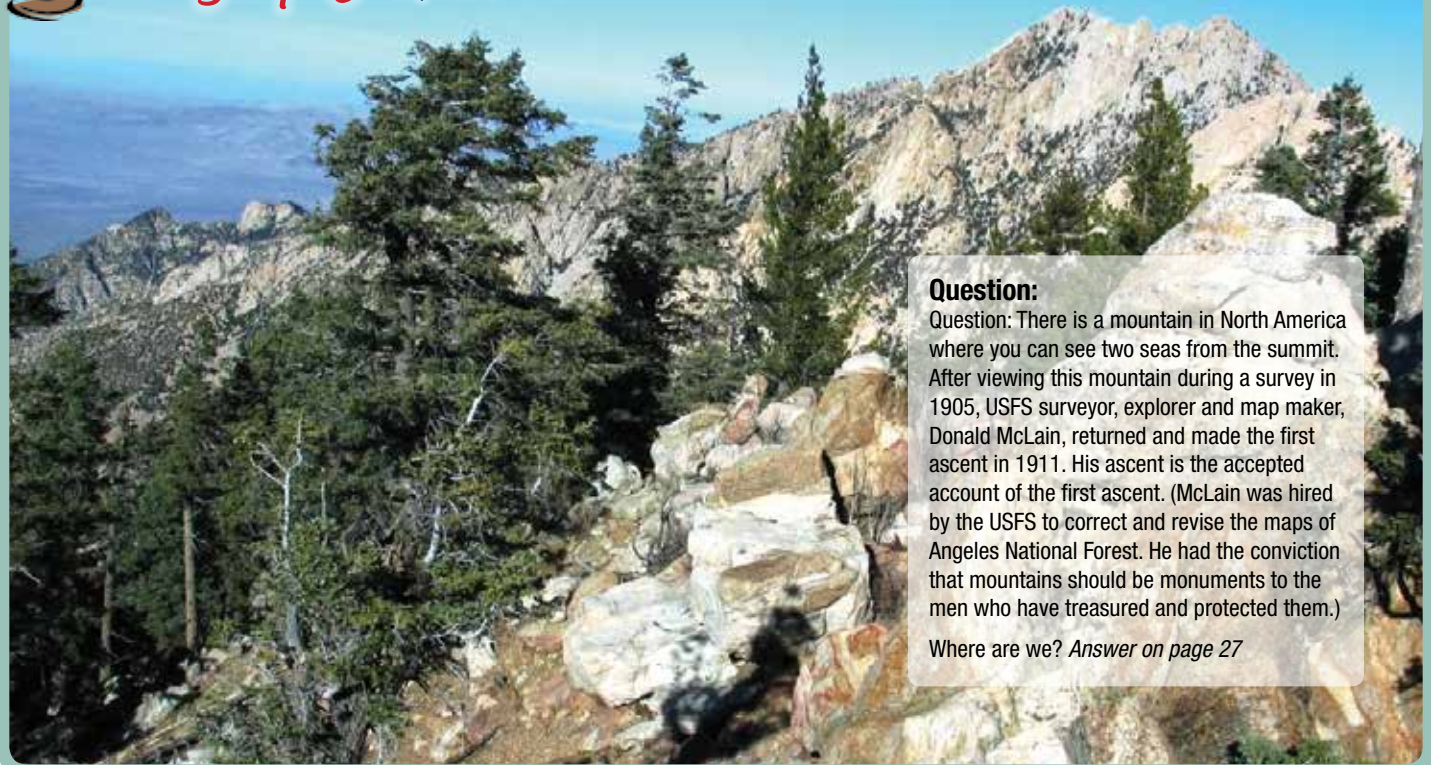


*3D plot*



## **Geography Quiz**

*By: Anne Hoppe, PLS, MSCE, and Germar Bernhard, Ph.D*



### **Question:**

Question: There is a mountain in North America where you can see two seas from the summit. After viewing this mountain during a survey in 1905, USFS surveyor, explorer and map maker, Donald McLain, returned and made the first ascent in 1911. His ascent is the accepted account of the first ascent. (McLain was hired by the USFS to correct and revise the maps of Angeles National Forest. He had the conviction that mountains should be monuments to the men who have treasured and protected them.)

Where are we? *Answer on page 27*





*By: Jay Kay Seymour, RLS, PLS, LLS*

*Jay Kay Seymour has forty-seven years of experience and is currently Owner of Professional Land Consultants, Inc. in Redondo Beach, CA. Jay has been a member of CLSA since 1989*

## President's Message

It is my pleasure to represent the 2,000 members of CLSA as the 50th president of the association. As a third generation land surveyor, whose father was instrumental in forming the Kansas Society of Land Surveyors, I will be truly "walking in the footsteps of my predecessor" as I lead our great association in 2015, in memory of my father and my grandfather.

In 2014, I was honored to "break-bread" with the membership. It was a challenge to visit all twenty-two chapters, and the four student chapters, but mission accomplished on November 25, 2014. The one question I asked at each stop, was simply this...Is there a value in spending the time and money to visit each chapter? Each time asked, the answer was the same, please continue the tradition! It enables the membership to see, meet, greet, and share local issues with the incoming president.

The chapter visits revealed consistent themes that I will be discussing with our Executive Director, the Officers, and the Board of Directors. The Membership has spoken, and I listened!

### **MEMBERSHIP-Comments, thoughts, and feelings:**

- WE need a national voice, negotiate a fair deal with NSPS
- WE need leadership, please lead us!
- WE need more seminars, workshops, webinars
- WE need to focus on education of the next generation
- WE need to represent both the public and private sectors
- WE need to focus on practice based issues, laws, rules
- WE need to tackle issues like unrecorded maps and bridging the gap with public agencies
- WE need to join forces with the GIS community
- WE need to protect the profession with Monument Conservation and QBS issues
- WE need more public awareness and exposure
- WE need to know that our officers are in charge and accountable to the association

As stated above, we have our work cut out for us. I commit to you to address these issues quarterly on the floor of the Board of Directors meetings in Oakland.

As we begin the next 50 years, we must realize that the paradigm has shifted, our profession is constantly changing and evolving, and we must adjust to survive. Business as usual cannot continue to be BUSINESS AS USUAL. The challenge is not new, our founding fathers of this association had to adapt to the ever changing profession in 1966.

I am encouraged by the talent and experience that I have to work with my Executive Committee, our Executive Director, and the Board of Directors. We are fortunate to have one of the original founders of the association, and our 1979 President, Paul Lamoreaux, Jr. still active and currently a director on the board. As is the custom, we also have several past presidents serving as committee chairs and directors.

Our association consists of 10 standing committees, and 18 special/ad hoc committees. As I worked to assign the committee chairs, it was my goal to have representation from the across the state, former presidents, and new members as my chairpersons.

It is my goal this year to grow the association by the inclusion of as many people and charters as possible. My goal is to increase membership by 15% in 2015. This can only be accomplished when each and every chapter is committed to this membership drive and the spreading of the word to those 2,000 plus California Professional Land Surveyors who are not currently members of CLSA. I also will reach out to the over 8,000 pre-82 RCE's who are also eligible to join CLSA as well.

It will also be my goal to reach out to the next generation of land surveyors. We must always have a presence in the community where we all live to support Career Day at our schools, encourage competitions like Trig-Star, Boy Scouting merit badge, and involvement in our community to get the word out, What is a Surveyor?

My professional career was based on a simple phrase, Solution Oriented Thinking! Therefore in closing, I ask of each and every member of CLSA for the following: bring me your ideas, bring me your support, bring me your dedication to the profession, and bring me your desire to make a difference.

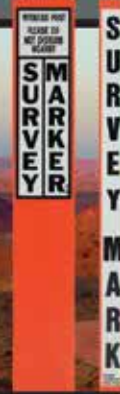
Let's all make a difference in 2015! WELCOME TO THE NEXT 50 YEARS! ❖



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## Letters to the Editor



Dear Editor,

So much good with this issue I had to write and tell you.

One: Your editorial was fascinating! Felt like I had visited the Czech Republic as well as learned more about these newfangled "geocaching" expeditions. Sounds like a game of fun-with-technology! Loved the "micro-cach" in the hand of the Wenceslas Square statue.

Two: I had no idea the Cal Poly Geomatics Program had become so evolved.

Three: The picture in the Hexagon advertisement. Was that a "lead-in" to Carl's let's-bury-the-trucks fiasco? Reminds me of a survey I had out in Marshall, CA for an AT&T micro-wave side on a large ranch. Ranches so large I needed some aerial recon . . . so the boss let me and my instrument-man/cameraman, Phil Hollenbeck, rent a Citabria. We flew over the ranches and figured out the routes to locate ranch fence corners, etc. (Before GPS days.) No sooner than we start our traverse . . . and my old '76 F-150 has a flat tire. We changed the tire with the spare. Because we were SO far from civilization I immediately drove to Point Reyes Station, whereby ol' Joe Orr's gas station repaired the tire.

Back on the random traverse. Setup where we just left and I'm about to jump in the truck and head out to the next foresight . . . when lo' n' behold another flat! Back to Point Reyes for a fix. Ol' Joe looks at me and the cartoon bubble above his head said, "This one stupid surveyor"! Another hour 'n a half burned!

That made me think. I must be running over something. Sure enough I walked ahead of the truck while Hollenbeck drove behind me. Sure enough and tee-iron fence post was broken off and the spade was projecting just enough to puncture the tire. Couldn't see it from the cab. Just like Carl's story - didn't get much done that day and it was a LONG day!

Four: Earthscope. Our damned government is penny-wise and pound foolish. Like campaign PACs, there should be tax exemptions for "donations" to maintain expensive and necessary (especially in earthquake country) infrastructure.

Five: Casey Lynch. It had to be said. I don't know if it's the economy, or what, but this back-biting has got to cease. For the good of the profession and CLSA.

Six: Mike Durkee's SMA article. Always good to hear Mike's take on things.

Seven: Funny Bones! All of us should all slap a mag-sign like that on our vehicles! Funny but not so funny. John Q. Public has no idea how difficult it is to do it right!

And some advice for the new licensees: every survey in your career should be treated as though it were a "test" question. I've seen many surveyors practice contrary to how they would answer a question on their Board test.

Eight: Carl's buried truck story! So bad he had to laugh or "Beretta" his brains.

Nine: Scott Martin's crossword puzzle taught me something new. Roosevelt?! WTF? I think our cartoonist Nino has been sharing secrets with Scott! Tryin' to pull some wool over our eyes?

Thank you for your efforts, John!  
Phil Danskin, PLS - Sonoma

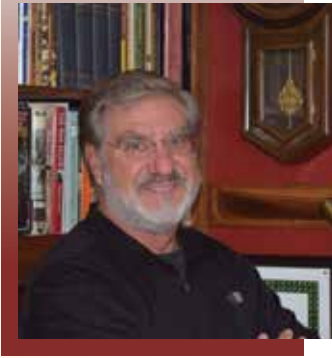
*The editor replies:*

*Thanks very much, Phil. We don't hear from our readers often enough. It's so nice to get feedback; we love to hear that people are reading and enjoying the magazine. ❖*

By: *Paul S. Pace, PLS*

*Paul* was a practicing land surveyor in Northern Nevada and Eastern California for 45 years. He was with Sierra Pacific Power Company's survey group for 34 years and for 11 years was a Special Projects Consultant and Senior Project Manager for Stantec Consulting's geomatics group. Both firms are located in Reno, Nevada. He retired in 2010.

For 20 years Paul was a surveying instructor and Director of the Summer Field Camp for mining engineering students, at the Mackay School of Mines, University of Nevada, Reno. He is a member of the Nevada Association of Land Surveyors and former Lahontan Chapter President. Paul has published numerous historical articles and papers. He resides in Sparks, Nevada with his wife Jeannie.



# Summers in the Sierra

## The Travels of George Henry Goddard, The Reluctant Surveyor



*Sketch of Lake Tahoe by George Goddard*

“In the evening there was a remarkably beautiful sunset”, George Goddard wrote in his field book. “A long narrow streak of clouds stretching from the northern to the southern horizon, formed... parallel with and above the eastern range of the Sierra Nevada. It retained the beautiful hues of sunset for a considerable time...”<sup>1</sup> Goddard was describing those spectacular Sierra Wave lenticular clouds often seen over the Carson Valley while he and his party were completing their survey at Mormon Station, Utah Territory. It was a Sunday, the 23<sup>rd</sup> of September, 1855 and while his party rested at the edge of the pine forest, he took more measurements: “I obtained observations for time” he said, “and computed some of those lately taken.”

Goddard was an Englishman, an architect, civil engineer, amateur geologist and a surveyor. But above all he was an artist, and always looking for subjects to paint. He must have had many, as the project required them to locate and barometrically profile a wagon road from Placerville, California, up the west slope of the Sierras, around the south end of Lake Tahoe and down into the verdant Carson Valley. In the process, Goddard and his party were

to determine the boundary between California and the adjoining Utah Territory, and tie to the Public Land surveys, then in progress nearby. George was born in 1817 at Bristol, England. He studied architecture at Oxford University and had made a name for himself as an architect and artist. Between 1837 and 1844 there were several showings of his paintings at the Royal Academy of Arts in London.<sup>2</sup> He also took several commissions for architectural designs from some wealthy patrons, notably Lord Holland, in the late 1840's, but in 1850 he was caught up in the adventure of the California Gold Rush. Leaving his wife Emily and children behind in Europe, he booked passage to the United States arriving at San Francisco in October, 1850.<sup>3</sup>

In November of 1850 he intended to leave for the Southern Mines. But in April, 1851 he wrote to his brother Augustus, still in England, that he was instead commissioned to perform a geological survey at the estate of Colonel John C. Frémont, the famous Army explorer. He traveled to Frémont's Mariposa ranch, but the Colonel was away. While there he was asked by Frémont's agent to examine a faltering quartz reduction mill on the property. Goddard detailed why the machine was inadequate for the task, and made some drawings for them. Then he headed for the diggings himself where he took a turn at mining, without much success. Frémont arrived many weeks later but regrettably couldn't afford to hire Goddard for the survey. Nor would he pay for the drawings his agent had requested.<sup>4</sup>

Broke and unemployed, Goddard had few remaining options. He sold his rifle, pistols and mattress to buy food and headed next for the little mining town of Columbia, California. He soon went into business with a fellow passenger from his voyage from England, an Irish doctor operating a small general store and pharmacy. He remained in Columbia until 1853, all the while making sketches and selling a few. But he became disillusioned, pronounced all the glowing reports about Columbia a “humbug” and left. Next he tried Sonora, California, another mining town. He wrote to Emily

*Continued on next page*



in April of 1853 that he had scraped up enough cash to build a small cabin there which he hoped to sell later for a modest profit. In the same letter he mentioned he had sold 6 litho prints for \$50 each and was hoping to hire on as an architect in New York City. All the while, he was making regular trips to Sacramento and to San Francisco, looking for work, but without luck. Alone and homesick, Goddard began asking Emily join him in California. But she was reluctant to attempt the long journey with the children, and had quite reasonable doubts about George's ability to feed them. She wrote to Augustus that George had been in California "too short a time to do anything... besides making [himself] liked by the Americans." She added, "One must overlook their odd ways, they are a good hearted people, although strange in manner."<sup>5</sup>



*Goddard's Bird's Eye View of San Francisco. Source- David Rumsey Map Collection.*



*Sonora, 1853, George H. Goddard, Source- University of California, Bancroft Library online collection.*

Indeed, George himself was less graceful in the description of his new countrymen: "...a perfect American must know... a general smattering of every kind of knowledge, and as he has the highest opinion of himself, he fancies that he is superior in each subject... He is not only the smartest and quickest in business but he can cook, cut down a tree, open a gold mine, work a steam engine, or sail a ship better than any man and to his various accomplishments, he can do the part of the hangman or the bully. This is a feeling that pervades all the Americans I have seen here..."<sup>6</sup>

From the moment of his arrival here, Goddard faced financial worries. He was chronically short on funds and his family back in Europe was doing no better. Even after George had been in California for many years they were forced to pawn Emily's silver service and a theodolite George had left in England in order to obtain enough money to get by. The letters to and from his brothers and his wife are filled with edgy discussions about their deteriorating financial situation. Forced by circumstance to find other work, he reluctantly took on the first of his survey projects.<sup>7</sup>

The Atlantic & Pacific Railroad Company, an early proponent of a transcontinental railroad, financed a survey expedition under the direction of Army Lieutenant Tredwell Moore. Lt. Moore gained notoriety for stumbling onto Mono Lake in 1852, while on a punitive raid against a band of Miwoks accused of murder,

and for his description of the Yosemite Valley, the first ever in print. Also along on the expedition was trapper and prospector John Ebbetts, who had come to California in 1849 as the captain of the Knickerbocker Exploring Company. He was known locally for exploring and prospecting the pass that today bears his name. The party was to explore a route up the Stanislaus River, find a pass over the Sierras, then search for a way into the arid deserts beyond. Goddard was hired as the Assistant Engineer and brought the party to a total of seventeen men. Their route crested the rugged mountains near what is now Sonora Pass then ran north along the eastern toe of the Sierras through Antelope Valley following present U.S. 395. From Antelope the survey turned east, dropping down to Walker Lake, then southeast to Sarcobatus Flat, in Nye County, Nevada. At this evocative sounding place, they lost some mules, ran out of water and provisions and turned back, the route having proved to be impractical, in any case.<sup>8</sup>

By 1854 Goddard was back in San Francisco. He was chosen to prepare an architectural design for South Park, the City's first planned, high-end residential subdivision. The idea came from George Gordon, another Englishman, who had made money in iron, sugar and real estate. In fact, it was Gordon who developed Mayfield Grange, an estate in Santa Clara County which was purchased by Senator Leland Stanford and later became Stanford University. The prospectus for the project stated "The architectural designs for South Park have been made by George H. Goddard, Esq. late architect to Lord Holland, and who laid out that magnificent addition to the West End of London known as the Holland Park Estate."<sup>9</sup> Things seemed to be looking up for Goddard and he felt sure he now would be noticed. He wasn't. His friend and colleague from the railroad survey John Ebbetts was killed in the explosion of the steamer Secretary in San Pablo Bay in April of 1854. George Gordon's Vulcan Foundry made the boiler for the doomed ship and Gordon himself was working on the boiler when it exploded. Gordon was indicted for negligence by a Grand Jury and though finally exonerated in 1855, the trial took a heavy toll. His planned development disappeared and along with it Goddard's hope of an

*Continued on next page*

## Summers in the Sierra

Continued from previous page

inroad to wealthy San Franciscans.<sup>10</sup> Goddard reluctantly returned to surveying and did work for Lt. R. S. Williamson, an Army Topographical Engineer overseeing military works in California.<sup>11</sup> Soon afterward, he hired on with the California Surveyor General's office.

In April of 1855 California Governor John Bigler signed a bill authorizing a reconnaissance of the most practical wagon route across the Sierras. California Surveyor General Seneca Marlette directed Goddard and Sherman Day, a mining engineer and California State Senator, to “determine astronomically with some precision the eastern boundary of the State of California and such barometrical observations” yielding a route “most practicable and economical for the Emigrant Road.”<sup>12</sup> Goddard had investigated several other proposed routes and suspected that Carson Valley was somewhat closer to the boundary line than shown on the existing maps which placed the California line well to the east of Lake Tahoe.<sup>13</sup> But here the story gets more complicated.

The Utah Territorial Legislature created Carson County in 1854, though settlers were living in Carson Valley since 1850 and had outlined a local government of sorts. In June, 1855 Territorial Governor Brigham Young named Orson Hyde, a Mormon Apostle, as Probate Judge and sent him west, along with District Judge Stiles, U.S. Marshall Haywood, John and Enoch Reese and an escort of thirty-five men.<sup>14</sup> This was now the recognized government in Carson Valley. Later, Hyde was also appointed County Surveyor.<sup>15</sup> But many of the settlers resented Mormon authority. And there was no small doubt as to where the western line of Utah actually was. Hyde's court and all other jurisdictional departments would be unable to conduct business until the boundary issue was resolved. Goddard himself explained the circumstances during an interview in 1893: “Judge Orson Hyde was appointed U.S. District Judge of Carson Valley by the then Governor of Utah [Territory], Brigham Young.” When Judge Hyde “arrived in Carson Valley to open the District Court...some settlers in the Valley objected...claiming Carson Valley was in California...Judge Hyde came to California to consult with Governor Bigler, asking that the boundary line be established. Judge Hyde agreed to furnish three extra men, provisions and animals. Governor Bigler and Surveyor-General Marlette agreed.”<sup>16</sup> This was, of course, only the beginning of the problems from an indefinite boundary; there would be jurisdictional issues all along the border in the coming years. In preparation for the survey, Goddard set up an observatory on the roof of the Surveyor General's Office located on 4<sup>th</sup> Street, in Sacramento. He set Marlette's altitude and azimuth instrument, an English unit with a 12 inch horizontal circle, a 16 inch vertical circle, 3 inch objective lens with 120x to 180x magnification, on the roof the office. But he noted, “The tremulousness of the ground...upon which Sacramento is built renders it an unsuitable place for astronomical observations and those taken for latitude, longitude and time were somewhat uncertain.”

He added “Previous to leaving Sacramento I compared my Greenwich time with that at San Francisco, by means of the Telegraph, which was obligingly placed at our disposal by its liberal operators...the time sent was that deduced from Anderson & MacGregor's transit observations at their observatory at Telegraph



Observatory at Telegraph Hill, San Francisco, circa 1880, from “Historic Lithographs of San Francisco” published by Waterson for the firm of Burger & Evans.

Hill”<sup>17</sup> situated near what is now the location of that San Francisco landmark, Coit Tower. Goddard and his men were at last ready to begin the survey. The small party packed their gear and made ready to leave Sacramento for the mining camp of Placerville. With instructions to find and profile a wagon road over the Sierras and determine the boundary between California and the U.S. Territory of Utah, Goddard and his party left Sacramento for Placerville on the 4<sup>th</sup> of August, 1855. Sherman Day met them in Placerville on August 10<sup>th</sup> after a reconnaissance of a southern alternative for the wagon road. The party remained in Placerville until the 26<sup>th</sup> while Goddard adjusted his instruments and conducted astronomic observations for latitude and longitude. In his report he stated “To make the matter of longitude quite certain, I had the Greenwich time transmitted to me by telegraph from San Francisco, in the same mode I had from Sacramento.” But Day was concerned about the telegraphic equipment so he undertook an extension of the Second Standard Parallel over to Goddard's astronomical station. To their dismay they noted more than a half mile difference between the longitudes derived from the two sources, but “...which has since been explained” Goddard noted “by an error of fifty-two chains having been found in the standard parallel, as originally run.”<sup>18</sup>

Marlette had provided Goddard with the fine, English-made altitude/azimuth instrument for the astronomic work, as well as a 6 ½” theodolite, several chronometers, barometers, a thermometer and telegraphic equipment for determining longitude. The addition of the telegraphic gear is significant. While the “American Method” of telegraphic longitude determination was developed by the Coast Survey in 1846, its limited use was confined to the eastern seaboard.<sup>19</sup> The method wasn't employed by the Coast Survey in general work until much later and not on the west coast until the late 1860's.<sup>20</sup> Goddard also brought his own 7” sextant with two artificial horizons, a Young surveyor's compass, and a Borda reflecting circle, an instrument similar to a sextant for determining longitude by measuring lunar distances. He also took a camera lucida, a prismatic device that allows a subject to be projected onto a sketch pad and drawn, while at the same time seeing the subject.<sup>21</sup> Goddard, ever the artist, would make drawings all along the line of the survey.

*Continued on page 14*



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The party now consisted of Goddard, the three men Judge Hyde had provided, Mr. Ferrel, a local who loaned the party a horse and then agreed to go along to look after the animals, Judge Hyde and Senator Day. While still in Placerville he secured a horse and buggy for the instruments. Fearing the chronometer's rates would be disturbed if strapped to the mules or carried in the buggy, Goddard had them carried on foot by members of the party, slowing their progress. Working east from Placerville, he would determine longitude by taking lunar distances, as well as observations requiring time from the chronometers. They worked their way up the west slope of the Sierra Nevada, though Hawley's and Tragedy Springs toward the Carson Pass. At every opportunity Goddard collected botanical and geological specimens and made a continuous record of meteorological observations. On the 29<sup>th</sup> of August he connected their present work with his 1853 railroad survey. That same evening they attained the summit of the Carson Spur. Over the next days they began laying down a triangulation network. On September 4<sup>th</sup> he noted "Mr. Day has been engaged in re-measuring two base lines...and in triangulating...to the flags he placed on Round Top, Red Mountain, the Elephant, etc." Short words, it seems, for the strenuous efforts of Day and his assistants. While Goddard worked from the relative comfort of the beach at Lake Tahoe, Day and his men traversed trackless wilderness to climb the tallest peaks in the central Sierras erecting sights, only to return again with their instruments to record the angles. It was difficult and dangerous work.

Round Top Peak figures prominently in the history of geodesy in western America. In the 1870's George Davidson, Coast Survey geodesist, scientist and general genius, occupied Round Top Peak as part of an enormous triangulation effort along the 39<sup>th</sup> Parallel, the Transcontinental Arc. A chain of enormous braced quadrilaterals ran eastward across California, Nevada and Utah, then tied to smaller chains as it went on. The western figures included Round Top, Mt. Shasta, Mt. Helena and numerous other prominent peaks. The observation from Mt. Shasta to Mt. Helena, incidentally, was 192 miles and required great sacrifice from the surveyors, but it set a geodetic world-record for length. In 1878 the Coast Survey was renamed the U.S. Coast and Geodetic Survey (USC&GS). The 120<sup>th</sup> Meridian passes over Round Top's summit and the USC&GS would return there many times to utilize it in its surveys along the oblique boundary. It is a difficult pack with heavy instruments and once at the mark, conditions are often less than benign. The 1973 National Geodetic Survey station description offers this tidbit: "... lightning blasted a 3-foot-deep and 3-foot-wide hole in the solid rock at the station site, fusing the metal light that was being shown to another triangulation station and destroying the station mark. On this date the hole was cleared of loose rocks and a 1500-pound mass of concrete was poured in the hole..."<sup>22</sup>

By September 5<sup>th</sup> 1855 Goddard entered into his notes: "I have seen sufficient to know that the angle of the State boundary must be in Bigler (Tahoe) Lake rather than in Carson Valley. I therefore gave up the intention of taking the instruments there and determined...to proceed to Bigler Lake Valley and there set up the instrument as near the initial point as might be convenient."<sup>23</sup> This was a significant finding and good news for Judge Hyde who,



presumably armed with this new information, had left a few days before to attend to the opening of the District Court in Genoa, the newly christened village growing up around the original Mormon Station trading-post. The next day, Goddard wrote in his notes "We arrived at Mormon Station by supper time, where we were greeted by Judge Hyde and Col. Reese. The U.S. District Court had been opened by Judge Stiles and the business already got through. The party were preparing for their return to Salt Lake City. My men, who had come out with them in the spring, wished very much to return, but Judge Hyde kept them to their duty."

The party continued the triangulation work, connecting into Day's double-chained base lines as they went. Then Senator Day left the party on September 11<sup>th</sup> to return to Sacramento, taking much of Goddard's data with him. On the 15<sup>th</sup> Goddard had an instrument block cut and floated a half-mile to a location east of the mouth of the Little Truckee River, where he set up the altitude/azimuth instrument. By the 21<sup>st</sup>, he had determined the latitude and longitude at the astronomic station, placing the intersection of the 120<sup>th</sup> Meridian and the 39<sup>th</sup> Parallel four miles distant, at North 30° 30' West from his station. From there he moved the party to the Carson Valley to measure a last base line, tie the triangulation network to it and locate the principle buildings in the valley. Judge Hyde also requested Goddard set several marks on the oblique in the southernmost reaches of Carson Valley, near a main road, to alleviate any further confusion. Goddard used the values from Army Lieutenant Lorenzo Sitgraves' 1851 survey at the Colorado River to compute the oblique's azimuth and set the approximate line.

By the 28<sup>th</sup> of September Goddard's field observations were complete and he had continued his reductions. He and the remaining party met with Judge Hyde at the home of Dr. Daggett to exchange goodbyes; the party then returned to Sacramento, carrying their barometric profile back, and arriving around October 1<sup>st</sup>. Two days later he wrote "California did not receive as much of the Carson Valley as I expected...The angle of the boundary falls at the lake; I am preparing a short report for immediate publication..."<sup>24</sup> Goddard was to receive \$2000 for the boundary work, but he was

*Continued on next page*



not paid as the project became entangled in a constitutional battle over who would pay for "internal improvements" including wagon roads. The issue went before the Supreme Court and was ultimately resolved with the issuance of State bonds. Goddard was finally paid three years later. Goddard's report on the boundary, together with Day's report on the wagon road survey, was published in the Annual Report of the State Surveyor General in time for the 1856 session of the State legislature.

Goddard's survey suffered from significant errors in latitude, longitude and elevation, as other early surveys in the area did. He was however the closest yet to determining the true location of the 120<sup>th</sup> meridian from Greenwich. In the summer of 1861 Army Lieutenant Joseph Christmas Ives traveled to Lake Tahoe, under the auspices of the U.S. Boundary Commission, to determine the western line of the soon to be created U.S. Territory of Nevada. The exact extent of his observations at the Lake and in western Nevada remains unclear. Nevertheless, Lt. Ives telegraphed the geographic position of his astronomic station at the Lake to John Kidder, Clerk to the Deputy Surveyor General of the Nevada Territory, Butler Ives (his distant cousin). Lt. Ives then resigned his commission and joined the Confederacy. Kidder published the values for Lt. Ives' observatory as 38° 56' 47.52" N and 119° 58' 38.34" W<sup>25</sup>, at some difference from Goddard's final values at his observatory of 38° 57' 01.1" and 119° 58' 08.2"<sup>26</sup>.

After an aborted attempt to begin a full boundary survey in 1861, John Kidder left from Ives' observatory block on Tahoe's south shore to begin the survey of the Nevada/California line in the summer of 1863. His party, working from the office of the joint California-Nevada Boundary Commission, had knowledge of Goddard's survey and contacted him concerning it, requesting information about Goddard's astronomical station at the Lake and inviting Goddard to meet them there. Goddard was unable to join the Kidder party at the Lake so instead sent written instructions on how to find it. Nevertheless, Kidder stated he proceeded north from Ives' station, sighting across the Lake, joining the 120<sup>th</sup> Meridian and thence running northward to the Oregon border. He then returned to the Lake and worked south along the oblique, stopping the work near Mono Lake. The survey was never resumed.

In 1873 the entire California/Nevada line was surveyed, this time by the Russian-born surveyor/engineer Alexei von Schmidt. However, issues remained at the completion of his work. The USC&GS returned again to Lake Tahoe in the 1890's to re-survey von Schmidt's rejected oblique line running south to the Colorado River. In a memorandum to the USC&GS in 1900, Goddard explained that he believed Kidder mistakenly began his survey at one of Goddard's lesser triangulation stations on the lake, not his astronomical station. Further Goddard quoted a newspaper article from the Sacramento Union stating that Ives had used Goddard's

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latitude and longitude for his position rather than determining a new one. These assertions do not appear to be accurate, though some uncertainty remains. In any case, the astronomical station at Telegraph Hill was later found to be in error by nearly 4000 feet in easting, which most certainly impacted the surveys of both Goddard and Ives.

Orson Hyde led the Mormon colony at Genoa from 1855 until 1857. The settlement was abandoned by them at great loss with the advent of the Utah War of 1857. Orson Hyde had been next in line to become president of the Mormon Church after Brigham Young, but was subsequently moved to a lesser status. Hyde was husband to seven wives, who bore him thirty-two children. He died in 1878 at Spring City, Utah at the age of 73.<sup>27</sup> Sherman Day became Surveyor General of California after his term as State Senator. The Yale graduate had once been superintendent of the vast New Almaden Quicksilver Mines near San Jose, California and was one of the original trustees at the University of California at Berkley. Day was a professor at the University, as well, teaching Mine Construction and Surveying. He died at Berkley in 1884, at the age of 78.<sup>28</sup>



Goddard continued his career as a surveyor, working for Theodore Judah during early work on the Central Pacific Railroad. Later he surveyed the Western Pacific Railroad from Sacramento to Oakland and over the years produced many notable maps

spanning the entire west coast and Nevada. In 1857 he wrote that “the surveying business is on the increase and often I have more than I can attend to.” That same year he published his well known map of California. Despite earlier misgivings about her husband’s career path, Mrs. Goddard joined her husband at Sacramento in 1858; they soon added to their family. In 1861 Goddard became a citizen of the U.S. and was immortalized in 1864 with the naming of Mt. Goddard, a 13,568 foot peak in the Sierras. About 1866 the family moved from Sacramento to San Francisco. Goddard continued painting, exhibiting pieces at the San Francisco Art Association in the 1870’s and 80’s.<sup>29</sup>

Mrs. Jane Stanford, wife of Leland and with him cofounder of Stanford University, offered Goddard \$16,000 for his collection, which included not only hundreds of pieces of art, but thousands of rock specimens, his survey, astronomical and assay equipment, maps and the accumulation of fifty years of work in California and Nevada. But Goddard felt that \$40,000 would be more appropriate and negotiations continued. But in February of 1905, Mrs. Stanford was murdered with a fatal dose of strychnine in her room at the Moana Hotel at Oahu, Hawaii; how and by whom remains a mystery to this day.<sup>30</sup> The collection was still in Goddard’s home on the morning of April 18<sup>th</sup>, 1906 when the earthquake and subsequent fires wracked the City. Goddard’s house, and everything in it, was completely destroyed. He did not long survive the loss of his property; he died December 27, 1906, at the Berkley, California home of his daughter Emily. He was 89.<sup>31</sup> ♦

## Endnotes

- 1 Report of a Survey of a Portion of the Eastern Boundary of California and of a Reconnaissance of the Old Carson and Johnson Immigrant Roads Over the Sierra Nevada, G. H. Goddard, 1855
- 2 The Artist’s Bluebook
- 3 The Life of George Henry Goddard, A. Shumate, 1969
- 4 Letter from G. Goddard to A. Goddard, April 1851, California State Library, Sacramento, CA
- 5 The Life of George Henry Goddard, A. Shumate, 1969
- 6 Letter from G. Goddard to A. Goddard, April 1851, California State Library, Sacramento, CA
- 7 The Life of George Henry Goddard, A. Shumate, 1969
- 8 *ibid*
- 9 *ibid*
- 10 *ibid*
- 11 Letter G. Goddard to A. Goddard, April 30, 1854
- 12 The Life of George Henry Goddard, A. Shumate, 1969
- 13 Letter from Goddard to USC&GS, May 4, 1893
- 14 Bancroft’s History of Nevada, 1890, page 76
- 15 *ibid*
- 16 The Life of George Henry Goddard, A. Shumate, 1969
- 17 Report of a Survey..., G. H. Goddard, 1855
- 18 *ibid*
- 19 U.S. Coast Survey Report for 1858
- 20 “Longitude by Wire: The American Method” Richard Stachurski, Professional Surveyor Magazine, 2003
- 21 Report of a Survey..., G. H. Goddard, 1855
- 22 N.G.S. Data Sheet for Round Top Reset, First Order Mark JS3905
- 23 *ibid*
- 24 Letter printed in the Sacramento Union, October 5, 1855
- 25 Kidder’s Survey Notes for the Houghton-Ives Boundary Survey, 1863
- 26 Report of a Survey..., G. H. Goddard, 1855
- 27 Utah History Encyclopedia
- 28 University of California On-Line Archive
- 29 The Life of George Henry Goddard, A. Shumate, 1969
- 30 Stanford Magazine, Sept/Oct, 2003
- 31 *ibid*



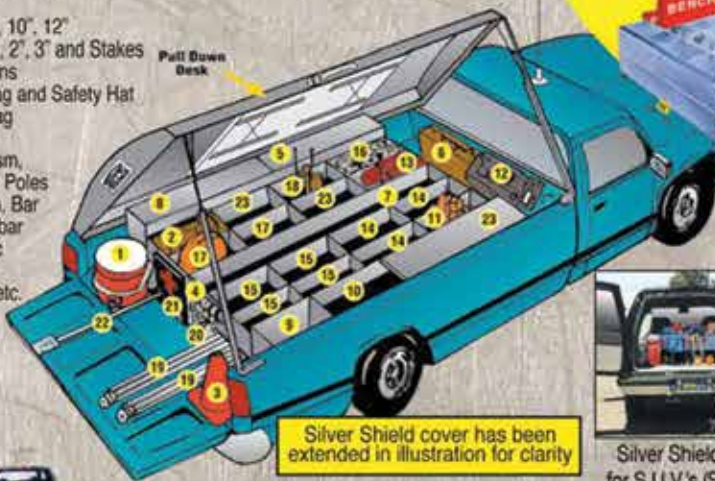
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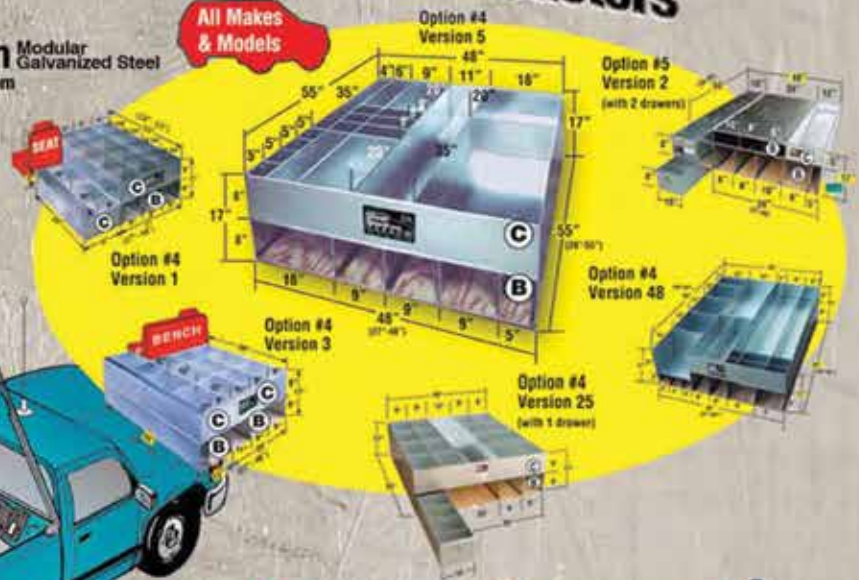
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# Big Boy Rolls Again:

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I love my career. Every now and then there comes a time or a job that when it is done you say to yourself, "self, THAT WAS AWESOME." So it was with the survey we (RSE, Inc.) did for Metrolink, job no. 12-0513, CTO no. 11. I just knew it as the "Big Boy survey". Big Boy? The only Big Boy I knew of was that hamburger guy who stood in front of the restaurants of his namesake. I was to find out that the Big Boy they were speaking of lived up to the name.

Big Boy was the name that was given to a set of steam locomotives, 25 in all, that were designed and built in the time span of 1941 to 1944 by the American Locomotive Company in Schenectady, New York for Union Pacific. An unknown worker scrawled "Big Boy" on the front of one of the engines when it was under construction and the name stuck. They were the largest steam locomotives ever to see service in the American West. The Big Boy in question here was built in 1941 and was deemed no. 4014. He is truly a giant at 132 feet long, so long in fact, it had what they call articulated

wheels in that the front set of wheels would pivot to allow the engine to round curves. He (locomotive) weighs 380 tons and with the coal tender overall weight is 550 tons (1.1 million pounds). The coal burner had automatic feed to the firebox and could fit a standard size car. It develops 7,000 h.p. on 16 drive wheels powered by 4 cylinders and could reach a max speed of 80 mph. He saw service hauling freight cars over the Wasatch Mountains between Ogden Utah, and Green River Wyoming. It carried 25,000 gallons of water and 27 tons of coal which would last about two hours. The train would have to make pit stops along the way for more coal and water. In its career he logged more than one million miles between 1941 and it's last run in 1959. Big Boy 4014 was officially retired in 1961 and traveled 11 days from Cheyenne, Wyoming to what was to be its new home for the next 52 years, arriving at the Los Angeles County Fairground in Pomona, California January 8, 1962. He was donated to the Railway and Locomotive Historical Society and went on display at the Rail Giants Train Museum located at the southern end of the Los Angeles

County Fairgrounds and was a major draw for the museum.

In 2012 Union Pacific decided they wanted Big Boy back to bring him home to Cheyenne Wyoming and undergo

a restoration project anticipated to take three to five years. Negotiations began with the museum and finalized in 2013. It was planned for Big Boy is to see service once again for the 150th anniversary of Union Pacific which was in 2012. Even though he missed that, Big Boy will still see service providing public awareness through nostalgic service trips traveling the country on Union Pacific's 35,000 miles of track.

The plan was drawn up to move Big Boy from the museum site at the south end of the fairgrounds to tie into existing Metrolink tracks located almost a mile away at the north end

**In 2012 Union Pacific decided they wanted Big Boy back to bring him home to Cheyenne Wyoming and undergo a restoration project anticipated to take three to five years.**

*Continued on next page*





Boy moving along.

of the fairgrounds. There they would tie into the Metrolink rail and continue Big Boy's journey. Union Pacific crews arrived in Pomona as early as July to begin the process of examining the locomotive to determine what needed to be done to get him ready to roll again. UP crews began laying sections of temporary track early in November 2013. The process involved laying a section of pre-constructed track over the existing asphalt surface of the fairgrounds and towing Big Boy and the attached coal tender to the end of the section and then moving the track sections previously rolled over, to the front of the sections Big Boy occupied. This leapfrog exercise was repeated until Big Boy was only a few hundred feet from the Metrolink lines. This is where we come in.

RSE was tasked to perform a topographic survey of the existing track of the Metrolink lines as well as the area to be crossed over by Big Boy so that our engineers could design the tie-in for Big Boy to move onto the Metrolink rail line. We arrived on site November 21, 2013 to begin the survey. That is when I first saw Big Boy. People who work the railroad have a term for people that are VERY enthusiastic about trains, "foamers." I do not consider myself as one, we on the railroad would never admit it, however, when I took one look at Big Boy that is what I did, foamed at the mouth, well, almost. The UP crew was some of the best UP has and it was great seeing them in action. Big Boy was still about 300 feet from its final resting place before going onto the Metrolink track and it was a treat seeing how they moved him. We finished up the survey and then were fortunate enough to get the chance to climb aboard. It was truly an experience I will never forget, standing there in the cockpit I could feel the power of this giant.

After our engineers designed the alignment and grade for the tie-in we returned to the site to stake the track layout. The rail gang for Metrolink then took over and began laying the



Big Boy.



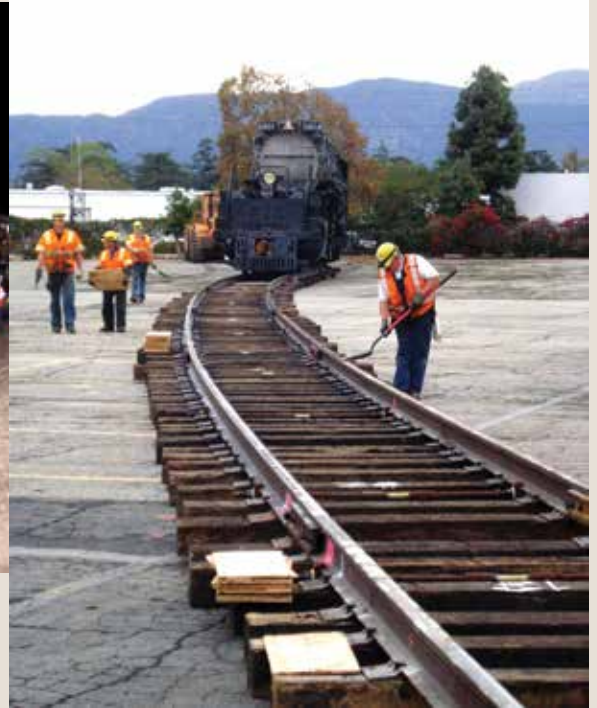
Big Boy Ready to go.

track from the final resting place of Big Boy within the fairgrounds to the Metrolink track. The final tie-in could not be finalized until after rail service ended for the day for Metrolink. The date of January 26, 2014 was slated as the date for the tie-in. The tie-in had to take place after the final train for the Metrolink service went by at 11:50 PM on the 25th. Time was of the essence in that not only did they have to cut, move and tie the main line to the Big Boy track, after he was gone they had to restore the mainline and be ready for service at dawn. Immediately after the last train passed the Metrolink rail gang took over and cut the track for the main line and warped it to match a curve leading out from the fairgrounds. Our work was checked by the rail gang and was said to be spot on. Everything was ready for the move. I arrived at the site at



# Big Boy Rolls Again:

Continued from previous page



*Top right to bottom left:  
UP crew at work.  
Looking for trouble before it happens.  
Ready to tie in.  
View from cockpit.*



11:50 PM on the 25th to witness the move. I was surprised to see about 500 people there to witness this historic event. Tensions were high among the UP and Metrolink crews because the last thing they wanted was for anything to fail or go wrong and end up with a train on its side. At approximately 2:45 am on Sunday morning January 25 a new Union Pacific diesel engine arrived and hooked up to Big Boy. The signal was given and they started to roll. Big Boy was on the move again. It was around 4 o'clock in the morning when Big Boy was fully on the Metrolink tracks and on his way. I noticed that one of the UP crew had written "Big Boy" on the front of the engine just like it was when that worker in New York scrawled it on one of his brothers.

As Big Boy was towed down the track he blew his whistle for a farewell salute to the home he had known since 1962. He arrived in Cheyenne Wyoming on May 8, 2014 after many stops along the way in California, Nevada, and Utah and is undergoing a complete renovation.

To this day when I look at the many pictures I took during our work there, I am proud to have been a part of a piece of history and that surveyors played a part in bringing it back to life .

I LOVE MY CAREER...

For more information on Big Boy visit the Union Pacific website(s): [www.up.com](http://www.up.com) - [www.uprr.com](http://www.uprr.com) ❖



# Kids Korner

Do you have a picture of a "junior surveyor" in your family that you would like to share? Send it in and we will put it in the Kids Korner.



◀ **Asher Neitsch**, age 13, holding the reverse scribing from the original 1880 northwest bearing tree to the corner of Sections 8, 9, 16, 17, T.47N., R.4W., M.D.M., in March 2014.

Submitted by Gregg Neitsch, PLS, CFED



▶ **Nicholas and Alisha Toutges**, ages 9 and 6, respectively, straddle the state line at Lake Tahoe.

Submitted by Sherry Toutges, PLS

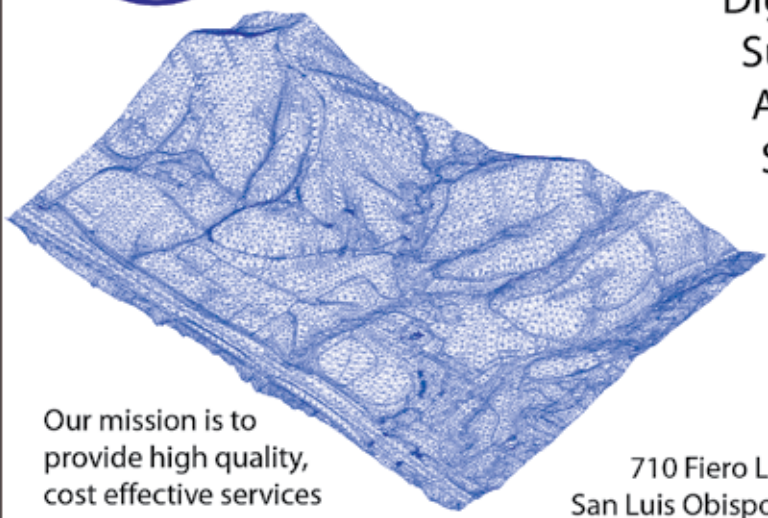
▲ **Emma Pugh (age 9) and Sienna Anderson (age 13)** enjoyed a day surveying with their mother, Kathy Nitayangkul, during Fall break from school.

Submitted by Kathy Nitayangkul, PLS



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# Utilizing Google Earth

By: John Tosto

As the latest equipment and programs advance, new ways spring forth for land surveyors to complete projects, provide deliverables and convey information. The profession saw this in full force with the onslaught of Google Earth. It gave land surveyors everywhere high resolution satellite imagery and the ability to create KML files that could represent points observed in the field as populated icons. Many have performed such a function with great results. But what if it were possible to flip it around - measure points in Google Earth and stake them in the field. I was presented with that opportunity on a recent project.

I was asked to head a project that required stakes for mile markers at every tenth of a mile for a 7 mile stretch of the LA River along the world famous Griffith Park, ending near Chavez Ravine, home of the LA Dodgers. The mile makers would be for a new stretch of the LA River Bike Path, a signature project with aspirations to construct a continuous bike path along the Los Angeles River - Starting from Warner Center in the West San Fernando Valley, through Los Angeles, then heading south to Long Beach where the LA River meets the Pacific Ocean. I was supplied with an archaic US Army Corps of Engineers map of the LA River, which included stations at major intersections. The accuracy specified for the project was "non-survey grade", with accuracy for the mile markers near a couple feet and reasonably precise in relation to one another.



There were a number of methods available to complete the project. A measuring wheel would have allowed for a speedy completion; however it could have lacked the precision and accuracy. A conventional survey using a total station would surely meet the desired accuracy but would also be time consuming to traverse the entire 7 mile stretch. In addition, setting up and tearing down heavy survey equipment in the Southern California heat didn't sound appealing. I finally settled on utilizing real-time GPS using a rover and the California Real-Time Network. With my weapon of choice selected, it was now time to calculate the mile marker locations. As stated above, I had the US Army Corps of Engineers map and I also downloaded the as-built maps of the LA River Bike Path. I correlated the USACE stationing to calculate the mile markers at the as-built stations. I checked the overall distance and calculated to the beginning of the project using the Google Earth "path" tool and the distances checked out well. That is when the idea hit me: instead of creating an alignment, I would use Google Earth to measure the mile marker coordinates.

Here is a little back story: I had started using Google Earth during my time at Fresno State's Geomatics Engineering program. I even based my senior project on Google Earth - attempting to quantify the unstated accuracy of Google Earth and then try to improve upon the coordinates it provided. My research

concluded the accuracy to be +/-0.5 feet (2 hour OPUS vs Google Earth UTM) for the areas around the CSU Fresno campus. I continued my use of Google Earth when I went back to work and found Google Earth to be relatively accurate when plotting points from field observed data. I had also been giving presentations around work about incorporating Google Earth into our everyday work flow. Coincidentally enough, the head of the LA River Group was interested in a KML for the LA River Bike Path that could provide pictures (1 upstream and 1 downstream) at every mile marker.

With the stage set I needed a way to accurately measure and extract the coordinates from Google Earth. The first thing I did was use Google Earth's "image overlay" function to overlay the as-built plans atop of the satellite imagery. It is not the simplest process to stretch, rotate and match the planimetric features. However, after the first few, the process does get faster. Next, I created icons for each mile marker at the calculated as-built stations using the "measure" tool in Google Earth. Then, I took the WGS84 coordinates of the icons and translated them to NAD83 using National Geodetic Survey's Horizontal Time-Dependent Positioning program (HTDP). After that, I used CorpsCon to transform the NAD83 coordinates to state plane Northings and Eastings and loaded them into a field controller. These transformations can also be done with some proprietary software programs.

It was now time to stake the points in the field. But not before incorporating a brilliant idea from my boss - rig a bicycle with a GPS unit by fastening a 1 foot rod to the front of the bike and clamp the controller to the body. With staking tools packed in my backpack, it proved to be very efficient going point to point as well as make for a great day of surveying. I was also equipped with a smartphone, loaded with the KML file for points where the GPS unit lost signal. When staking, using the smartphone, I used planimetric features I could see in the Google Earth imagery near the mile marker icons. The field staking ended up only taking 2 days for the entire 7 mile stretch. This included taking pictures at every mile marker. When I got back into the office, I created URLs for every photo and linked them in the icons in the original KML file.



The LA River Group was grateful for the KML as it provided them with a "virtual recon" tool, allowing them to ponder future improvements without having to do preliminary field recon. The City of Los Angeles was also extremely happy with the project, as the method saved over 200 man hours compared to a conventional survey. The project gained a lot of publicity and I was presented with Mayor's Civic Innovation Award, for outstanding creativity, innovation and excellence. It was an honor to bring recognition to the hard work we surveyors do every day, with Mayor Garcetti commenting on the value of us land surveyors. While staking using Google Earth currently remains a rare occurrence, the software is becoming a main-stay survey tool in my office with KMLs for tracking monument preservation jobs, digitally mapping sewer maintenance holes, analyzing network residuals by icon color and many other uses. ❖



John Tosto (center) with Mayor Garcetti (left)



# Introducing NGS Regional Geodetic Advisor Dana Caccamise

By: Scott Martin, PLS

During my surveying career in California, I have had the privilege to work with the first National Geodetic Survey (NGS) Geodetic Advisor to California, Don D'Onofrio, and the second, Marti Ikehara. My work with them was primarily focused on planning and executing Height Modernization projects in the Sacramento-San Joaquin Delta and Sacramento Valley. However, they were both very involved with the California Spatial Reference Center (CSRC) where I have been a member of the Coordinating Council since 2001. We worked together at the CSRC, including being involved in awarding NGS funded Height Mod contracts administered by the CSRC. I also worked very closely with Marti during the last year of her NGS career, even touring parts of California with her to spread the Geodetic "Gospel."

Don transferred to California from Alaska in 1990, where he was serving as the Geodetic Advisor. Through a cooperative agreement between NGS and Caltrans, which was executed to support the development and implementation of the High Precision Geodetic Network (HPGN), the NGS Geodetic Advisor to California position was created. Caltrans served as the State partner for this program, funding roughly half of the salary for the position, as well as providing office space and support, from its inception in 1990 until its conclusion in March, 2013, when Marti retired.

Before Marti's retirement, the NGS had already decided to move away from the State Advisor concept involving a local partner in most of the States, like Caltrans, and transition to a Regional Advisor concept, fully funded by NGS and covering all of the United States. Consequently, the contractual relationship and partnership between NGS and Caltrans was not renewed. Following Marti's retirement, California was without an assigned Geodetic Advisor for more than 18 months, as NGS worked to get hiring exemptions during a period that included a shutdown of the Federal government. During the hiatus, adjacent, and not-so-adjacent NGS Advisors assisted with covering the more pressing NGS Advisor needs in California, including providing OPUS Project Manager Training through two CSRC/CLSA organized workshops in June of 2014. Mark Armstrong, NGS Advisor to Oregon, and Bill Stone, NGS Regional Advisor to New Mexico, Arizona, and Utah, served as instructors for those workshops. Their efforts above and beyond to assist California during the dark and rudderless period of being without an NGS Geodetic Advisor were much appreciated.

But, those days are over now because California and Nevada now have a NOAA/National Geodetic Survey's (NGS) Pacific Southwest Regional Advisor. Introducing Dana Caccamise.

He will be assisting the geospatial community throughout California and Nevada—including public- and private- sector surveyors, GIS professionals, engineers, and earth scientists—with proper application of the National Spatial Reference System.

Dana is a recent addition to the NGS, and he previously held geodetic management and engineering roles in the Geodesy and Geodynamics group at The Ohio State University (OSU). While working at OSU, Dana participated and collaborated in a wide range of global geodetic research projects that emphasize geophysical applications of continually operating GPS/GNSS stations. As a result



Dr. Dana J. Caccamise II.

of these efforts, Dana was awarded an Honorary Doctorate and several other awards and accolades from both Bolivia and Chile for contributions to geodesy in South America. Dana's notable credentials include his Doctoral Candidacy in Earth Sciences/Geophysics at The Ohio State University and Master's Degrees in Geophysics and Geodesy from both The Ohio State University and the University of Hawai'i at Manoa.

The California Spatial Reference Center (CSRC), located at Scripps Institution of Oceanography (SIO) at the University California San Diego (UCSD), is currently hosting his position. Dana also now holds a Research Associate position in the SIO's Institute of Geophysics and Planetary Physics (IGPP) department.

## A personal note from Dana:

*I am in the process of relocating to the warm sunny weather of San Diego, a place where most geodesists can only visit or even dream about. The achievements and good works of people like you, the readers of this article, play a significant part for the existence of the Geodetic Advisor position, and certainly not a minor consideration in my desire to take on this role. Let's face it; today and in the recent past, California & Nevada is where the geodesy innovations have occurred. I am not a betting man, but if I were, I'd bet it will continue for quite some time and I would very much like to be a part of these successes. I am also very grateful to UCSD's California Spatial Reference Center for hosting my position, and of course the NGS's optimism that I can represent them to the fullest extent. As I get further along in my position, I look forward to meeting all of you soon, possibly at one of your local chapter meetings.*

For more information about the NGS and its products please visit:  
<http://geodesy.noaa.gov>

The advisor program can be found at:  
<http://www.geodesy.noaa.gov/ADVISORS/>

For more information about the CSRC please visit:  
<http://csrc.ucsd.edu> ♦

*Michael Stanton, PLS is the owner of MBS Land Surveys in San Luis Obispo. He is a past president of the Central Coast Chapter and served on various local committees related to public agencies. He has been a land surveyor in private practice since 1981 working with both private and public agencies. He has a B.S. degree in Resource Management from California State Polytechnic University, San Luis Obispo and was a part-time faculty member in the Agriculture Engineering Department at Cal Poly from 2010 to 2011. He occasionally serves as an expert witness for cases involving boundary disputes and legal parcels.*

# Monument Preservation

## Professional Land Surveyors Act Section 8771 Needs Improvement

As our state passes its 164<sup>th</sup> birthday, monument preservation becomes more important. Boundary monuments that have existed for 80 years or more are quickly being destroyed – not by malicious vandals, but by our trusted local agencies – City Engineers on behalf of local Cities, and County Engineers on behalf of the unincorporated areas throughout our state. While I’m sure their actions are not intentional, the end result is the same – destruction of land boundaries that had been fixed for decades, are now unknown or uncertain. These “improvement” projects include street repaving projects, curb and gutter replacement and handicap ramp construction required under the Americans with Disabilities Act (ADA). Some government representatives have the attitude of, “well, just put it back” without realizing that “putting it back” is much more of a challenge when monuments in an entire block or entire subdivision have been destroyed. They obviously don’t understand the advantage of locating these monuments on a common horizontal datum prior to replacement.

Too many times over the last few decades, I’ve bid a boundary project, performed all of the appropriate research up front, only to find in the field that 90% of the record monuments have been destroyed by a recent public works project. Essentially, monument destruction paid for by the taxpayer. I then spend days of extra work re-creating what the public agency inadvertently destroyed. If the purpose of our licensing laws are to protect the public, then the public is not well served by the current process for public works projects as it relates to boundary monuments. Section 8771 of the LS Act has been a problem for decades and there have been attempts over the years to strengthen the law to no avail. The 2015 version of the law reads as follows:

(b) When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control, the monuments shall be located and referenced by or under the direction of a licensed land surveyor or licensed civil engineer legally authorized to practice land surveying prior to the time when any streets, highways, other rights-of-way, or easements are improved, constructed, reconstructed, maintained, resurfaced, or relocated, and a corner record or record of survey of the references shall be filed with the county surveyor.

(c) A permanent monument shall be reset in the surface of the new construction, or a witness monument or monuments set to perpetuate the location if any monument could be destroyed, damaged, covered, disturbed, or otherwise obliterated, and a corner record or record of survey shall be filed with the county surveyor prior to the recording of a certificate of completion for the project. Sufficient controlling monuments shall be retained or replaced in their original positions to enable property, right-of-way and easement lines, property corners, and subdivision and tract boundaries to be reestablished without devious surveys necessarily originating on monuments differing from those that currently control the area.

(d) The governmental agency performing or permitting construction or maintenance work is responsible for ensuring that either the governmental agency or landowner performing the construction or maintenance work provides for monument perpetuation required by this section.

(e) It shall be the duty of every licensed land surveyor or licensed civil engineer legally authorized to practice land surveying to assist the governmental agency in matters of maps, field notes, and other pertinent records. Monuments set to mark the limiting lines of highways, roads, streets or right-of-way or easement lines shall not be deemed adequate for this purpose unless specifically noted on the corner record or record of survey of the improvement works with direct ties in bearing or azimuth and distance between these and other monuments of record.

(f) The decision to file either as required by subdivision (b) or (c) shall be at the election of the licensed land surveyor or licensed civil engineer legally authorized to practice land surveying submitting the document.

So, the current version of the law only requires monuments to be located and referenced prior “to recording of a certificate of completion for the project.” It does not require them to be located or referenced during the design phase of the project. This current provision of the law allows the City Engineer or County Engineer to skirt their responsibilities by inserting just one sentence into the specifications of the project that is similar to the following:

*Continued on page 26*



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# Report from the CLSA Monument Conservation Committee

By: Ron Nelms, PLS

Ron is the Chair of CLSA's Monument Conservation Committee

Our thanks to Michael Stanton for addressing issues related to identifying and preserving monuments, often a matter lost in the course of casual treatment related to legal oversight. He affirms that there is a general problem leading to monument destruction and that it is caused in such oversight to the point of neglect in what we identify as "improvement projects." The Stanton paper engages a serious problem for professionals in our field, and that problem impinges upon the rights and expectations of public interests. It describes a common frustration related to monuments experienced by surveyors in working with government agencies throughout the state. It is somewhat common to pass the problem of monument identity and restoration to some other entity than government - likely to the contractor. It is the agency's duty to protect the public interest and offer a level playing field for legitimate contractors. The government agency ought not divest itself from protecting this public interest, so to take on the responsibility for this matter at the outset of the project - to make clear how the monument factors are to be addressed and policy is to be carried through to satisfaction.

Ramifications of monument destruction are not always apparent at the launch of a project, and may not emerge for some years after the completion of the project. This drag may cause agencies to become too casual, leaving the matter to future considerations when the monuments may be forgotten or left to 'hang' without fair solution. Time can make the matter unresolved, perhaps irreversible. The agencies seem apathetic, perhaps not valuing monument preservation. It may be passed over with statements like: "We will look into it." What follows is a great silence. Surveyors usually understand the importance that monuments have to the public. We are rightly exasperated when these matters are passed over.

Our current problem is that we are having difficulty in gaining a platform for serious attention to monument restoration. We need to press forward on at least two fronts: 1) strengthen our case through legislative action, and 2) establish a standard means to communicate the importance and meaning of the issues we address here. CLSA has been working on the first point through the Legislative Committee, and the second point through the Monument Conservation Committee (MCC). The MCC is populated from both public and private surveyors. The members have been developing a power point presentation offering a unified message related to the issue. The purpose is to articulate the history and public interest including the merits of administrative obligation that includes the need for compliance to State Law with some empowerment to involved surveyors.

The presentation will focus on four varied target groups: 1) Government and Agencies, 2) Contractors and Utility Corporations, 3) Service Clubs/Chambers/Networking Groups, and, 4) Surveyors. We need to consider the importance of legal management for monument preservation. If projections go well the package will be available for the Chapters in March, 2015, so to begin making presentations to target groups. We believe this will offer an excellent avenue for our profession to educate others on the issues, and dialogue with others interested on the importance of maintaining integrity for monument control. It will be educative and persuasive. ❖

*Continued from page 24*

**"Contractor shall protect all survey monuments within the project area and replace any monuments destroyed in accordance the Land Surveyor's Act."**

At first glance this might appear satisfactory; however there are a few problems with this approach. First of all, this specification puts the responsibility for monument preservation onto an unlicensed individual (the contractor). Unless the contractor happens to trip over a monument during the course of the project, there is no incentive for them to hire a licensed professional to do this work. It's simply a policy of "don't ask, don't tell". If nothing is discovered, then nothing needs to be replaced. Is someone on a backhoe trained in searching for pipe monuments that may lie just 6" below the surface? Are they trained in finding 50 year-old chiseled crosses etched into the back of the sidewalk? Probably not.

The main problem with putting the responsibility for monument preservation onto the contractor is that it puts monument preservation into a competitive bidding process. In construction, the cheapest bid cost normally gets the job. So now the contractor (or the surveyor working for the contractor) who finds the least amount of monuments or has to replace the least amount of monuments is the winner!

For example, let's say a city recently put out a repaving bid. It includes about 6 lineal miles of street grinding and re-paving, 600 lineal feet of new curb and gutter and a few new handicap ramps. Let's say that a contractor bidding the project calls a few surveyors the day before the bid deadline to get some numbers for a survey bid. Surveyor "A" stays up all night, researches the 137 record maps in the area and determines that 160 monuments lie within the project area and will need to be replaced along with the filing of a record of survey. Surveyor "A" bids the staking at \$2,000 and the monument preservation at \$6,000 for a total bid of \$8,000. Surveyor "B" doesn't have time to do the proper research and assumes that 5 monuments will be destroyed. His bid is \$2,000 for staking and \$500 for monument preservation for a total bid of \$2,500. Well, two months later, guess who wins the bid - Surveyor "B" gets the job and 155 monuments are now destroyed by a taxpayer funded project.

*Continued on page 28*





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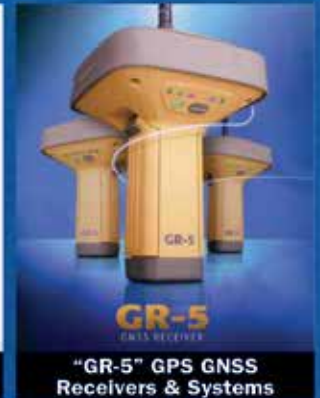
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## Geography Quiz Answer

Question on page 7

### Answer:

Picacho del Diablo at 3096 meters, is the highest mountain in the state of Baja California, Mexico. It is in the Sierra de San Pedro Mártir National Park. From the summit you can see the Pacific Ocean, the Sea of Cortez, and mainland Mexico. The park is also home to Mexico's largest optical telescope and the California Condor, through a successful introduction program.



## Funny Bones

Have a funny bone to submit, email us at [clsa@californiasurveyors.org](mailto:clsa@californiasurveyors.org)

*Arizona needs a spell check?*



Submitted by: Phil Danskin, PLS

## Monument Preservation Professional Land Surveyors Act Section 8771 Needs Improvement

Continued from page 26

According to Government Code Sections 4525-4529.5, the practice of land surveying is a professional service where the firm shall be chosen based on “demonstrated competence and on the professional qualifications necessary for the satisfactory performance of the services required” (Sec 4526). So why are County and City Engineers continually allowed to include land surveying services as a part of construction contracts where competitive bidding is allowed? I have spoken with a few City Engineers regarding this issue and they insist they have had their City Attorneys research the issue and they have been advised by their legal staff that this approach (of making the contractor responsible) is legal. In my opinion, any time you put monument preservation into a competitive bid process, the public loses. The cheapest bid will preserve the fewest monuments every time—it’s just that simple.

### So what is the solution? Section 8771(b) of the LS act needs to be revised as follows:

**(b)** When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control, the monuments shall be located and referenced by or under the direction of a licensed land surveyor or licensed civil engineer legally authorized to practice land surveying and the monument positions shall be shown on the improvement plans or construction documents for projects which call for any streets, highways, other rights-of-way, or easements to be improved, constructed, reconstructed, maintained, resurfaced, or relocated. Monument positions shall be indicated by coordinates or by station and offset from the construction centerline. A corner record or record of survey of the references shall be filed with the county surveyor prior to award of the construction contract. All monuments (record or non-record) shall be searched for within the project area prior to award of the construction contract. The number of monuments and character of replacement monument shall be specified in the bid documents.

### Also, under Section 8771 (d):

**(d)** The governmental agency performing or permitting construction or maintenance work is responsible for ensuring that either the governmental agency or landowners performing construction or maintenance work have located and identified monuments within the project area on the construction drawings prior to award of the construction contract, that a pre-construction and post-construction corner record or record of survey is filed, and that all monuments destroyed during the course of construction are perpetuated as required by this section.

### Possibly the scope of civil engineering needs to be redefined under Section 6731 of the Professional Engineer’s Act as follows:

6731 (h) In the capacity of City Engineer or County Engineer, the preservation of boundary survey monuments are to be shown on civil design plans in the performance of the activities described in subdivision (a) through (f) consistent with the Land Surveyor’s Act Section 8771.

It is obvious that the law as currently written is not working; agencies have simply deferred monument preservation to contractors. Any time monument preservation is put to a competitive bid process, the public loses. The work involving the recovery of survey monuments within the project area should be performed along with the base mapping for the engineering design, and the consultant performing this work should be chosen on a qualifications based selection process. Survey monuments (record and non-record) should be located with positions clearly delineated on the plans as well as on a record of survey or corner record. Prior to construction, the bid documents should identify the exact number of monuments within the project area that could be destroyed so that each potential bidder is on a level playing field. ❖

## Professional Outreach Events Public Awareness - Adopt a Road

By: Rich Brown, LSIT

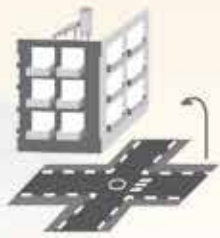


The Central Valley Chapter of CLSA is participating in the Stanislaus County “Adopt-A-Road” program. The Chapter will be responsible for maintaining the mile long stretch of Claribel Road, between Roselle Avenue and Claus Road. Chapter volunteers will participate in clean-up efforts twice a year. This is a great opportunity for public awareness at little to no cost to the Chapter. ❖



# Use a regular camera for surveying

Draft your CAD maps directly on images of regular cameras



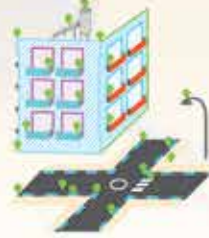
## Shoot

Photograph the surveyed area using a regular camera



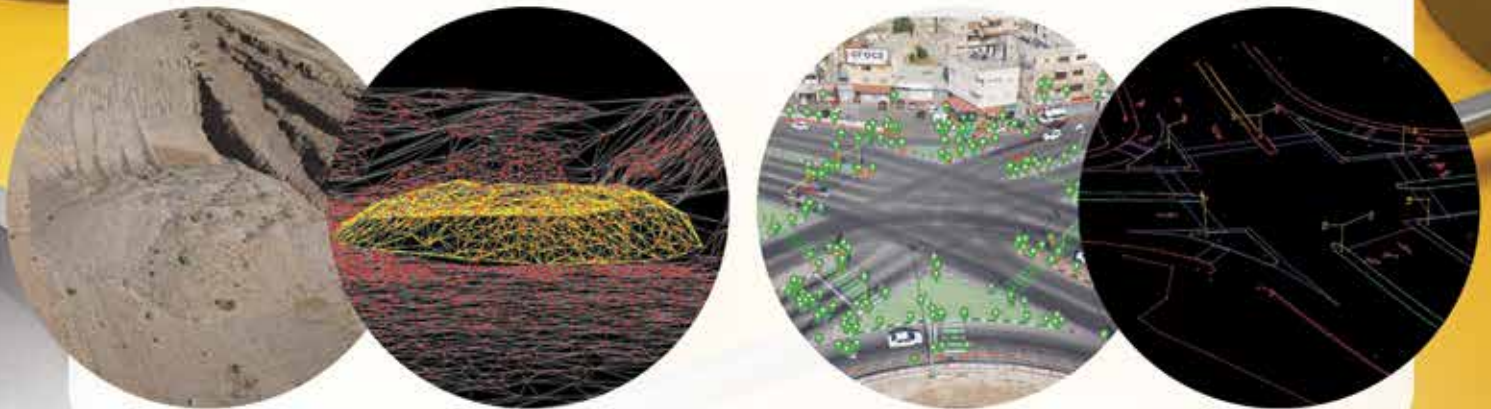
## Anchor

Measure few control points to geo-reference the images



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## Becoming Santa Claus



Barely 2 weeks after graduation from PSCS, while on an extended long distance motorcycle ride (another 'other hat'), I was approached by a child and his parents while standing outside a hotel in Twin Falls Idaho. Harleys and leathers are not your usual garb as Santa, but this child was undeterred.

"Are you Santa Claus" the young boy asked.

"Why yes I am" I replied.

"I wanted to thank you for bringing me Jessie last Christmas".

"You are very welcome. How is Jessie doing"?

"He's doing fine". (At this point I am looking at Mom and Dad for some clue as to who or what Jessie might be.)

"Tell Santa what you want for Christmas this year, Kevin" Dad said with a grin.

"I want a bow and arrow", came the reply.

Knowing a little about archery I ask "A recurve or compound bow"?

"A compound bow"

Considering the eager face atop a little body standing before me I said "Let's see you can probably hold, what, about a 25# pull?"

"35#!" Dad proudly says.

Whether you know him as St. Nicholas, Kris Kringle, Pere Noel, Sinter Klass, Father Christmas or, of course, Santa Claus, he is perennially associated with the magical spirit of Christmas. I am honored to have the opportunity to portray one of the most beloved characters in the world. Bringing Santa to life in the eyes of children, young and old alike, is the one of the most uplifting, exhilarating feelings I have ever experienced.

There is nothing quite like walking down the street in Los Angeles and having someone drive by and yell "Hey Santa Claus"! Or having a small child come out of an ice cream shop in Palm Springs in the middle of summer, look up at you and simply say, "Santee"! With white hair and a beard, there is no point in denying my natural resemblance to the BIG GUY! Looking the part, I began to consider "playing" Santa. However, the portrayal of the jolly old elf is not to be taken lightly.

About 5 years ago I decided to find out if there existed somewhere a school for Santas-in-Training—some sort of Elf Academy or Santa 101. A little research and a few phone calls and I was enrolled at the Professional Santa Claus School (PSCS) in Denver, Colorado. Happily, training was also available for my lovely wife Maureen who agreed to participate as Mrs. Claus in the formation of my alter ego.

Off we went over Labor Day weekend in September 2011 for 5 days of very intense training sponsored by American Events of Denver. This was the 29th year that America Events has put on the PSCS and many of the instructors are past graduates, all very successful Santas in their own right.

There is much more to being a professional Santa than I ever imagined! It is more than a red suit and a few HO HO HOs. The first thing I learned is that one does not 'play' Santa but rather one 'becomes' Santa. It is a transformation! Maureen and I graduated from PCSC ready to embark on our journey with our new personae. I didn't realize how soon I would have cause to use some of what I had learned.



"I'll keep my eye on you and Jessie and, if all goes well, Santa will try very hard to get the elves to make that bow for you" (Rule #3, never promise to deliver). As I get a big hug from Kevin, I give his Dad an aside, "Make me look good!" I still don't know who Jessie is, but I'm pretty sure Kevin got his bow. I know I was on cloud nine for the next several hours.

*Continued on next page*



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*Continued from previous page*

Each year over the next several years, from Thanksgiving to Christmas, Maureen and I have 'transformed'! In 2011 we became the official Santa and Mrs. Claus for The Christmas 365 Foundation in Corona California. Founded by Dr. Kim and Larry Kimpel, The Christmas 365 Foundation is dedicated to helping families who, for whatever reason, need a little help—not just during the holidays, but all year long. We support many of their fundraising activities throughout the year and, of course, appear at their Christmas open houses held on the first 2 weekends in December. Supporters and recipients alike gather to tour the Kimpel's residence which has been set aglitter with over 50 trees! Each year a few more trees appear—Santa is always impressed!

We also make appearances at private and corporate parties, schools, photo sessions etc. entertaining with recitations of "Twas the Night before Christmas", Christmas Trivia, 'Santercises', Christmas Carols (Santa does not have a very good singing voice but Mrs. Claus does), and the Ho-Ho-Hokey Pokey dance. Imagine seeing Santa 'shake his bottom all about'!

But ultimately, there is nothing quite like hearing, in the immortal words of my grandchildren, "That's Santa... he's my Papa!"







# Postcards



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I came across this sign in 2011 where there had been "issues" regarding Surveyor's right of access in Alpine, San Diego County.

Submitted by Scott Fitch, LS 5284

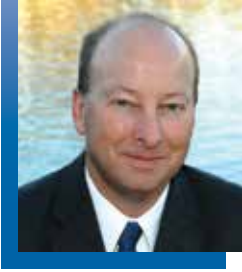
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Mr. Helmer is a Professional Land Surveyor registered in four states with over thirty-five years of experience in geodetic control, Surveying Geomatics and GIS. Through the firm of GA Helmer Consulting, he provides advanced geospatial positioning, mapping, and database application services to public and private sector clients, together with research and development, training, and consulting for GNSS geodetic control, land parcel boundaries, rights of way, subdivision entitlement, and technology implementation. He has published more than 30 articles and professional papers and is nationally recognized for his contributions to GNSS surveying and high-precision geodesy. Mr. Helmer is a graduate of Chapman University, a contributing author to the National Height Modernization Program for NOAA, a Fellow in the Institute for the Advancement of Engineering, a Fellow with the American Association for Geodetic Surveying, and a founding member and past Chairperson of the California Spatial Reference Center at Scripps Institution of Oceanography.

# GNSS Surveying Standards and Specifications,

a Joint Publication of CLSA and CSRC



One of the stated goals of the California Land Surveyors Association (CLSA) is "to promote and maintain the highest possible standards of professional ethics and practice," and similarly one of the objectives of the California Spatial Reference Center (CSRC) is to "promote the development of specifications and guidelines for GPS surveys, not otherwise provided at the national level." So it was entirely appropriate that in January of 2014 the two organizations came together and authorized a task force to develop updated standards and specifications for GNSS geodetic control surveying. One year later version 1.1 was ratified by CLSA's Board of Directors and CSRC's Executive Committee, and is available for download from their respective websites.

<http://www.californiasurveyors.org/resources.html>

[http://csrc.ucsd.edu/docs/CLSA\\_CSRC\\_GNSS\\_Standards\\_and\\_Specifications\\_v1.1.pdf](http://csrc.ucsd.edu/docs/CLSA_CSRC_GNSS_Standards_and_Specifications_v1.1.pdf)

The publication provides a consensus opinion of the appropriate measure and documentation of horizontal and vertical accuracies, together with a summary of current best practices. It is targeted at assisting the professional with methods for thorough and consistent practices, and at the agency consumer of geodetic control to easily request and enforce the requisition of geospatial data of high quality.

confidence level is the only measure endorsed, and in an effort to promote consistent and simplified reporting, the more readily-understandable Federal Geographic Data Committee (FGDC) network accuracy definition is adopted. Accuracy is to be reported separately for horizontal and vertical components, including separate analysis and reporting for orthometric heights and local elevations where augmentation for uncertainty in the geoid model and/or tidal datum model must be addressed. Accuracy can be generalized over any homogeneous project or sub-project into one of five standard levels from 0.5 cm to 10 cm. It is also acceptable and encouraged to report actual achieved accuracies on a point by point basis. Again with the idea of simplification, it is suggested that adopting the major axis of the error ellipse computed from a properly-weighted least squares adjustment scaled to two standard deviations (95% confidence) is a superior measure of horizontal accuracy, over the somewhat more complicated computation of circular error probable suggested by the FGDC. Network and local accuracy measures are discussed, again for consistency with network definition promoted, and local accuracy recommended as having appropriate reporting applications such as for monitoring networks. It is not sufficient to simply process and adjust GNSS data and make a claim of accuracy based upon the network adjustment report. Validating the final positions with independent testing is a requirement imposed. Testing against published values of a higher accuracy, or longer observation sessions and different software solutions are just some of the possible validation tests. Finally, as geodetic control surveying is within the definition of Professional Land Surveying in California (Section 8726(f) of the Land Surveyors Act), it is required that the claim of accuracy is accompanied by a sufficiently-detailed project report signed and sealed by the professional in responsible charge.

Classification	95% Confidence Region		Notes
	Meters	Feet	
0.5 cm	≤ 0.005	≤ 0.016	Horizontal and vertical accuracy classifications included in these specifications.
1 cm	≤ 0.01	≤ 0.033	
2 cm	≤ 0.02	≤ 0.066	
5 cm	≤ 0.05	≤ 0.164	
10 cm	≤ 0.1	≤ 0.328	

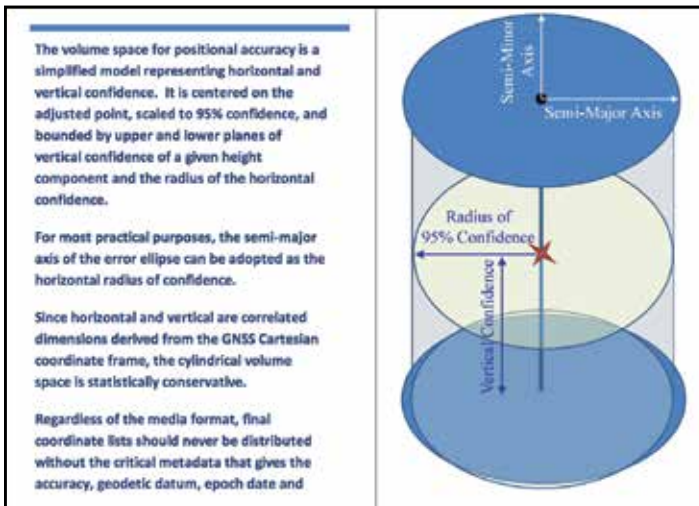
Five standard levels of accuracy are defined for classification of geodetic control. Reporting of actual accuracy achieved on a point by point basis is also encouraged.

Chapter one defines what it means to claim a level of accuracy for horizontal and vertical control and the minimum criteria necessary to do so. Positional accuracy within a 95% statistical

Chapter one provides the extent of the mandates imposed by the GNSS Surveying Standards and Specifications publication. The practitioner is allowed the freedom to employ appropriate

Continued on next page





Data Collection	Horizontal	Horizontal	Horizontal	Vertical	Vertical	Vertical
Spatial Accuracy Classification	.5 cm-2 cm	2 cm-5 cm	5 cm-10 cm	.5 cm-2 cm	2 cm-5 cm	5 cm-10 cm
<b>Repeat Station Observations</b>						
percent of number of stations						
Two times:	100%	100%	80%	100%	100%	80%
Three or more times:	10%	10%	0%	50%	25%	0%
Sidereal time displacement between occupations (start time to next start):	60 min.	45 min.	30 min.	120 min.	60 min.	45 min.
<b>Satellite Observations</b>						
Minimum number of satellites observed during 75% of occupation:	7	6	5	8	7	5
Maximum PDOP during 75% of occupation:	3	4	5	3	4	5
<b>Antenna Setup</b>						
Maximum centering error (measured and phase center):	3 mm (0.010')	5 mm (0.016')	7 mm (0.023')	5 mm (0.016')	5 mm (0.016')	7 mm (0.023')
Independent plumb point check (rotating plummet, 2 <sup>nd</sup> level bubble, etc.):	Y	Y	N	Y	N	N
Maximum height error (measured and phase center):	5 mm (0.016')	5mm (0.016')	5 mm (0.016')	3 mm (0.010')	5 mm (0.016')	5 mm (0.016')
Number of independent antenna height measurements per occupation:	2	2	2	2	2	2
Digital Photograph (location and close up) for each mark occupation:	Y	Y	Y	Y	Y	Y
Fixed Height Tripod Recommended:	N/A	N/A	N/A	Y	Y	Y

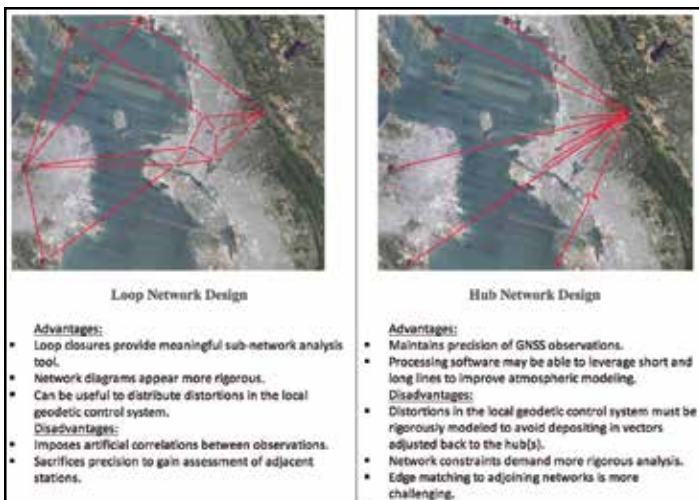
GNSS tools and procedures, provided that they deliver the necessary analysis and proof required to validate the accuracy claim. Chapter two offers a series of best practices using current technology, mostly addressing carrier-phase differential surveying methods. Looped versus hub network designs are discussed with advantages and disadvantages of each presented. The stability of typical monument types are discussed along with several important considerations for site selection. Data collection and processing sections key in on some of the significant matters impacting the quality of GNSS geodetic control surveys such as repeat occupations and centering and stability of the antenna phase center. A section on vertical control covers ellipsoid heights and geopotential heights where very little analysis is necessary beyond the least squares adjustment, and the tremendously more challenging determination of NAVD88 California Orthometric Heights, local elevation systems, and tidal datum. A process chart for height determination is presented to assist in the iterative process needed to validate height constraints, identify trends and corrections, and produce reliable heights.

**Best practices using current carrier-phase differential GNSS surveying methods provide guidelines known to produce acceptable results. The professional is allowed the freedom to employ the appropriate GNSS tools and procedures, provided that they deliver the necessary analysis and proof required to validate the accuracy claim.**

The document appendices provide examples of reporting and a glossary of GNSS positioning and processing methods. The professional is urged to never report coordinate values, regardless of the media format, without the critical metadata that gives the accuracy, geodetic datum, epoch date and projection. Since much of the GNSS Surveying Standards and Specifications was appropriately borrowed from a similar California publication from two decades previous, the need to wholesale update this version 1.1 seems unlikely. Like any technical treatise, some additions and modifications are to be expected and are provided for by the authorizing professional associations.

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- Curtis Burfield, PLS 6753
- Kimberly Holtz, PLS 7080
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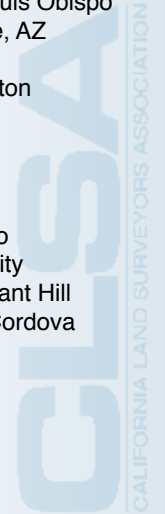
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Steve at Joshua Tree National Park



Li Zhang, past president of the Nevada Association of Land Surveyors, at the Francis Ford Winery, in November 2014.  
Submitted by Steve Martin, PLS



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By: Carl C. de Baca, PLS

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## Bad Backsights

### Total Bastard Airlines

In July, 2010 I attended the CLSA board meeting in Oakland. My trip started with a 250 mile drive from my home near Elko, Nevada, to Salt Lake City, Utah where I got a hotel room, spent the night and hit the airport at 7 a.m. Following is a brief description of the trip. I don't recall the meeting itself.

In the eighties, Saturday Night Live had a recurring skit called "Total Bastard Airlines." This was obviously a thinly veiled reference to a real airline with a regional hub in Salt Lake. Their motto is "The customer is always right but his luggage goes to Sheboygan regardless." I was scheduled for a same day round trip and had printed the boarding pass to Oakland at home the day before. Unfortunately I could not print a return boarding pass even though I deliberately did not leave home until it was less than 24 hours before the return flight. At the ticket counter a matronly lady with a vaguely, and by "vaguely" I mean fake British accent told me that sadly, she could not print out a boarding pass for the Oakland to Salt Lake flight more than six hours in advance but that I could print it out at home. I protested that I had tried to print it at home and that now I was here not there. Nothing she could do, pip-pip, tally ho, dreadfully sorry, old bean.

After queuing through the security gate at SLC International, I walked the endless corridors until I found the 'old' part of the airport where you enter the planes by walking out on the tarmac and in the case of my plane, climbing up a ladder while being careful not to get caught in the propeller. This was the first plane I have ever seen that had a bumper hitch on the back and a luggage rack on the top. It was obviously designed by the inventor of corrugated metal pipe and the wings looked like two surfboards stabbed into the sides. I knew I was in for a ride when the pilot told everyone to jump into the air right as the wheels left the runway. I must say however that the milk crate was quite comfortable.

I still have the complimentary peanuts that the flight attendant passed out. She asked me to share them with the other passenger but he was out on the wing with a roll of duct tape trying to secure something. I couldn't see exactly what because of the thick black smoke, so I kept the peanuts all for myself - heh, heh, heh. As Ron White famously put it, the plane was travelling at "half the speed of ... smell." I asked the attendant for an in-flight cocktail but she declined, saying, "I'm sorry sir but we are low on fuel and need to save the rum for just in case."

After the BOD meeting I shuttled to the Oakland airport for my return to Salt Lake. The terminal was nearly empty the way airports look in the last reel of a horror movie. I had a whole row of naugahyde seats to myself as I awaited the arrival of my plane. In the next row a young lady was loudly exclaiming into a cell phone, (to a sibling, a pastor, perhaps a parole officer...), that her dad had just moved to Arizona but he should have moved to New Mexico where pot smoking is decriminalized. His California medicinal use card was not recognized in Arizona and it's not like he's going to just quit because of where he moved. That bit of eves-dropping was interrupted by a gal sitting across the corridor from me who was crying into her phone and telling a (presumably) close friend of the transformative experience she had last night at an NA meeting. The image of her dreadlocks shaking in concert with the caterwauling, sticks with me to this day. I actually looked forward to getting on the plane.

The flight back was uneventful, except for being diverted to Twin Falls, Idaho due to a vicious storm over Salt Lake and our fuel supply being again low. I would have thought that someone would take the time to fill the Jerry cans attached to the side of the plane while in Oakland. We landed in a potato field on the outskirts of a place that as near as I can tell had no in-skirts. While we were waiting to take off, everything was fine until the commode overflowed. It is rather disconcerting to hear the flight attendant's voice on the intercom asking the pilot how many rolls of paper towels are on board. Have you ever seen the airline version of a Shop Vac?

We finally landed in Salt Lake and taxied to the terminal - literally. A taxi came out and picked us up since the plane had run out of gas right after landing. The airline sent a representative out to meet the taxi and pick up the fare, though not the tip. He informed me that my luggage had been traced to an airport in Wisconsin. At first I laughed since I had no luggage but then I remembered the last time I flew out of Salt Lake.

Author's note: I may have exaggerated a little - there is no proof that the field in Idaho was suitable for potato growth. ❖



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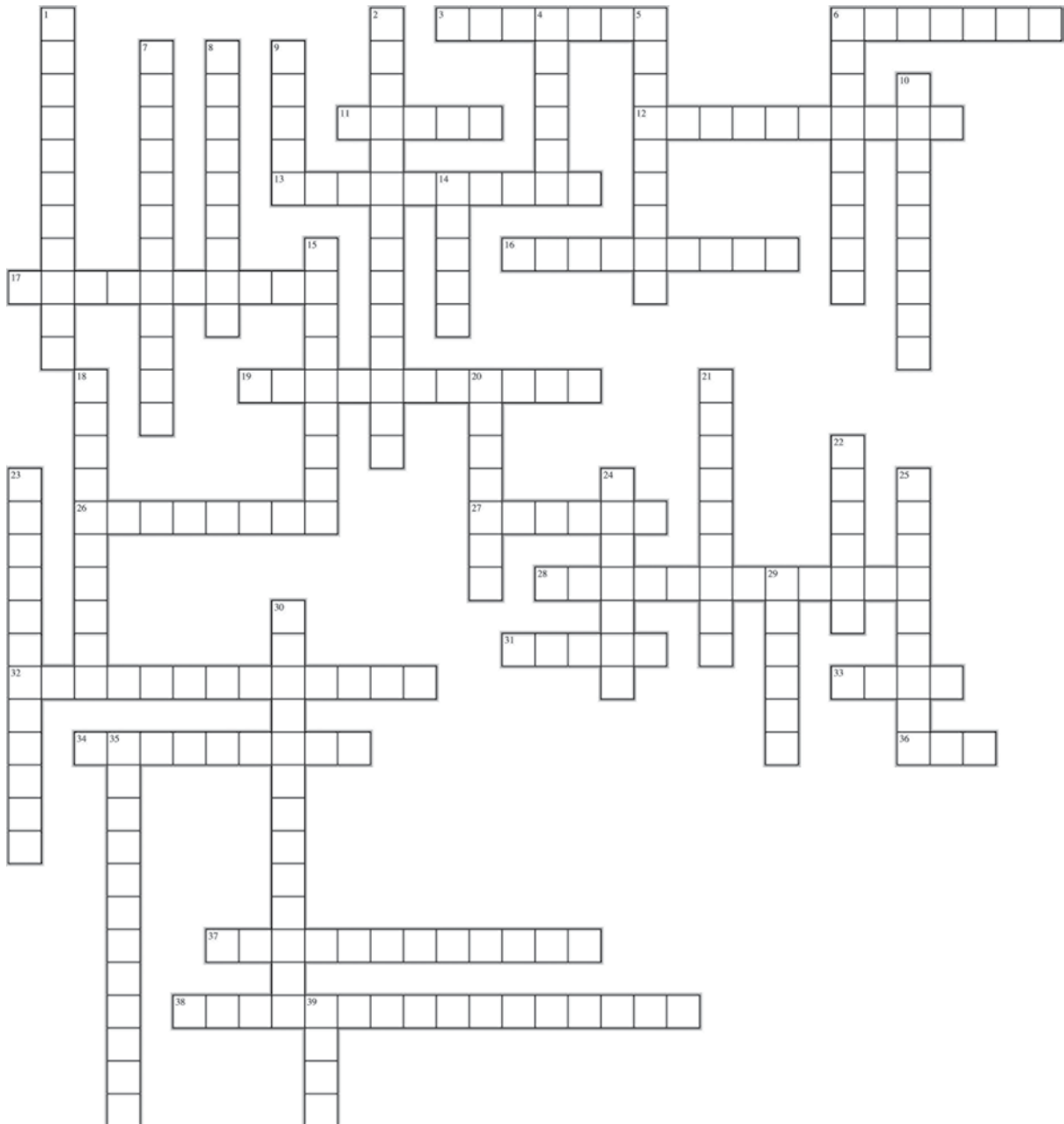
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**Scott Martin** has been working in surveying since 1977 and obtained his California license in 1987. He worked in the private sector until 1993 and has been employed by the State of California since then. He lives in the Gold Country of California and enjoys collecting, restoring, and using Coleman lanterns in his leisure time. The one in the picture is from 1920.

## Crossword Puzzle *by Scott Martin*

CLSA Crossword Puzzle # 33





## Across

3. Prisms have these
6. A zone to respect
11. Often staked on high rise construction
12. It only matters beyond 5 miles when going from geodetic to State Plane
13. A beetle to worry about
16. It happened on September 9, 1850
17. The B in B.E.S.T.
19. Origin of NAD27
26. Evidence along the way for the GLO
27. LiDAR is this type of sensing
28. Origin of NAVD88
31. A type of lettering
32. You need a meter to enter one
33. NGS positioning tool
34. Often incorrectly called a chain
36. Type of scale or place to not do a survey
37. Surveyors used them out before calculators
38. 12A is one

## Down

1. A baseline to visit regularly
2. One of us if pre-82
4. Rights that must be recognized
5. It has an SPF factor
6. They can mess with your levels on a hot day
7. Minimum requirement before removing a monument
8. GRS80 is one
9. It's rise over run
10. Important part of a topo
14. You might need a bore to find it
15. 2009 is the latest version of it
18. OSHA says every job must have one
20. A type of possession
21. NAD83 is this type of datum
22. Reading between the lines to get the distance
23. The D in HTDP
24. An equation along a line
25. Bullseye bubbles follow this
29. A type of rod or steak sandwich
30. The HP 3805 was an early one of these
35. A math must for surveyors
39. County with the lowest and highest points in CONUS

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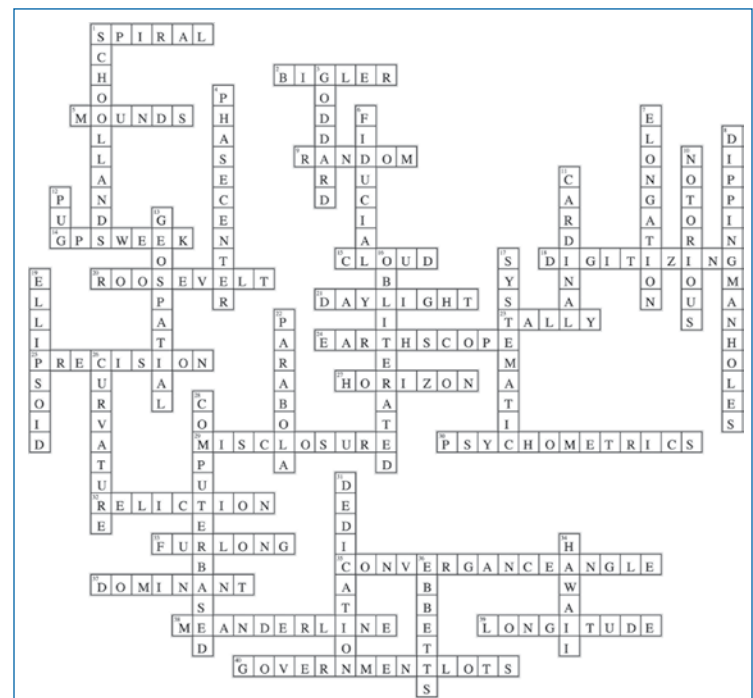
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## Key to CLSA Crossword Puzzle # 32

(Surveyor Issue # 179)





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## Top Captions for issue #179



Arf: "Banner Peak? Marti GPS'd it last year. You'll be the first Hoomahn to take that measurement from Mt Ritter. Hope your batteries last! And call me on my cell and let me know what elevation you came up with. Marti told me Ritter was 4,005.080 meters high. I think she's close - 'cause I get headaches at about 4,000 meters."

Hoomahn: "We don't "lead the nation" anymore. CalTrans went backwards to the King's foot again!"

Arf: "You don't say? If a caveman can do it, you'd think they could too! We've been on it for centuries without a hitch. Probably the dumbest hammer in the box (contractor) that made 'em go back. Have a nice day 'n say high to Breyfogle's father when you get there. "4788" won't tell me where he's buried."

Submitted by Phil Danskin, PLS

Around 800 BC Urban and Regional Planning was introduced into the region now known as Las Vegas, Nevada.

"The new pyramid goes in the middle of the valley on the west side of the cart path with the main entrance orientated due east."

Submitted by BJ Tucker, PE, LS

"Legend has it that teeny-footed hairless hominids roam those parts. I think it's a crock!"

Submitted by David King, PLS



Submit your caption for the below cartoon to [clsa@californiasurveyors.org](mailto:clsa@californiasurveyors.org) by April 10th.

Our favorite captions will be published in the next issue of the California Surveyor.

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