California Surveyor

Winter 2014 Issue #179

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California Surveyor

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"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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California Land Surveyors Association, Inc.

CENTRAL OFFICE
526 So. E Street
Santa Rosa, CA 95404
E-Mail address: clsa@californiasurveyors.org
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EDITOR
John P. Wilusz, PLS, PE

ASSISTANT EDITORS
Paul M. Brown, PLS – Jill Van Houten, PLS

CONTRIBUTING WRITERS
Anne Hoppe, PLS
Dane Ince, PLS
Michael P. Durkee, Esq.
Richard R. Hertzberg, CPUC, ARM
Scott Martin, PLS

DESIGN AND PRODUCTION
Tony Monaco

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EDITOR'S ADDRESS
John P. Wilusz, PLS, PE
E-mail: johnwilusz@gmail.com

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Fall ..... August 1	Winter .....November 1

Articles, reports, letters, etc., received after the above mentioned date will be considered for the next edition.

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These brass plates mark the site of the Prague Meridian in Old Town Square, Prague, Czech Republic. To learn more read "Geocaching in Prague" on page 6.

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

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

From the Editor

Geocaching in Prague

In August I visited several Eastern European cities. One of them was Prague, where I tried geocaching for the first time. Wikipedia defines geocaching as "an outdoor recreational activity in which participants use a Global Positioning System (GPS) receiver and other navigational techniques to hide and seek containers, called 'geocaches' or 'caches.'" Participants navigate to a specific set of GPS coordinates and then attempt to find a container hidden at that location. Geocaching containers typically hold a log book and, if big enough, trinkets. I've been meaning to give this a try so I Googled "geocaching Prague," found the website geocaching.com, and picked a few caches near areas I wanted to visit. Thus began my "geocaching tour" of the historic heart of city. I used my iPhone and the app "Theodolite by Hunter" to navigate to the coordinates. Read on to learn more about my geocaching adventure and get a whirlwind tour of Prague. You can enhance the experience by using the coordinates to visit the sites on Google Earth.

Wenceslas Square

I found my first cache, "Wenceslas Square," hidden in a stone sculpture in front of the National Museum. This is a busy spot and the website advised searchers to be careful when retrieving and replacing the cache because tourists "will most probably look in your direction." I found this to be true. The coordinates are N 50° 04.762, E 014° 25.828. The website described this as a "microcache," which turned out to be a plastic 35 mm film canister packed solid with tiny slips of paper. The little papers were logs left by people who found the cache. Someone had logged-in just 15 minutes before I did.

Statue in Wenceslas Square. The micro-cache was hidden in the reclining man's hand.

The square is named for Wenceslas I, a 10th century Bohemian king. In those days Bohemia was a country and its capital was Prague. Bohemia survives today as one of three areas that comprise the Czech Republic; the other two are Moravia and Silesia. Wenceslas is believed to have been a wise and benevolent ruler and he is credited with Christianizing his subjects. The Christmas carol Good King Wenceslas describes an event on a cold winter night in which the compassionate king traveled on foot across a frozen landscape to provide food and firewood to a peasant in need. The king's page, who was not thrilled about the trip, discovered that he could keep his feet warm by carefully stepping into the king's snowy footprints. A miracle! Or so the story goes. The Catholic Church made Wenceslas a saint after his brother murdered him to seize the throne. Today Saint Wenceslas rides a bronze horse in the square and keeps a watchful eye on Prague. He has seen a lot of changes over the years.

The square itself was founded in the 14th century by another popular ruler, the Holy Roman Emperor, Charles IV. More about him later. Wenceslas Square has been the site of many big events in Czech history and one of them has to do with the collapse of communism. In 1989 communist governments were falling like dominoes across Eastern Europe. The wave began in Poland with "Solidarity," a social movement started by a trade union, and it rolled west, smashing the iron curtain along the way. The people had enough of the Soviets. In November of 1989 hundreds of thousands of demonstrators filled Wenceslas Square to demand an end to Communist rule. Things could have gone very badly for the unarmed citizens, but instead the hated government collapsed and Communist leaders were swept aside in the so-called "Velvet Revolution." A new era began. The Republic of Czechoslovakia was finally free to rule itself. It promptly elected its first president and in 1993 split into two separate nations: the Czech Republic and Slovakia.

When I visited in August, Wenceslas Square was filled with people who were busy spending money. To me it seemed like poetic justice. Communism is a distant memory and private businesses cater to tourists from around the world. I found McDonalds and Starbucks in the square and they were both filled with customers, although they didn't get any money from me. The Czech Republic is a member of the European Union but for the time being it is still using its own currency, the Czech crown. Some businesses also accept Euros. I spent about $60 per day on lodging, food, and public transportation. Entertainment costs vary depending on how you like to be entertained.

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Prague Meridian

My second cache was "Staroměstské náměstí," a name I have no idea how to pronounce. It was a virtual cache, meaning there was no geocache container at the site. That's because there is no place nearby to hide anything, and even if there were, the area is so swamped with tourists it would be impossible to manipulate the container discreetly. The site consists of

Prague Meridian.

two brass plates with a Latin inscription. The coordinates are N 50° 05.250, E 014° 25.283. The website described the general area as "a lovely spot to spend a lazy hour over a plate of pasta and a glass (or two) of Pilsner or Budvar." Speaking of Pilsner and Budvar, I was surprised to learn that Czech beer is actually cheaper than bottled water.

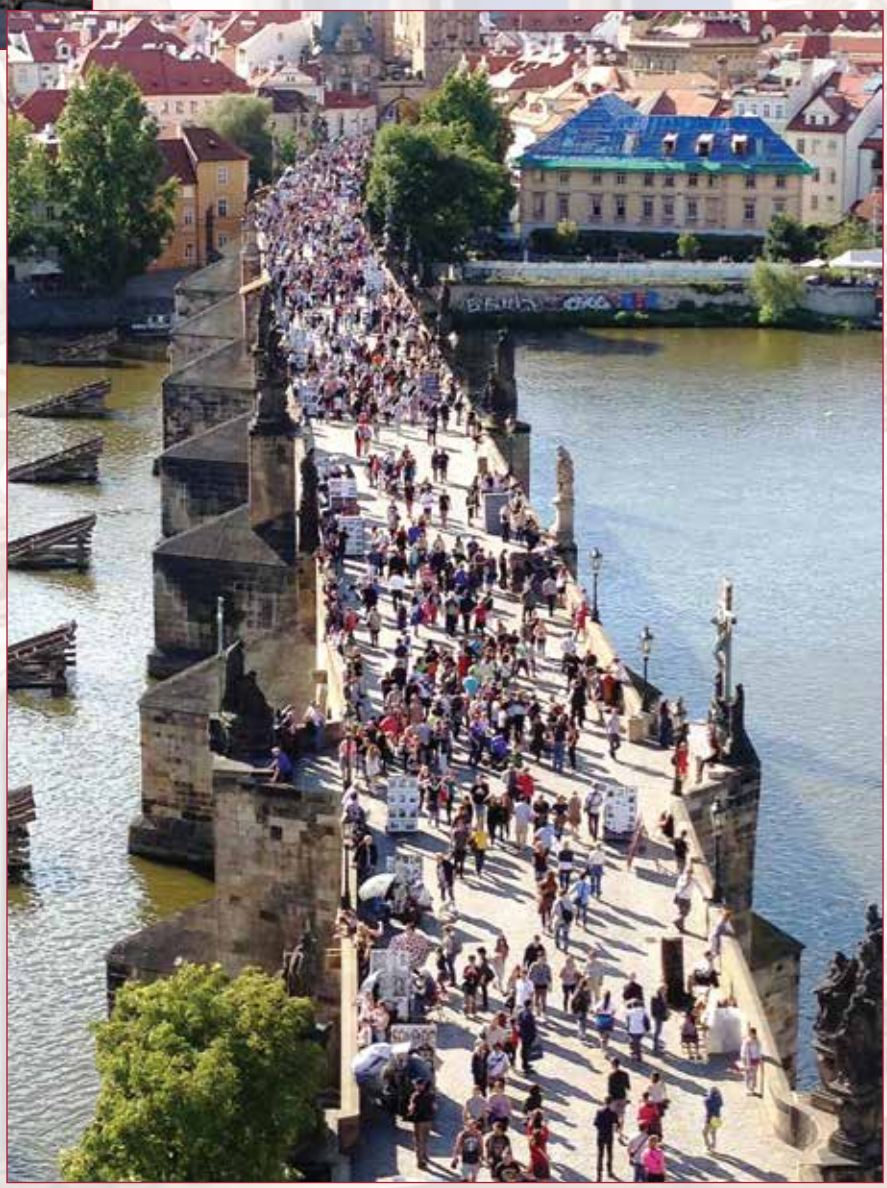
The brass plates were easy to find. They are set in the cobblestone pavement of the Old Town Square, and they mark the site of a stone column, now long gone, that was used to mark solar time. The column was a big sundial and the sun's shadow at noon was known as the "Prague Meridian." The Latin inscription on the plates is "Meridianus quo olim tempus Pragense dirigebatur meridian," which translates to "According to which time in Prague was determined." Geocachers log their visit to the brass plates by sending an email. The website shows over 10k logged visits to the site.

Today you can check the time by strolling over to the nearby 14th century astronomical clock. You can't miss the clock; it's in a medieval stone tower and it has giant, whirling discs with mystical symbols painted in gold. Best of all it's a "cuckoo" clock and every hour on the hour a parade of wooden apostles cycles out of one door, and then back into another, three stories above street level. It's a show worth seeing but it goes by quickly. Old Town Square is surrounded by exquisitely-restored historic buildings of several architectural styles: Gothic, Renaissance, Baroque, Rococo, and Art Nouveau are especially well-represented. The reason these beautiful, old buildings are still standing is because the Nazis deliberately spared Prague from catastrophic bombing during WWII, supposedly because Hitler liked the architecture and had post-war plans for the city.

Charles Bridge

My third cache, "Cache my Czech," was on the Charles Bridge and it was another virtual cache. The coordinates are N 50° 05.199 E 014° 24.618. The website directed participants to log the find by emailing a photo posing next to "…the animal that the people keep touching." The animal turned out to be a bronze bas-relief image of a dog that has been polished to a high shine by the admiring hands of tourists. The website showed over 15k logged visits to the site.

Charles Bridge crosses the Vltava River and connects Prague's four historic areas: Old Town and New Town on the east side of the river, and Little Quarter and Castle Quarter on the west side. During the middle ages the bridge was part of an important trade route that connected Western and Eastern Europe. Statues were installed on the bridge in the 19th century to add beauty and character, and today Charles Bridge is a destination in itself. It is closed to motor vehicles so it's a perfect place to walk and enjoy views of the city and the river. In the summer it's packed with tourists, artists, street musicians and pickpockets. Everybody loves it. Construction began in 1357. Legend has it that the Emperor Charles IV set the first stone himself on the 9th of July at 5:31 am. Charles liked numerology and he chose this day and time because, when written out in digits, it's a numerical palindrome: 135797531. The auspicious beginning was worth the effort because 657 years later the bridge is still here and it's a smashing success.



Charles Bridge

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Geocaching in Prague

From the top:
Prague's iconic Astronomic Clock
The shiny dog of Cache My Cache
Lennon Wall

Lennon Wall

My last cache, "Lennon Wall," was described on the website as being hidden near an "historic wall in Prague, but since the 1980s, people have filled it with John Lennon-inspired graffiti and pieces of lyrics from Beatles songs." The coordinates are N 50° 05.167 E 014° 24.431. Wikipedia says this about it:

In 1988 the wall was a source of irritation for the then communist regime of Gustav Husak. Young Czechs would write grievances on the wall and in a report of the time this led to a clash between hundreds of students and security police on the nearby Charles Bridge. The movement these students followed was described ironically as Lennonism and Czech authorities described these people variously as alcoholics, mentally deranged, sociopathic, and agents of Western capitalism.

The wall continuously undergoes change and the original portrait of Lennon is long lost under layers of new paints. Even when the wall was re-painted by authorities, the next day it was again full of poems and flowers. Today, the wall represents a symbol of youthful ideals such as love and peace.

I looked for but did not find the cache at "Lennon Wall." An additional hint on the website said it was hidden behind a drainpipe. "The place is very frequented, be careful while seeking, hiding and manipulating the cache and its contents, please." I'm pretty sure I found the pipe, but the cache was not there. Evidently somebody was not careful enough. There were over 14k logged visits to the site.

Concluding Thoughts

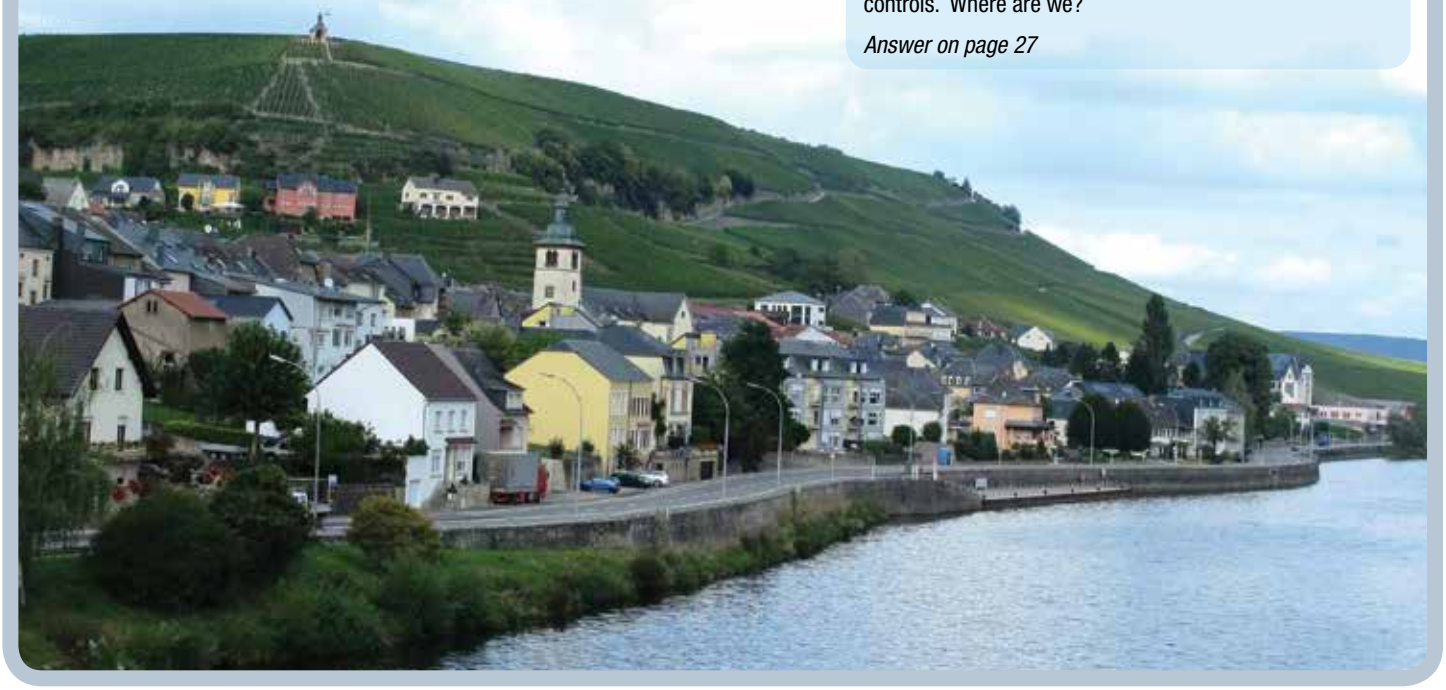
Prague's population is about 1.2 million and it has the sprawl to prove it, but the historic heart of the city is compact and walkable. Since I don't speak Czech I expected a language barrier, but many of the people I met spoke English. After the Velvet Revolution, kids started learning English in grade school. During my trip I used the guidebook "Rick Steves' Eastern Europe." I also used Rick's book as a reference for this article. Despite the title, my new Czech friends told me they consider the Czech Republic to be in Central Europe, not Eastern Europe. I also found this sentiment in Krakow, Poland, which I visited the week before. I'm not sure why people feel that way, but my guess is that it further separates them from the unhappy days when Czechoslovakia and Poland were part of the Eastern Bloc. ❖

Geography Quiz

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

Question:
A vineyard-draped river flows through a place where three countries meet. In 1985, a river-boat was engaged with member countries to sign an agreement to abolish border controls. Where are we?

Answer on page 27



By: Rolland Vandevalk, PLS

***Rolland Van De Valk** has 28 years of experience and is currently serving as senior land surveyor/project manager at Diversified Project Services International, Inc. in Bakersfield, CA. Rolland has been a member of CLSA since 2002.*

President's Message

A few days ago I attended a monthly division manager meeting for the company I am employed with. There was an agenda full of business items, but as always, the President started the meeting by going over the mission statement, vision statement, and core values which have been in place for as long as the company has been around. The President always ensures that whatever direction the company is heading, the business plan is in conformance with the outlined mission, vision, and values that everyone in the company must understand and strive to achieve.

CLSA has a mission statement. You can find it at the beginning of the strategic plan, the latest of which was adopted by the Board of Directors in 2012. The mission statement reads:

The California Land Surveyor's Association advances the interests of the land surveying profession, promotes the highest possible standards of professional ethics and practice, encourages uniformity of professional practices and procedures, enhances the competency and professionalism of its members and expands the public's knowledge, understanding and appreciation of the land surveying profession.

We must all heed the meaning of these few sentences, not as exact orders, but as the guidelines of which we perform the duties and the business functions of this organization. With every member of CLSA following these guidelines, we can function in solidarity and accomplish all that is needed for the betterment of the profession. Actions outside of, or in contradiction to, the mission statement can often times be counterproductive and slow the main objectives of the organization.

Just like the President of my company starts out his managers meetings, we should start out our CLSA Chapter meetings, committee meetings, board meetings, or any other gathering by which CLSA business and actions are being formulated and acted upon, by first thinking about whether or not we are doing this in the spirit and in conformance with the mission. If we cannot agree as a homogeneous group that what we are doing is in the best interest of CLSA and achieves the goals of the organization, we should stop proceeding down that avenue and take aim at another path that would be in the best interest of the organization.

Is this a difficult thing to do? I say not. Most of us follow these very same principles in our daily professional lives and careers. We must also follow them in our volunteer actions towards our association.

This is my last President's message in the Cal Surveyor that I will have a chance to offer to this organization. I would like to close out by thanking the wonderful people of CLSA that I have come to know and have crossed paths with. It has been a challenging but rewarding opportunity which will continue in 2015 as Immediate Past President, working with committees, and being a member of CLSA. I wish the best of luck and offer my support to those which will guide this organization in the future. May they always do the business of CLSA with our mission and core values in mind. ❖

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.

Miles Dudley, age 5, at "A Day Under the Oaks, 2014," an annual event that highlights programs offered by Santa Rosa Junior College. I was assisting staff of the Civil Engineering, Surveying and Geospatial Technology program when my son, Miles, became intrigued with finding hidden nails in the lawn using a magnetic locator. Here he is shown measuring the distance between found points using a total station and prism. He has the bug! Submitted by Mathew Dudley

By: Dr. Francelina A. Neto, PLS

***Dr. Neto** is a professor in the Geospatial Engineering Option, Civil Engineering Department, California Polytechnic University, Pomona. She obtained her first surveying license in Europe in 1987 and holds California PLS 7606. She received her Ph.D. in Photogrammetry from the University College London, UK in 1993. She has been a faculty in the Civil Engineering Department at Cal Poly Pomona for over 17 years, and was department chair between 2009 and 2014. Her main interests are higher education issues, engineering curriculum development and 3D modeling and visualization. She is currently the university's Semester Conversion Director.*

Geospatial Engineering Program at Cal Poly Pomona

Abstract

California Polytechnic University, Pomona offers a geospatial engineering program embedded in the civil engineering program. This program is accredited by the Accreditation Board for Engineering and Technology (ABET) for both civil and surveying engineering, giving its graduates the opportunity to become dual licensed. This article summarizes the geospatial option part of the program, and its surveying specific components. The integration of the curriculum to engineering practice is briefly described and the components of the programs are concisely presented. A view of possibilities for the use of geospatial technology and land surveying is offered at the end of the article.

Engineering at California Polytechnic University, Pomona

The California State University (CSU) system accommodates a wide range of undergraduate and masters degree programs. Within the system, two campuses have been dedicated to learn-by-doing education since their inception: Cal Poly San Luis Obispo and Cal Poly Pomona. The Cal Poly Pomona College of Engineering offers 11 undergraduate and 5 masters degree programs housed in 7 departments. Serving over 5,000 students, the college is the 17th largest in the nation. The Civil Engineering department currently has two programs: Civil Engineering (CE) and Construction Engineering Technology (CET) with approximately 1,300 undergraduate students, and 140 graduate students. Its growing graduate programs make the department one of the largest undergraduate programs in the nation, with a wide range of capabilities. The Civil Engineering program has three options, one being Geospatial Engineering (GE).

The CE department at Cal Poly Pomona is supported by 21 full time faculty, and additional adjunct faculty. The department is currently searching for two additional tenure-track faculty to start in Fall 2015; one in the geospatial area, and the second one in construction engineering.

All faculty are required to have industry experience. In addition to a doctorate degree, a professional license in the area of expertise is required before tenure is granted. The goal of this requirement is to ensure that graduates receive an education that prepares them for research opportunities with practical applications for social infrastructure, as well as the expectations of the industry. Additionally, all adjunct faculty must have field experience and licensure in the technical area of the courses they teach, as well as post-graduate education.

Geospatial Engineering Program

The Geospatial Engineering program is embedded in the Bachelor of Science in Civil Engineering (BSCE). The BSCE at Cal Poly Pomona currently requires completion of 98 quarter units (132 semester units) for graduation. Of these, 68 quarter units are general education (GE) courses mandated by the state's educational code and set by the campus. The GE program enhances the students' education in communication and critical thinking, mathematics, physics, natural sciences, humanities, arts, literature, social sciences and awareness toward the importance of lifelong self-development. As is the case with all engineering programs, CE includes a number of mathematics, physics and chemistry courses, leaving 73 quarter units of core, specific department courses to prepare the students for a successful career in the technical area of their choice. This approach requires strong curricular strategies to keep up with the demands of an evolving world, and results in a high quality program that prepares engineers who are ready to tackle increasingly more difficult societal infrastructure problems. Two very important goals of the engineering curriculum are to (1) make the graduates aware of their role in society, and (2) help them appreciate the impact their work will have on the sustainability of the world's infrastructure.

Surveying equipment laboratory at Cal Poly Pomona

Continued on next page

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The BSCE at Cal Poly Pomona has three options: general, environmental and geospatial. All three options are ABET accredited under the civil engineering criteria. The geospatial option is additionally accredited under the surveying engineering criteria. Since the late 1980s, graduates from the GE program have received credit to sit for both the Professional Land Surveyor (PLS) and the Professional Engineer (PE) license examinations. The BSCE options have about 75% of their course work in common. All undergraduate students in the program follow similar GE curriculum as prescribed by the campus, and have a set of common core classes. The common engineering core includes mathematics, physics, chemistry, statics, and dynamics. All students in the BSCE program take common courses in drafting, surveying, transportation, materials, structures, geotechnical engineering, and environmental and water resources.

Students in geospatial engineering complete the program with advanced courses in specific curriculum: Advanced Surveying, Surveying Computations, Highway Design, Photogrammetry, Remote Sensing, Geographic Information Systems (GIS), Global Position Systems (GPS), Geodesy, Public Land Surveys, Boundary and Land Survey Descriptions, Legal Descriptions, Subdivision Design, Digital Mapping and Laser Scanning. All students have a nine (9) month capstone Project Design. The Project Design is a comprehensive project involving all aspects of a real world engineering assignment, involving several technical areas including the geospatial aspect.

From Elementary Surveying to Laser Scanning

All students in the geospatial option in CE have to take drafting and surveying courses as freshmen. The drafting courses include theoretical and laboratory courses on the fundamentals of drafting plus gaining experience in Autodesk and Bentley support software. In the course sequence, all CE, CET and GE students advance to surveying curricula that includes theory and a large amount of "learn by doing" field experience.

Cal Poly Pomona has three laboratory spaces dedicated to support the geospatial engineering program and surveying courses. Two of these labs support the field training courses, and the third lab supports the high tech computer based courses.

Geospatial Information Systems laboratory

The surveying equipment for laboratory and field includes the following: 8 Trimble GPS receivers; 3 Topcon theodolites; 17 total stations; 4 robotic stations; 6 levels and a Trimble GX laser scanner. All students in CE, CET, and GE use the levels and total stations in their first two surveying courses. At the end of the first surveying course, all students know the principles of, and have conducted, distance and angle measurements, leveling, traversing, staking, and data collection. Working in surveying teams, the course experience culminates with the production of a topographic map of a small area of the campus. Basic surveying concepts are further expanded in a second course where students improve their skills with precise leveling and engineering surveying, learn the fundamentals of GPS and robotic surveying, and ultimately design a go-cart race track. These courses are gatekeepers for all other geospatial students, and give the basics for the construction and engineering design courses.

Geospatial engineering students take courses covering engineering applications of surveying, courses supported by current technology as applied to surveying and engineering, and courses in more classical land surveying areas. In the surveying computations course, students are introduced to the theory of measurements as it applies to surveying work, and more specifically in error propagation in horizontal and vertical positioning, and in rectangular coordinate systems. They learn least squares adjustments of triangulation, trilateration and traverse networks, as well as the use of computer software that support such adjustments. Students are taught the principles of remote sensing, interpretation of aerial photography, stereoscopy and photogrammetric modeling. Students learn the application of aerial surveying to engineering problems and mapping. The geodesy and satellite surveying curriculum covers spherical trigonometry, Cartesian and curvilinear coordinates, transformations between geodetic datums, major control network extension, satellite and terrestrial positioning systems. Students receive basic training in GPS, including mission planning, field surveying with a variety of GPS techniques and receivers and post-processing of GPS data.

The GIS course covers the theory of spatial information systems, maps and data capture models. Students gain experience in generating databases, designing data display methods and output models, designing data storage and data manipulation processes, and designing data dissemination models. They also gain knowledge in the application and design of spatial information systems in engineering and surveying practice. Students also take a hydraulics and a hydrology course, followed by a subdivision design course covering engineering and surveying methods in land use planning, design and construction of subdivision development projects. To support these classes, the GIS lab is equipped with 31 digital photogrammetric workstations used for Photogrammetry, GPS, GIS and laser scanning modeling. Intergraph, Bentley, AutoDesk, ESRI, ArcGIS and ERDAS software is used for courses in 3D modeling and visualization, as well as spatial position and manipulation.

The GE program also includes courses in land survey descriptions, public land surveys and California land and boundaries law. Students learn the history of ownership and transfer of title, types of documents of land conveyance, forms of legal descriptions of public and private lands, and the interpretation of maps and documents for the physical survey location of land boundaries. The curriculum covers the principles of writing precise land boundary descriptions, study of easements and the value of monuments. In the public land surveys course, students learn the history of the general practice and rules for the survey of the public lands, the system of rectangular surveys, and public lands monumentation procedures. The course also covers the principles of restoration of lost or obliterated corners, subdivision of sections, special surveys and instructions, field notes, plats and patents, meander lines and riparian rights as pertinent to public lands. All GE students take the course California Land and Boundaries Law, which is classified as a general education synthesis course. In this course, students study the historical, social, political geographical and economic aspects of real property and boundary law in America, with an emphasis on social and historical aspects of the extent and limits of property ownership.

Digital Mapping

All students in the geospatial option in CE have to take the Digital Mapping course. As many as 24 students take this course per year, and some students use this acquired knowledge in their final comprehensive design project. The Digital Mapping course covers data collection systems for 3D surface modeling. Students learn to integrate robotic and laser scanning technology into visualization and animation for engineering projects. Over the course of their education, students are introduced to the theory of electronic data, data transfer and 3D modeling and interfacing in a variety of settings. Both Leica C10 Scanstation and Trimble GX scanning equipment, and Leica Cyclone software and Trimble Realworks are used in data modeling.

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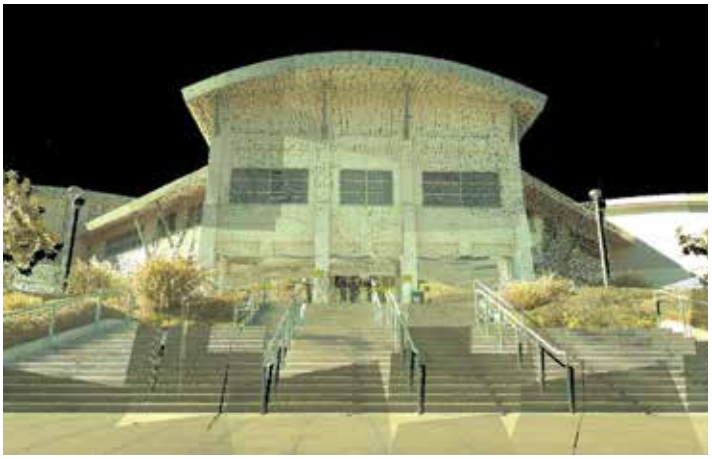

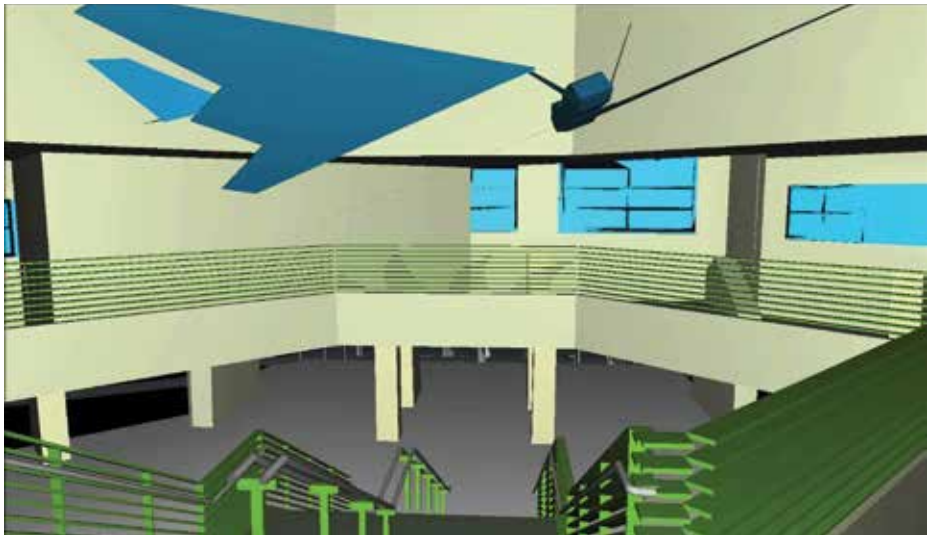

From the top:
Engineering building
Engineering building scan outside
Engineering building scan inside

Students apply these tools and technologies to topographic analysis, forensic crime scene investigation, public safety, homeland security, bridges and tunnels modeling, volumetric calculations, and pipeline recognition, among much else. In recent times, students have used laser scanning in senior projects to generate models of interiors and exteriors of buildings, and to extract data for safety and security assessments. In these kinds of projects, students also learn to link different data collection systems such as GPS and laser scanning. One of the senior projects run under Dr. Turner's supervision in the CE department is a good representation of such student work. In that particular project, students collected data for one of the College of Engineering buildings, and generated "fly thru" views of the model. Students also scanned the interior of some areas in the same building, and generated 3D models of the building corridors.

Students also experiment with integration of laser scanned data with other data obtained from different sources. One such example is the integration of data collected in the same project with CAD models shared by the campus facilities and management office. In its most recent assessment of the curriculum and specifically the digital mapping course, the CE program decided to incorporate 3D modeling and visualization aspects into more areas of its curriculum. Prof. Ng and Dr. Neto were awarded a small grant to expand faculty training on the use of laser scanning. Several engineering faculty received training during Summer 2014, and they are exploring its applicability for solutions in environmental, construction, structural and transportation engineering. We expect that more senior projects will adopt the use of laser scanning in their designs and engineering solutions, and that more Cal Poly Pomona graduates will be ready to use the technology in the work place in the future. One of the goals for the future is also to extend this technology to more engineering programs, as well as to the CE master thesis and projects.

Future of the Geospatial Engineering Program

The geospatial engineering program at Cal Poly Pomona will continue as a dual ABET accredited program in civil and surveying engineering. As senior faculty retires, new faculty searches are being placed to ensure the continuation of the program. The administration's commitment to support the GE program is evident by the recent hire of Dr. Abellera, and the on-going search for a new tenure-track faculty to start in Fall 2015. All new faculty will be subject to the requirement of a PLS license in order to attain tenure, on top of all other academic criteria. The commitment by the department to keep licensed surveyors with good field experience as adjunct professors is proof of the understanding of the importance of surveying to various areas of the engineering profession. The Construction Engineering program moved to the CE department, and brought with it a wealth of new courses. Several of these new courses can be used to create a stand-alone new program in geomatics with direct application to infrastructure systems. This can be done using current resources without placing a burden on the department or the campus. We intend to pursue this option in the near future so we can better serve transfer students in southern California junior colleges who are interested in studying geomatics.

Acknowledgements

The author would like to thank Dr. Turner, Dr. Abellera, and Profs. Ng and Bledsoe for their continuous effort in developing strategies and curriculum for the geospatial program, and for sharing the images of their student work and senior projects presented in this article. ❖

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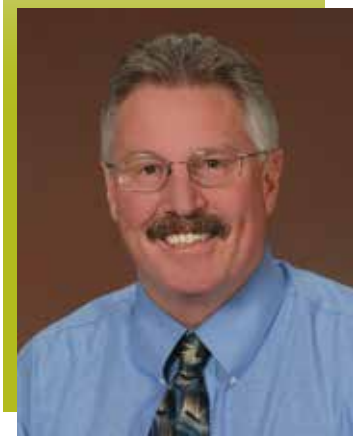
PART OF HEXAGON

· when it has to be right

Leica Geosystems



By: Scott P. Martin, PLS

***Scott** works for the State of California in Sacramento and lives in the Placerville area.*

What is EarthScope? Why surveyors should know

September 30, 2018 is approaching quickly considering the significance that date has to land surveyors in California. Do you, as a California land surveyor, know why this date is significant to you and why you should be concerned about what could transpire on that date? Well, if you don't, you should, and hopefully this article will fully explain why.

The EarthScope science project, funded by the National Science Foundation (NSF), and operated by UNAVCO, Inc. was launched in 2003. From the EarthScope website:

> *EarthScope is a vast project for deep geoscientific exploration of the entire North American continent, as well as our entire Earth, to better understand the materials it is made of, how it was assembled, and how it works — including its recurring earthquakes and active volcanoes.*
>
> *EarthScope scientists use state-of-the-art instruments and methods to collect data from seismic waves, crustal movements, Earth's magnetic field, rock and soil samples, and images obtained from aircraft and satellites. Our scientists analyze these diverse sets of data in combination with innovative laboratory experiments and theoretical modeling. The research produces transformative knowledge that helps us better explain geological phenomena, protect ourselves against natural hazards, and locate necessary resources.*
>
> *The expertise, enthusiasm, and findings of the EarthScope community constitute an increasingly rich resource for enhancing Earth science education in formal (K-12, college, university) and informal (parks, museums, media) settings. The EarthScope National Office education and outreach program facilitates dissemination of EarthScope science to educators and to the public with a focus on free-choice or informal learning environments.*

Pretty cool stuff, but so what? This is what - the NSF funding for EarthScope sunsets on September 30, 2018. This means that all of the instrumentation installed to support EarthScope science will no longer be funded to sustain operation unless solutions are found in the interim. These instruments include approximately 1,100 continuous GPS stations (CGPS) distributed mostly in the western part of the continental U.S., western Canada, and Alaska. Approximately 575 of these CGPS stations, more than half of the total, are in California.

Without a solution or multiple solutions, more than 70% of the active geodetic control backbone of California included in the National Spatial Reference System (NSRS) will go dark on that fateful date.

Are you starting to get where I am going with this?

Almost 60% of the CGPS/CORS stations in California (approximately 850 total) were installed for the EarthScope project by the Plate Boundary Observatory (PBO), the geodetic component of EarthScope, at a cost of over $33M. Although the original and primary purpose of these CGPS stations was (and is) to measure tectonic plate movement, detect and characterize volcanic activity, and record seismic events, the reality is that a secondary community of beneficiaries, the geospatial community, has emerged and developed an immense reliance on the PBO CGPS infrastructure. Other secondary uses have also been developed, such as using the delays of the GPS signals to infer water vapor in the atmosphere, a critical variable in weather forecasting, for example, but this article is focused on what this all means to California land surveyors and the geospatial community as a whole.

Continued on next page

Desert station.

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Of the approximately 285 NGS CORS stations in California, 207 of them are owned by NSF and operated by the PBO and thus are at risk because of the planned end of EarthScope project. Without a solution or multiple solutions, more than 70% of the active geodetic control backbone of California included in the National Spatial Reference System (NSRS) will go dark on that fateful date. What would that mean to you as a land surveyor? The impact could be even more significant in less urban areas of the state where most likely the CORS/CGPS you rely on for OPUS solutions, for post-processed control, and maybe even for real time streams are PBO owned and will be gone. Nope, the NGS isn't going to be taking them over. They do not have the resources to do so. Additionally, more than 50% of the stations that the CSRC includes in the California Spatial Reference System, as defined in the Public Resources Code, are PBO stations, as are more than 50% of the stations that comprise the California Real Time Network (CRTN), also operated by the CSRC. It is pretty safe to say that the loss of the PBO stations would have a catastrophic effect on the official geodetic control in California, both NGS and CSRC pedigreed.

Now do you care about EarthScope?

The NSF has strongly encouraged the UNAVCO/PBO staff to aggressively start looking for solutions to this very serious concern now, rather than waiting, because the matrix of complex solutions that likely could be involved will take time to identify, develop, and implement. To that end, Dr. Glen Mattioli, PBO Director and UNAVCO Director of Geodetic Infrastructure, began outreach and education efforts with potential stakeholders in 2013. Dr. Mattioli has traveled from Colorado to California several times to present at various events, such as the California Spatial Reference Center (CSRC) Coordinating Council meetings, the Southern California League of California Surveying Organizations (LCSO) annual conference, and most recently at a CLSA/CSRC workshop in Ontario. He has also presented to the recently formed Western Region Height Modernization Consortium (as defined by the NGS – the western region consists of eleven states in CONUS) because all of the states represented in that group are reliant on PBO stations for positioning to varying degrees.

In addition to traveling to stakeholders, Dr. Mattioli recently coordinated and hosted a two day workshop titled "The Future of PBO in the GAGE Facility (2013-2018) and after EarthScope." The workshop was held on September 22 and 23, 2014 in Breckenridge Colorado and was attended, through an invitation only process, by 67 invitees and 17 UNAVCO/PBO staff. Although the majority of participants were from the geophysical science and academic stakeholder communities, the geodetic surveying community was also represented. Greg Helmer, PLS and founding member and past chairman of the CSRC was in attendance, as was Ken Bay, PLS and Lead Geodetic Surveyor for the Oregon Department of Transportation, and Gavin Schrock, a PLS from the State of Washington. The purpose of the workshop

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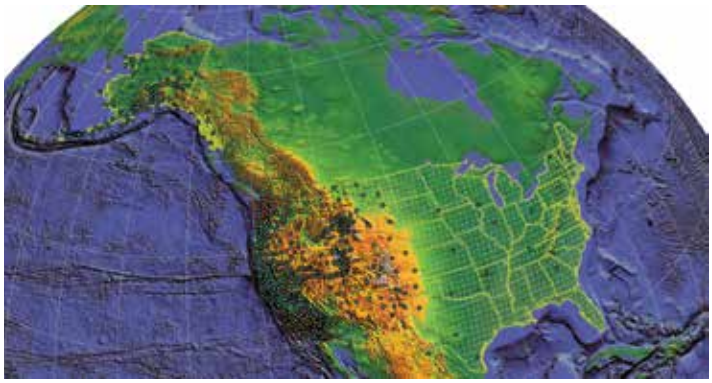

Long latitude

was to bring a targeted group of stakeholders together to discuss the future of PBO, how UNAVCO and PBO should best utilize their remaining resources as the EarthScope project winds down, and to brainstorm on potential long term solutions to support this critical national and regional geospatial resource. Some excellent results came out of the effort including some suggestions which UNAVCO are already adopting with regards to the best use of available resources, both people and funding, in the near term. Much more work is left to be done to save these valuable resources, but the UNAVCO/PBO management and staff, the geophysical research and academic communities, and the secondary geospatial community are already collaborating, which is an excellent start.

The answers could come in various shapes and sizes, including determining new science opportunities that could leverage and sustain these resources as part of their mission, partnerships with other State and Federal or even local agencies to either take over the operation, maintenance, and ongoing permitting costs of stations or provide funding to support these functions. Creativity in finding solutions is being strongly encouraged, so as surveyors who use this valuable resource, you should be thinking about ways you might get involved. Perhaps collaborating through your local CLSA chapter to write letters of support to your Federal and/or State representatives, explaining the value these stations have to their constituents, including public safety (think emergency response, early earthquake warning systems, and tracking of hazardous materials), and encouraging them to provide funding to sustain this valuable investment is one way?

If you work for an agency or company that frequently depends on PBO owned stations in your work area and would suffer significantly from their loss, perhaps you start talking to others in your region in the same situation, maybe at the county level, to formulate some sort of "adopt a station" plan? In addition, PBO and UNAVCO management are open to discussions about how individuals, institutions, and organizations could contribute to providing additional resources to upgrade or enhance existing PBO stations to real-time and true multi-constellation GNSS operations. Creative solutions are encouraged. Whatever you do, don't just sit back and hope someone else does something to save this valuable resource. Surveyors, unfortunately, have taken a "sit back and wait" approach in other critical areas. For example, we collectively failed to recognize the immense value and power of GIS and the critical role we could have played in it since day one. We are still playing catch up on that one. Let's not be in the same situation again. But just in case, you better keep a couple old GPS units around to use as base stations on passive marks when the lights go out on EarthScope. ❖

Scott thanks Dr. Glen Mattioli, PBO Director and UNAVCO Director of Geodetic Infrastructure, for providing peer review this article.

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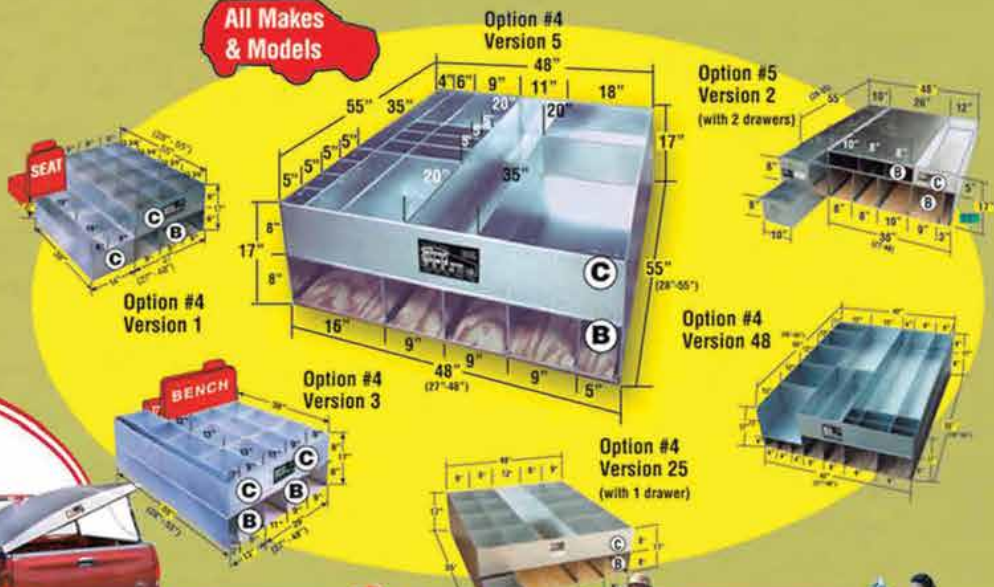

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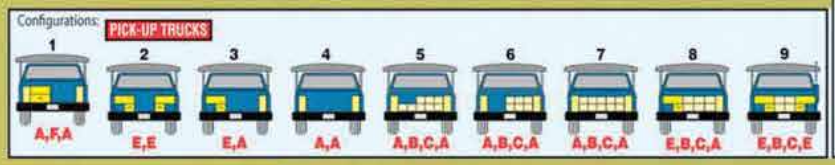

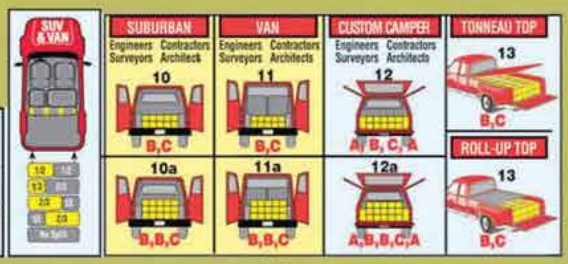

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The Geodimeter Model 6

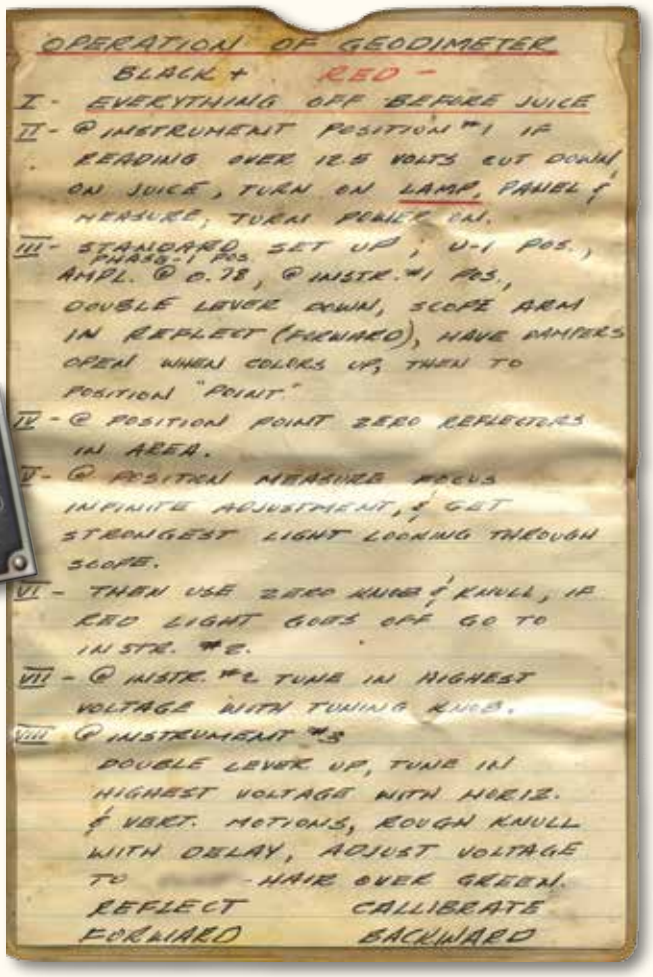
By: Phil Danskin, PLS

***Phil** owns a surveying business in Sonoma, California. He is a past editor of the California Surveyor.*

My first dealings with the Model 6 were after college when I was living at my grandmother's in Petaluma. John Bolin took me into the field and demonstrated how to operate the Model 6 on a large ranch-like retracement survey in Fairfax, Marin County. "Okay, I got it," I said. He told me to take it home and practice with it over the weekend. So I piled into my '55 VW and sped off to grandma's. I spent the weekend practicing with it and keeping notes.

The following week he taught me how to "reduce" the distances. Well, not exactly distances . . . but a bunch of numbers, etc. I think it was about one hour per observation to come up with a horizontal distance. Thence off to the Olivetti 101. (If you're too young to know what this is, Google it.) What a piece of work! One screw up and you had to start all over! I wanted to do the calculations by hand using the traverse sheets instead. Everyone laughed. "The Olivetti is really fast, man!" What a nightmare. But once I caught on, it was kinda cool.

Well the point of this pointless missive: they let a 21-year old take home what would be valued at $56,000 piece of equipment today . . . in a '55 VW bug with about 250,000 miles on it! (When I pulled the engine to rebuild it, the wrist pin in one of the cylinders had freed itself and was gouging the cylinder.) The thing ran like a top and smoked about as bad: a quart of oil every 70 miles. Compression? What's that?? Simpler times. Oh to be young again. I bought that same Model 6 from the remaining heir for $200, Colson's son, Greg. It makes a nice anchor. ❖


OPERATION OF GEODIMETER
BLACK + RED -
I - EVERYTHING OFF BEFORE JUICE
II - @ INSTRUMENT POSITION #1 IF READING OVER 12.5 VOLTS CUT DOWN ON JUICE, TURN ON LAMP, PANEL & MEASURE, TURN POWER ON.
III - STANDARD SET UP, V-1 POS., PHASE-1 POS AMPL. @ 0.78, @ INSTR. #1 POS., DOUBLE LEVER DOWN, SCOPE ARM IN REFLECT (FORWARD), HAVE DAMPERS OPEN WHEN COLORS UP, THEN TO POSITION "POINT."
IV - @ POSITION POINT ZERO REFLECTORS IN AREA.
V - @ POSITION MEASURE FOCUS INFINITE ADJUSTMENT, & GET STRONGEST LIGHT LOOKING THROUGH SCOPE.
VI - THEN USE ZERO KNOB & KNULL, IF RED LIGHT GOES OFF GO TO INSTR. #2.
VII - @ INSTR. #2 TUNE IN HIGHEST VOLTAGE WITH TURNING KNOB.
VIII @ INSTRUMENT #3 DOUBLE LEVER UP, TUNE IN HIGHEST VOLTAGE WITH HORIZ. & VERT. MOTIONS, ROUGH KNULL WITH DELAY, ADJUST VOLTAGE TO HAIR OVER GREEN.
REFLECT FORWARD
CALLIBRATE BACKWARD

Operating instructions

OPERATION OF GEODIMETER

Black + Red

I. EVERYTHING OFF BEFORE JUICE

II. @ INSTRUMENT POSITION #1 IF READING OVER 12.5 VOLTS CUT DOWN ON JUICE, TURN ON LAMP, PANEL & MEASURE; TURN POWER ON.

III. STANDARD SETUP, V-1 POS; PHASE 1 POS. AMPL. @0.78, @INSTR #1 POS., DOUBLE LEVER DOWN, SCOPE ARM IN REFLECT (FOR WARD), HAVE DAMPERS OPEN WHEN COLORS UP, THEN TO POSITION "POINT"

IV. @POSITION POINT ZERO REFLECTORS IN AREA

V. @ POSITION MEASURE FOCUS INFINITE ADJUSTMENT, & GET STRONGEST LIGHT LOOKING THROUGH SCOPE

VI. THEN USE ZERO KNOB & KNULL, IF RED LIGHT GOES OFF GO TO INSTR. #2

VII. @ INSTR. #2 TUNE IN HIGHEST VOLTAGE WITH TURNING KNOB

VIII. @ INSTRUMENT #3 – DOUBLE LEVER UP, TUNE IN HIGHEST VOLT AGE WITH HORIZ. & VERT. MOTIONS, ROUGH KNULL WITH DELAY, ADJUST VOLTAGE TO HAIR OVER GREEN

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By: Casey Lynch, PLS

***Casey** is a Principal with Burkett & Wong Engineers in San Diego, California. He has served the CLSA as a Past President of the San Diego Chapter, and currently sits on the San Diego Chapter Joint Professional Practice Committee. He spends his free time with his wife and two daughters working on their small ranch and is expecting his third daughter in March of 2015.*

Oh Brother, Where Art Thou?!

Reprinted from CLSA San Diego Chapter Survey Notes, October 2014

In light of recent and upcoming events, I find it necessary for someone to stand up and say what we all are hopefully thinking. This could end up being my Jerry Maguire moment, where you all ride me out of town, or it may end up being a success; nevertheless it is important and must be said.

We have a statutory code of conduct that we should all be aware of. It is contained in the California Code of Regulations, Title 16, Division 5, Section 476. It provides us with certain ethical direction necessary to ensure we all uphold the foundation of professionalism. It falls short of dictating how we interact with one another, as it should. Personally I do not need a statute to dictate how I interact on a professional level with my peers. I know there is an unwritten code that was handed down to me by my mentors and one that I strive to keep alive every day. It is becoming overwhelmingly obvious that certain individuals could benefit from a reminder of the unwritten code. There once was a fellowship that bound us together, but over time that fellowship has become thin, and it is time we fix it or lose it forever.

Some of our peers have become distraction experts, using distraction and self-interest centered tactics to draw our focus from what is important. Mr. Darby once wrote, in Volume 1 Number 1 of the Cal Surveyor:

"Professional associations become a vital necessity when a profession finds itself faced with major problems which are beyond the capabilities and financial capacity of the individual"

And…

"As a practical matter we are at this moment in the mainstream of national life through which we must mutually assist each other or individually flounder."

Not much has changed since April of 1967. The individual is still not as strong as the whole. What has changed is that we seem to have allowed a few the chance to unearth and uproot the foundation upon which our Association is built on. These distraction tactics must be stopped as they are damaging the fabric that binds us together.

How we react and proceed with our association business and our profession is not only seen by others related to our industry, but by the younger generation coming up in their careers. It is our responsibility to interact and conduct ourselves in a certain manner that is prestigious and courteous. We need to give care and direction to others when necessary, all the while respecting one another as the equals we are.

I recognize that remaining objective at all times is very difficult. Our subjective side of the brain tends to quickly take hold of our thoughts and actions, driving us down a path towards our perceived goal. The professional surveyor is one that slows and tempers those subjective thoughts, remaining open and passive to the other side until all opinions have been heard. It is only at that point of clarity can an objective decision be made with confidence and with resolve.

We work in a profession that offers decent pay for hard work. It's a profession where we all pay our dues, not in the financial sense, but in the sense that we have all spent time at "one end or the other of the tape." This profession has provided our families the means to survive, put our children through college, and provided a comfortable retirement for those that have spent a lifetime protecting it and seeing it move forward. It is not a profession that is going to stand by and take transgressions from others for too long, it is not one that allows anyone the chance to tarnish another reputation for the sake of their personal ideals or motives.

In protecting our profession, a group of fine individuals gathered together in 1966 to form a common body that would eventually gain strength in numbers and over time gain recognition as a formable force in the land development industry. Our members are not supposed to be rivals on opposing teams, and it should not be our goal to record wins and losses when it comes to issues and decisions. We are one team, and we should treat one another as such. One of my favorite quotes is from Vince Lombardi:

"Individual commitment to a group effort – that is what makes a team work, a company work, a society work, a civilization work".

We cannot lose sight of this, and we need to make sure every action we take, no matter the subject, is predicated on the fact that CLSA is our TEAM.

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I recognize that in general, some of us have retained the activist spirit that our Association was founded on. Activism is a good thing for our profession, as long as that activism is centered on benefiting the common goals of the whole. Quoting Mr. Darby once more:

> *"It is after all, progress that has always paced man's hopes and fortunately, every now and then, something causes progress to noticeably freshen and the pace quicken. This we believe could become a reality if the membership of this Association consisted of every professional land surveyor who can benefit from it, every professional land surveyor who is determined to get ahead and every professional land surveyor who is unafraid of the responsibility his profession implies."*

The professional surveyor is one that progresses without dereliction of their duty to the profession. Mentoring others respectfully and allowing them the chance to come out with dignity is the only avenue we should take when issues are discovered. We can't change the past, it is what it is and we have to deal with it, and then move on. The discussion we should be having is not where we are today, but where we are going in the future. If there is a true issue at hand then one must become involved and see it's change all the way through. It is not enough to bring forth something without a method of resolution. It is not proper to argue points of order, only to back down and do nothing about it when the time has come to take action. These are distraction tactics, and if we allow them to persist, we will watch our Association crumble.

If that is what each of us want, then please stand by and watch these few burn it to the ground. If what you want is to keep moving forward, then it's time we roll up our sleeves and get our hands dirty. It is time we make amends with one another, forgive and forget, and move forward. If we need to change our management system, then let's do it for the good of the whole. If what we have is acceptable to the whole, then let us put the distraction tactics behind us and move forward.

There are many issues we need to resolve, and there are many threats coming forward to our livelihood that need to be defeated. The few that have demanded our attention for so long must be willing to find resolve so we can accomplish those things that matter. We need to focus on LAND SURVEYING, above all other matters, to get back to the core of what was started in 1966.

The next chapter of CLSA history is on us to write, how do you want it to start? ❖

By: Ric Moore, PLS, BPELSG Executive Officer

BPELSG Chronicles

A Topographic Survey Map…You Want Fries with That?

Property Owner: Hello, I'm building a house on my property and the county tells me I need a topographic survey. What is that and can you do that for me?

Land Surveyor: Sure I can do a survey and prepare a topographic map for you. A topographic survey is one where the existing conditions such as elevations, contours, utilities, improvements, etc. are mapped and is generally used by the county to determine if you have the right conditions for building what you want. It is also used by a civil engineer or architect as the basis to design the house.

PO: Oh okay, that makes sense. The county also told me that I needed to hire an engineer or architect to design the house and make sure it meets the approved building code. How much will it cost for you to do the topographic survey and when can I get it?

LS: Well, I need to know some information first and probably should visit the property to see what conditions I may run into. Do you have an address, deed, or title report that I can see? You should have received a copy of the deed or title report when you purchased the property.

PO: I'll look for that in my files and get it to you. (Later)

PO: Hello again. I called you about a week ago about a survey and now have hired an engineer. She told me that she needed the property lines on the topographic survey because of some set back requirement or something like that. Can you add those and how much extra will that cost?

LS: Well, doing a boundary survey can be pretty expensive especially if you want the property corners set. It will probably add about $$$$ to what we agreed to for the topographic survey.

PO: Wow, that much extra! I already gave you the deed, doesn't that help? This engineer is costing me a lot of money also, is there any way you can give me a better price? Aren't you just drawing a couple of lines on the map?

LS: Drawing the property lines on the map is more involved than just the drawing part of it. Yes, you did give me your deed but I need to find some monuments nearby to measure from. I can do that and plot the record boundary on there for you. That will only cost an extra $$.

PO: Okay, that is still a little high, but I can do that. Thanks. By the way, the engineer said to tell you she needs the survey right away.

Regularly, staff at BPELSG receive inquiries or full complaints asking if certain surveys or maps have triggered the mandatory filing of a Record of Survey or Corner Record. One of the more common situations that we encounter in this regard involves a topographic map prepared by a land surveyor (or Pre-1982 civil engineer) which depict property lines even though the map is only entitled "Topographic Survey". In quite a few of these situations, the preparer of the topographic map includes a note attempting to describe the nature of the property lines. Examples of such notes include:

"PROPERTY LINES SHOWN ARE RECORD ONLY. A BOUNDARY SURVEY WAS NOT PERFORMED."

"BOUNDARY LINES SHOWN ON THIS MAP WERE DERIVED FROM DOCUMENT 19XX-XXXXXXX SUPPLIED BY THE CLIENT. NO EFFORT WAS MADE TO RETRACE OR ASCERTAIN THE CORRECT LOCATION OF BOUNDARY LINES."

"PROPERTY LINES SHOWN ON THIS MAP PER DEED PROVIDED BY CLIENT. A FULL BOUNDARY SURVEY WOULD BE REQUIRED TO CERTIFY THE LOCATION THEREOF."

As is often the case, "clients" or land owners do not always read the notes shown on the map that was delivered to them and generally only remember what the land surveyor or field crew told them when out in the field. Consider the following scenario:

> A land surveyor provides a "topographic survey map" to the client depicting boundary lines. The client removes a fence and a few trees between the client and the neighbor and puts in another fence. The neighbor is very upset that "his fence" was removed since it had been in that location for many years as he thought it was his property line and confronts the first land owner who points out the fence on the map and how it is "inside" his boundary. Subsequently, the neighbor hires a different land surveyor who performs a survey and files a Record of Survey because 1) the property lines between the two land owners is a deed line which has not been previously mapped and 2), the filing land surveyor notes the location of the old fence based on testimony from his client. A complaint is submitted to BPELSG against the first land surveyor who prepared the topographic survey map. Upon receiving notice of the complaint, the land surveyor responds to BPELSG stating that he was not responsible for what occurred as he was not contracted to perform a full boundary survey and he put a note on the map stating that (see example note 2 above).

Regardless of the "note" depicted on the topographic survey, the licensed land surveyor is responsible for considering the perspective of the general public when it comes to utilizing the services of the licensed professional. One manner in which to do this would be for the land surveyor to ask themselves "How is my work relied upon by the client?" In the above scenario and regardless of how the locations of those lines were determined, shouldn't the licensed land surveyor consider that the location of property lines do not solely impact his client but the adjacent land owners as well? What about the perspective of any other professionals (i.e., engineer, architect, contractor, agency, etc.) who subsequently rely upon the topographic survey?

Continued on next page

Continued from previous page

How does a licensee explain "Oh no, part of my map is very accurate (topographic portion) but the other part (property lines) is not. You're not supposed to rely on that?" Or "I'm only providing you with the record boundary, not the real boundary.?" What happens if an engineer or architect relies upon the land surveyor's topographic survey, in its entirety, and the subsequent design and/or construction is negatively impacted by the location of the property lines?

Regardless of how accurate the land surveyor determines the placement of the property lines in relation to the topographic features depicted on the survey, that determination involves the skill and judgment associated with being appropriately authorized to exercise those skills for the benefit of the public. While there may be others, such as unlicensed subordinates, engineers, or architects that may possess minimal experience to believe they are capable of performing this function, the public is only adequately protected when the appropriately licensed person performs or oversees this service.

In closing, it is important for the land surveyor to understand that

1. The property owner (client) or others needing to rely upon this topographic survey and the property lines depicted thereon have the right to assume that your work was properly performed simply by virtue of you being licensed and by sealing and signing the work.
2. Should the property owner (client) share with others, rely upon, or act on your topographic survey, that property owner (and others) has the right to not fully understand notes such as the examples provided above and to rely upon the delivered survey product in its entirety.
3. Notes, such as the examples provided above, do not alleviate the licensee from properly completing any responsibilities mandated by the Professional Land Surveyors' Act relative to filing a Record of Survey or Corner Record if the situation dictates it and do not allow the licensee to provide substandard services to the unsuspecting public.
4. Unlike certain specific features relative to the purposes for the topographic survey which is generally only useful to the intended client, the depiction and determination of property lines have the potential to impact adjacent land owners who share the property lines.
5. Individuals authorized to provide these services have a responsibility to protect the public's trust.

Next time, a potential client "orders" a topographic survey, the licensee is responsible to ask if they want fries with that (want the property lines). And if providing property lines, the licensee is ethically and legally responsible to provide properly surveyed and determined property lines to the best of that licensee's ability. ❖

By: Matt Vernon, PLS.

***Matthew Vernon**, PLS is Vice President of RBF Consulting, a Company of Michael Baker International, LLC. In 2009, Matt served as CLSA President.*

Building Surfboards

I wear a number of hats that many of you may recognize, such as Land Surveyor, Husband, and Father. Occasionally, I wear another hat that many of you may not be aware of - Surfboard Builder. Yeah, I know all the stereotypical surfer references like "hey Spicoli" or "Cowabunga dude!" Growing up on the New Jersey shore, I have been surfing since I was a kid, but I shaped my first surfboard about 10 years ago.

It all starting one day when I was talking with Greg Helmer, my colleague at RBF. Many folks know Greg as a GPS expert, but Greg also wears the surfer hat. I was explaining that I was having difficulty finding a new surfboard that fit my needs. You see most surf retailer's only stock surfboards that fit the height and weight of much younger people. So Greg asks, "Why don't you build your own?"

Now for me, this was like alien talk. When I learned to surf in the 70's, all the surfboards in the country came from either California or Florida so I had no experience with the surfboard building industry. I'm pretty handy and have experience working with wood, building furniture and such for quite some time. However, it never dawned on me that I could actually build a surfboard. Think of it this way, would you ever consider building your own surveying instruments? Anyway, we got together and Greg helped me through my first surfboard shaping experience. I was hooked.

I began building more boards and researching as much as I could on design concepts and technique. Things all changed suddenly in 2005 when Clark foam closed. Clark manufactured the foam cores for virtually 95% of the surfboards being built in the world between 1961 and 2005. When they suddenly shut down, under pressure from the EPA, it left manufacturers scrambling to find new suppliers and materials. It was then that I discovered some more modern techniques for building surfboards. The newer techniques produce surfboards that are lighter, more durable and use much less toxic materials such as epoxy resins and renewable resources like balsa and redwoods.

I continue to make surfboards for myself, my family and friends using a variety of materials and techniques. I find the experience very relaxing and rewarding. ❖

Special Thanks

Over the years, Matt Vernon has generously donated his handmade surfboards to the CLSA Education Foundation Scholarship Auction helping to raise thousands of dollars for land surveying students.

2009 Scholarship Auction – 2009 Education Foundation Chair Steve Martin displaying Matt Vernon's surfboard for the live auction.

2014 Scholarship Auction – Cal Poly Pomona Student Janie Han displaying Matt Vernon's surfboard for the live auction.

Geography Quiz

Question on page 9

Answer:
On the river Moselle, near Schengen Luxembourg, bordering Germany and France. The Schengen Agreement was implemented in 1995 to abolish border controls between Belgium, France, West Germany, Luxembourg, and the Netherlands. Since then, the Schengen Area has been expanded to now include 26 member states with more than 400 million people. Amendments to the agreement are made according to the legislative procedure of the European Union (EU).

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Conference One Day Select Day: ❑ Sunday ❑ Monday ❑ Tuesday ❑ Wednesday	$205	$255	$_____

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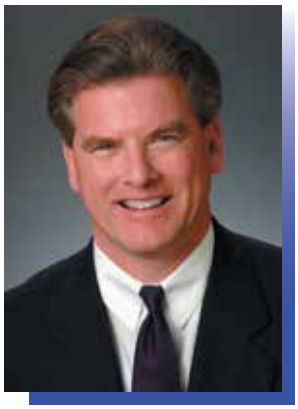
Q&A SMA Expert

By: Michael P. Durkee, ESQ



Michael P. Durkee, *is a partner at McKenna Long & Aldridge where he represents developers, public agencies and interest groups in all aspects of land use law. Mike is the principal author of Map Act Navigator (1997-2013), and co-author of Ballot Box Navigator (Solano Press 2003), and Land-Use Initiatives and Referenda in California (Solano Press 1990, 1991.) mdurkee@mckennalong.com*

Question:

I have 1 conveyance deed that transacted 5 lots. Each lot on that deed is legally described by reference to a 1910 recorded map. The 1910 map is still in record. No newer recorded map has superseded the 1910 map. And each of the lots referenced in the deed is shown on the face of that recorded 1910 map. How many lots do I have, 1 or 5?

Answer:

Great question! There has been a lot of confusion on this issue. I believe you have 5. Despite the fact that some argue that you only have one, I believe they are wrong. The following is the explanation of my opinion:

We know that there are at least two different ways to create new parcels in California: (1) by recording an appropriate "final map" or "parcel map" in compliance with the Map Act See Gov't Code § 66412.7; or (2) by recorded "conveyance." Gardner v. County of Sonoma (2003), 29 Cal. 4th 990,1002-1003.

We know that there are at least two different ways to create new parcels in California: (1) by recording an appropriate "final map" or "parcel map" in compliance with the Map Act *See* Gov't Code § 66412.7; or (2) by recorded "conveyance." *Gardner v. County of Sonoma* (2003), 29 Cal. 4th 990,1002-1003.

As far as what is an appropriate recorded map, we know that the courts have determined – with some caveats and exceptions – that pre-1929 recorded maps did not necessarily "create" the lots shown on their face by the mere fact that such maps were recorded. *Witt Home Ranch, Inc. v. County of Sonoma* (2008) 165 Cal. App. 4th 543; *Abernathy Valley Inc. v. County of Solano* (2009) 173 Cal. App. 4th 42. While I think those courts are wrong (and hope one day such error will be cured!), I cannot argue with the fact that those cases currently exist.

But even though such courts have held that such pre-1929 maps are not "creators" (at least while *Witt Home Ranch* and its progeny remain good law), that does not mean that such maps filed during the first thirty six years of the Map Act's existence (between 1893 and 1929) were a legal nullity. Instead, these early maps (including the 1910 map in our question) continue to function as "descriptors" of lots, which lots, once conveyed, spring into legal existence as map-described parcels. If one accepts that the Map Act had some purpose during its first 36 years (other than "creating" parcels through recordation, which was the view rejected by *Witt Home Ranch*), then that purpose must have been to ensure proper coordination between conveyance documents (i.e., deeds) and the official "data" (description) placed into the "neutral" recorder's office (i.e., the recorded map). Buyers could thereby avoid fraud by confirming that the seller was the owner of the mapped land, that the map was properly recorded, and that the parcel or parcels identified in the deed corresponded to the parcel or parcels shown on the recorded map. That deed conveyance, once recorded, then created as legal the parcels described in the deed (and shown on the face of the recorded map).

Nothing in *Witt Home Ranch* is to the contrary. As stated above, in addition to the creation of new parcels by recorded map, new parcels can be created by recorded conveyance. A conveyance creates those parcels described on the face of the conveyance deed, once that deed is recorded with the County Recorder. See *Gardner v. County of Sonoma* (2003) 29 Cal.4th 990, 1001-1002. Other examples of parcels being created without the need for a map include conveyances by federal land patents (see *Lakeview Meadow Ranch v. County of Santa Clara* (1994) 27 Cal.App.4th 593 [reversing] a county's denial of certificates of compliance for three parcels of land created by federal patents]), and the sale by the government of a portion of a tax-deeded parcel (see 64 Ops. Cal. Atty. Gen. 814 (1981)).

The Map Act recognizes this separate means of parcel creation in its provisions regarding certificates of compliance, including its provisions authorizing conditional certificates of compliance where an illegal lot is created by illegal conveyance.

Because a single grant deed may lawfully convey more than one lot, it follows that if a conveyance deed identifies multiple separate parcels by reference to a recorded subdivision map, that conveyance "creates" new parcels in the same fashion unless there is some indication on the face of the deed that is to the contrary. Compare *People ex rel. Brown v. Tehama County Bd. of Sup'rs* (2007) 149 Cal.App.4th 422, 437-38 (holding that where a deed specified the conveyed property as "*that certain lot and parcel of land*" with a metes and bounds description, rather than "*all* those lots and parcels of land," the deed conveyed a single parcel rather than two new fractional parcels as argued).

This is because whether the conveyance deed references one or multiple parcels makes no difference to the event of "creation." No one would dispute, for example, that a conveyance deed that describes multiple parcels that are non-contiguous, independent "islands" of land would not create such non-contiguous parcels. This is confirmed by our ordinary understanding of what a "parcel" means (i.e., a discrete unit of property defined by the drawing of boundary lines that close.)

In my opinion, the same holds true when a deed separately describes and conveys multiple parcels shown in a pre-1929 map, even where the lots happen to be contiguous, unless the conveyance language in the deed discloses a contrary intent.

Certainly, there is no legal description – metes and bounds or otherwise – that describes only 1 lot. Since legal descriptions define what lots are created, where is the legal description for only 1 lot? There isn't one in the example you provided. Therefore, in answer to your question, I believe that 5 lots were created when the deed conveyance, which separately described the 5 lots by way of reference to the 1910 map, was recorded. ❖

Index To Advertisers

Funny Bones

Have a funny bone to submit, email us at clsa@californiasurveyors.org

My new magnetic sign to go on the back of my truck.

Submitted by: Robert Reese, PLS

Postcards

This photo, of Richard Prutz, RCE, and me, was taken at the northeast corner of my parents' property in Auburn, Maine. These granite survey monuments can be found quite often in Maine.

Submitted by Neil C. Hansen, PLS

Only in Marin, particularly Bolinas. My client had a beautiful Gravenstein apple tree that was loaded with apples and this guy knew exactly where it was. This is one of two bucks that were traveling together.

Submitted by Phil Danskin, PLS

By: Richard Hertzberg, CPCU, ARM, Vista International Insurance Brokers

Insurance and Losses

You Had a Bad Loss

This is the reason you buy insurance but your insurance company is about to deny your claim and this is the reason you get disappointed in your insurance company. You thought they were going to pay you for whatever happened that could cost you a lot of money and put you out of business. You find out after your loss they may not pay you at all or they may only pay a small amount.

What happened?

Well, there is a deductible to consider, an insuring clause and definitions that determine what's covered, valuation clauses and on and on. You hope you have a good broker or a good lawyer or you have reported everything correctly, submitted the claim properly and that you have good luck.

I wish that insurance coverage was truly all risk and that it paid for what damages actually happened that caused you to lose money. Here goes the sort out. Maybe you didn't buy the coverage you needed to have to cover your property, equipment, business interruption, general liability, professional liability, auto, workers compensation and cyber liability. Just hope you have that good broker or good lawyer to help you through this maze.

What's Happening Now?

In September, Allianz, one of the world's biggest insurance companies and owner of Fireman's Fund Insurance Company, came out with a report on top losses worldwide and they found that professional liability, product defects, fire, earthquake, flood and bodily injury were in the top ten causes of loss.

They said that "technology, economic growth, climate change, societal change and the fast developing legal and regulatory framework are all affecting risk and making insurance claims more challenging, not least with a shift away from tangible risks like fire damage towards intangible risks like reputational risk and supply chain interruption.

"For property casualty insurance and claims, rising natural catastrophe exposures and climate change, the increasing complexity and interconnectivity of risks, especially business interruption, and the growing importance of cyber threats will be among the most relevant emerging risk trends to watch."

So remember your risk management principles to lower your risk exposure: Avoid, Control, Retain, Transfer and Monitor. See my article in the last issue of California Surveyor.

Also remember to keep your eye on your equipment. Bad people are frequently stealing fancy unattended GPS items.

Allianz, in their loss analysis, goes on to say that professional liability is the top cause of loss they are seeing. Due to a far less forgiving regulatory environment and "the spread of collective actions, driven by a growing claims culture and increasingly savvy litigators and litigation funders."

Please keep your professional liability coverage fine-tuned and in-force. In the end it may be your most important coverage, even if you never use it. Also, when you retire, consider buying extended warranty coverage (tail coverage) for at least three years.

Insurance Companies

It's always best to stick with financially sound and top-rated companies.

- Here's the top 10 US property/casualty writers in 2013:
- State Farm Group
- Berkshire Hathaway Insurance Group, includes GEICO and Oak River
- Allstate Insurance Group
- Liberty Mutual Insurance Companies
- Travelers Group, includes St. Paul Fire and Marine
- American International Group, includes New Hampshire
- Nationwide Group, includes Allied and Scottsdale
- Progressive Insurance Group
- Farmers Insurance Group, a Zurich Insurance subsidiary, includes Foremost
- USAA Group

ACE, CNA and Hartford Insurance are in the top 20.

Even if your insurance company, such as top-rated Lloyds of London, is not on this impressive list, make sure they are A rated and financially strong.

Finally, indications are that insurance pricing should be stable this year. ❖

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2015 Refill Package (8 ½ x 11 ½): includes: PLS Roster, PE & PLS Act with Board Rules, Subdivision Map Act and Index and Misc. Statutes (Includes DVD with searchable PDFs)	$27.00	$37.00	$54.00		
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CLSA Exam Guide	$25.00	$35.00	$50.00		
LS Instructional DVDs – Full Set (10 subjects, 19 discs)	$149.00	$209.00	$298.00		
Standard Contract Forms Agreement for Professional Services (Pad of 25)	$6.00	$8.00	$12.00		
Land Surveying for the Land Owner & Real Estate Professional by Daniel E. Beardslee, PLS	$8.00	$14.00	$16.00		
CLSA Safety Tailgate Meeting Guide	$25.00	$35.00	$50.00		
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Submit Photos to: CLSA@californiasurveyors.org

*Submitted by **MARIA GHISLETTA**, LSIT, CPESC, QSD*
DIMENSIONS 4 ENGINEERING & LAND SURVEYING INC.
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Boundary survey and topographic mapping on a bluff lot near Highway 1, Jenner, Sonoma County. We found numerous record monuments marking the same corner. Eenie, meenie, miney, moe…

Topographic mapping and construction staking at an agricultural turbine site in Petaluma, Sonoma County.

Construction staking for roadway and wellness facility improvements, Cazadero, Sonoma County.

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By: Carl C. de Baca, PLS

***Carl** is Principal of Alidade Surveying in Elko, Nevada, and a past editor of the California Surveyor. He can be reached at: alidade.nv@sbcglobal.net.*

Bad Backsights

Wilton Mud

I was going through a box of miscellaneous junk in my office recently when I found a stack of photographs held together with an old, cracked rubber band, which broke as soon as I picked up the photos.

The top photo was a picture of my brand new bright red 2000 Dodge 2500 truck buried up to the middle of the tires in some muddy field. Taken altogether, the pictures told a sordid tale of the Sacramento Valley during the rainy season. I had pretty much forgotten that winter day but looking at the photos now, it all came back to me - the grimy wet desperation of floundering around in the Wilton mud.

The story goes like this:

One of our party chiefs, Roger was sent to a property in south Sacramento County for initial boundary retracement in a fully outfitted two wheel drive truck, sporting a Silvershield © lid over the bed – a nice, heavy, low-slung truck. He left the paved road near the east boundary line and was driving cross-country toward a fence

corner near the south east corner of the property when he became stuck in a soft muddy low spot. Roger called Lou, another of our party chiefs who was working on a project a few miles away. Lou drove out to the site, assessed the situation and drove toward Roger, following approximately the same route, and achieved approximately the same result. Now two trucks sat, ten yards apart slowly sinking in the mud. A peculiar feature of Wilton's soil, with its high caliche content is that once you break through the crust on the surface, the resulting hole gets wetter and wetter as water wicks upward. Roger's tires were now sitting in pools, enlarged by some earlier futile rocking back and forth - Lou's would be soon. They dug relief trenches to drain the water away from the tires but those turned into ponds in short order. Lou and Roger used their available resources and jacked the first truck up, placed a bundle of lath under each back tire and drove ahead with, it is sad to say, predictable results. A few more attempts and all their stakes and lath were now entombed in the wet clay. Soon after, they finally called the office.

I hung up, signed out, jumped into my brand new 4x4 and headed home to get a few supplies. I threw in all four of my tow chains, over 60 feet worth, plus a couple pieces of plywood, some miscellaneous wooden blocks and my wheel barrow, in case I needed to portage the materials from the road out to the buried vehicles. Between getting the initial call and reaching the site took close to two hours. It was late morning and looking like it was going to rain at any time. I drove out near the stuck trucks without breaking through the top layer of clay and parked on a point slightly higher than the poor surveyors. I loaded the blocks and the plywood on the wheelbarrow and trudged over to them. It was clearly a situation where half measures would not do. We enlarged the relief trenches to get the water flowing away vigorously. We jacked up each rear tire in succession and slid a strip of plywood under, then Roger drove forward as fast as possible with Lou and I pushing. This method actually worked and Roger managed to drive up onto the crust, gain speed, made a large looping turn, and headed back toward the road. Unfortunately, he stopped the rig a hundred yards short of the road, in order to come back on foot and help with the second truck. He didn't notice that he had pulled up in a slight, but distinct depression. While we labored to extract Lou's truck using the successful methods just developed, Roger's truck began sinking into the ground, worse than before, if that was possible.

After similar preparations, Lou broke his unit free and made the same looping turn as Roger and when pointed at the road, gave it a little too much gas and slid sideways into the depression near Roger's truck, promptly spinning the tires down into the muck. It was too funny not to laugh and too tragic not to cry. At least my truck was high and dry. It was time for tow chains. We attached the first chain to the front of Lou's truck, which was noticeably less sunk than Roger's. We linked each of the chains together in succession, stretching out to the west. I figured that I might just be able to stay out of the depression when attached to the chain but I would be towing westerly, nearly parallel to the road instead of north toward it, so it wasn't an optimal situation.

Bad plan! Now my truck was buried too, but more dramatically (deeper) than the other two. Anyone with a four wheel drive will tell you that when you are in trouble, many times that second drive axle will just end up making things worse, especially in the mud. Regrettably, I must concur. All four wheels were half buried and since the truck leaned to the left, the driver's side door couldn't open very far before hitting mud. Things were not looking good.

Continued on next page

Continued from previous page

It was about then that a local farmer drove by and spied us out in the field. He honked and pulled over and got out of his truck so we walked in his direction, though it was still at least a hundred yards to the road. He met us half way and said, "Looks like you boys have found the Wilton mud." We readily acknowledged as much. He

said, "Let me go get my tractor and I'll see if I can help you out. Don't go anywhere." (Farm humor, I guess.) We were profuse in our thanks and headed back to the scene of utter devastation. There was nothing to do but wait.

It was now early afternoon and looking more and more like it was going to rain. We were all covered with mud, our feet were soaked, our backs were sore. No surveying was going to be done this day - that much was certain. Presently the farmer rolled up to the edge of the road on smallish John Deere 4600 tractor with a back hoe. He pointed the tractor toward us and drove right out, making it look easy as the big tractor tires propelled it across the field. He came from the east so he was closest to the two survey trucks. After a brief discussion we unhooked the chains, drug them around the other way and hooked them to the rear of the closest truck and wrapped the other end around his front bucket. As Roger put in reverse in gunned it, the farmer started backing up and pulled the truck right out of the muck. We unhooked the chain and Roger drove the truck to the road without stopping. One down, two to go.

The farmer, whose name we never got, maneuvered the tractor into position to pull the second truck, and we chained up at both ends. It had started to lightly rain and we pressed ahead anxiously. The second truck was harder to get out. The first attempt caused the tractor to start sinking in. We disconnected the chain and he moved the tractor a few feet to the left and we tried it again. The tractor was backing up and pulling the truck but it wouldn't come up on the crust so it was essentially plowing a furrow in the field. This went on for about fifty feet and finally it rolled up on more solid ground and backed up under its own power. We disconnected the chain, and Lou backed truck no. 2 all the way to the highway. It was now raining pretty steadily. The farmer got the tractor to within the chains length of the rear of my truck and we attached the chain to my truck and the tractor. By this time my truck was low to the ground and water was standing all the way around it. That meant crawling on my belly in the cold muddy water to attach the chain to my tow bar. Like a salamander I slid onto the truck seat and started her up. The inside resembled a rice paddy, (and was never completely clean again). I threw it in reverse and when I felt the jerk of the tightening chain I gunned it and… nothing. I think I actually sunk lower into the ground. But even worse, the farmer had broken through and the tractor was now sitting on the mud with all four tires spinning helplessly. We couldn't push it, pull it or dig it out. He asked if we had anything we could put down in front of the loader bucket for him to use to push up with. We had used all the lath, stakes, plywood etc, and there was nothing left to sacrifice - except my wheel barrow. I reluctantly placed it upside down in front of the tractor whereupon he put the bucket down on it and lifted the front end of the little John Deere. Then he turned around and used the back hoe to lift the rear wheels out of the mud and crab-crawled to the left enough to put them on solid ground again. He backed up a little way, turned around and came toward my truck at an angle. We attached the chain to the backhoe bucket and he dragged the truck about ten feet. We adjusted the chain and did it again, and again and again and at some point it broke out of the mud and I drove back to the road. I walked back to join the oth-

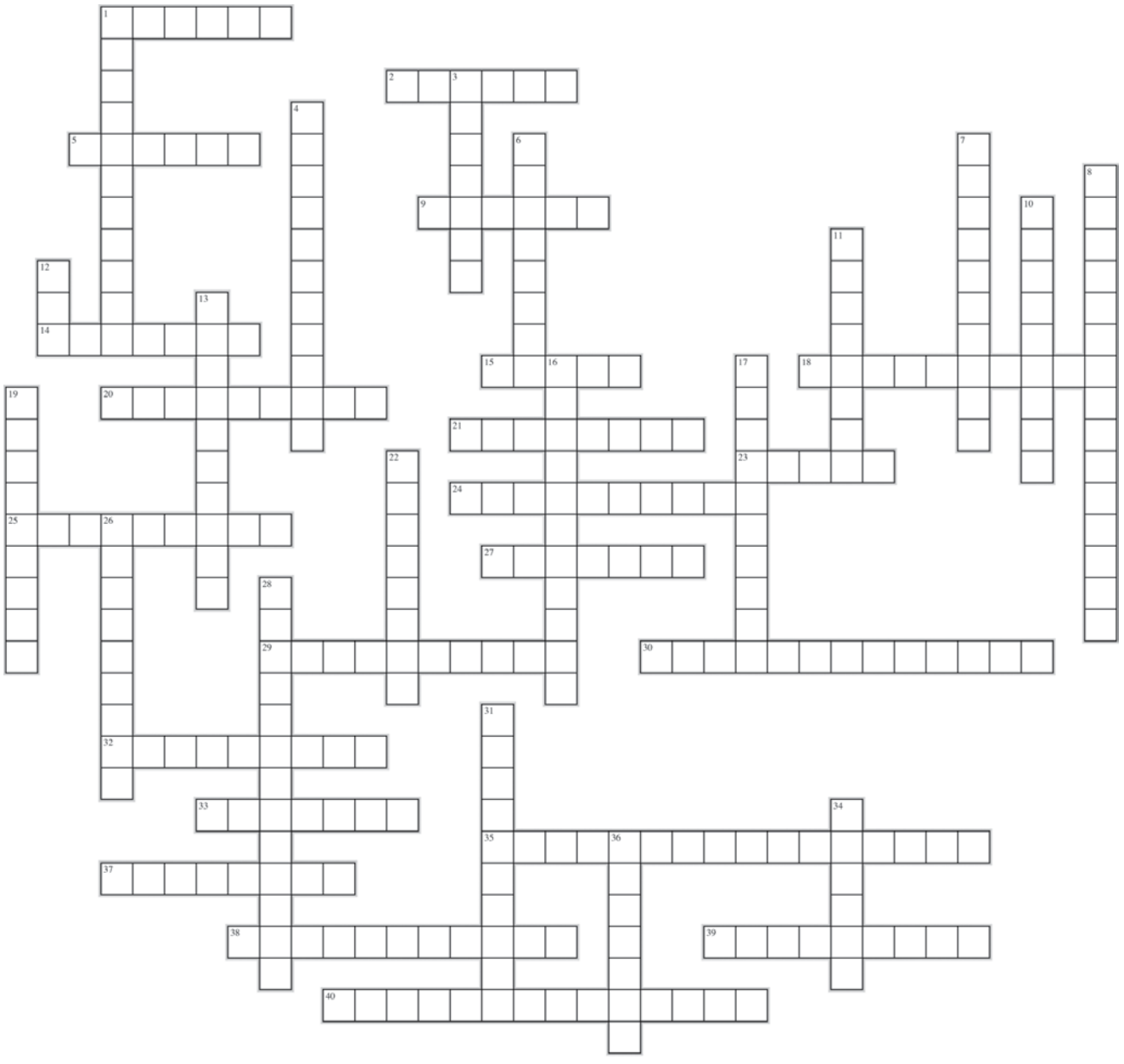
ers. By this time it was dark and raining biblically. The farmer was getting his tractor in order before driving back to the road and the three of us chatted amongst ourselves. Lou suggested we should take up a collection and give the guy some money. All together the three of us had a whopping $37 in soaked ones and fives. It was all we could do to get him to take the handful of wet bills, and we were still yelling our thanks in his direction as he chugged away home.

I noticed later, when we had the two rolls of film developed that every picture we took with our hero in it, he had deliberately turned his head, pulled his hat down low or otherwise hid his face. As I said, we never got his name, but whoever he was, thank goodness he was driving by that day. Roger did get the boundary survey done a couple days later, mostly on foot. We flew the site for design level topo the next week and the 9x9's showed the horrendous tracks we had left, like some insane parody of the Nazca plains. There's a one-acre ranchette subdivision there nowadays, (so at least somebody lived happily ever after). My truck was never the same, no matter how many times I visited the high pressure car wash. I traded it in a year later. And my wheelbarrow was never seen again. Here is the last known sighting…❖

***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 # 32



EclipseCrossword.com

Across

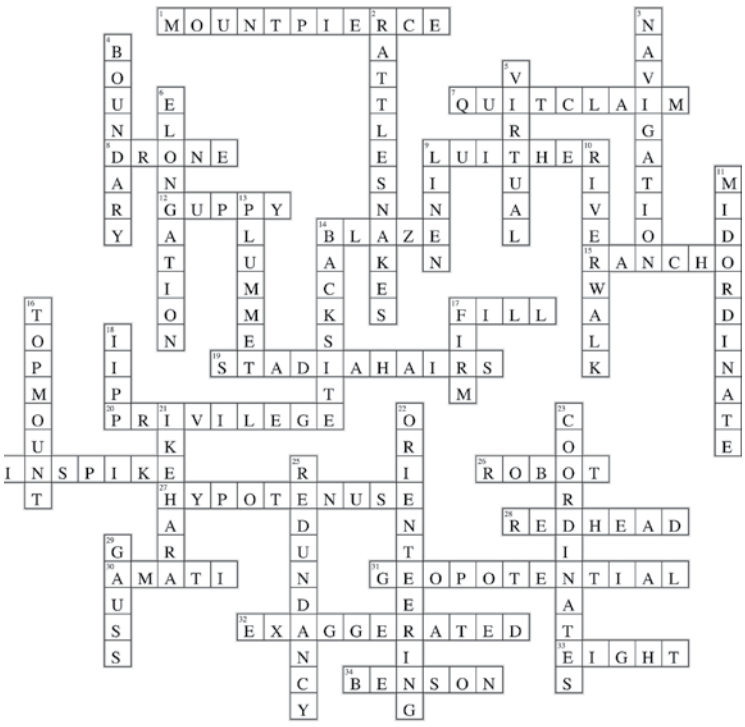
1. A railroad curve is one
2. Tahoe by another name?
5. They go with pits
9. It preceeded the true line
14. It started on January 6, 1980
15. Something not wanted on Title
18. It was done on a tablet
20. Only surveyor on Mount Rushmore
21. Where the cut meets the OG
23. Used to keep track of count when chaining
24. The project that funded the PBO
25. It can be high and still wrong
27. You can close it to check you angle
29. Every traverse has some
30. The field of study related to exam performance
32. When the water slowly recedes
33. 220 yards
35. Between geodetic and grid north
37. A type of estate or a bully
38. Run along a body of water for area
39. It is a function of time
40. Section 6 typically has the most

Down

1. Section 16 and 36 in most Townships
3. The reluctant surveyor
4. Antenna models correct for it
6. Important marks on a 9 by 9 photo
7. The path of Polaris has a western and eastern
8. You keep a rod just for this if you are smart
10. A condition of Adverse Possession
11. North is one of four
12. Type of dog or photogrammetry term
13. A Cal Poly Pomona type of engineer
16. It is gone, but not lost
17. Clock bias is this type of error
19. Clarke's of 1866 is one
22. A vertical curve is one
26. Must be corrected for in long level runs
28. The State specific PLS exam is this now
31. It can be irrevocable
34. Where Mrs. Jane Stanford met her fate
36. Highway 4 traverses this pass

Key to CLSA Crossword Puzzle # 31

(Surveyor Issue # 178)



Sustaining Members

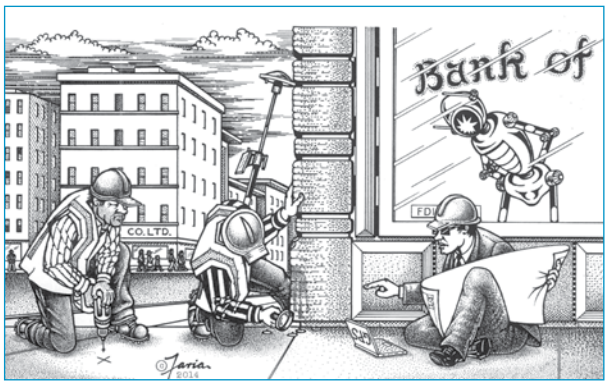
Top Captions for issue #178

"So... the ALTA survey notes that the 1st tag fits the grant deed, the 2nd tag fits the warranty deed, the 3rd tag fits the quitclaim deed, and you say that the 4th tag is an old buffalo nickel worn smooth and bonded to the concrete with pink bubblegum. Is that about it?"

BJ Tucker, PE, LS

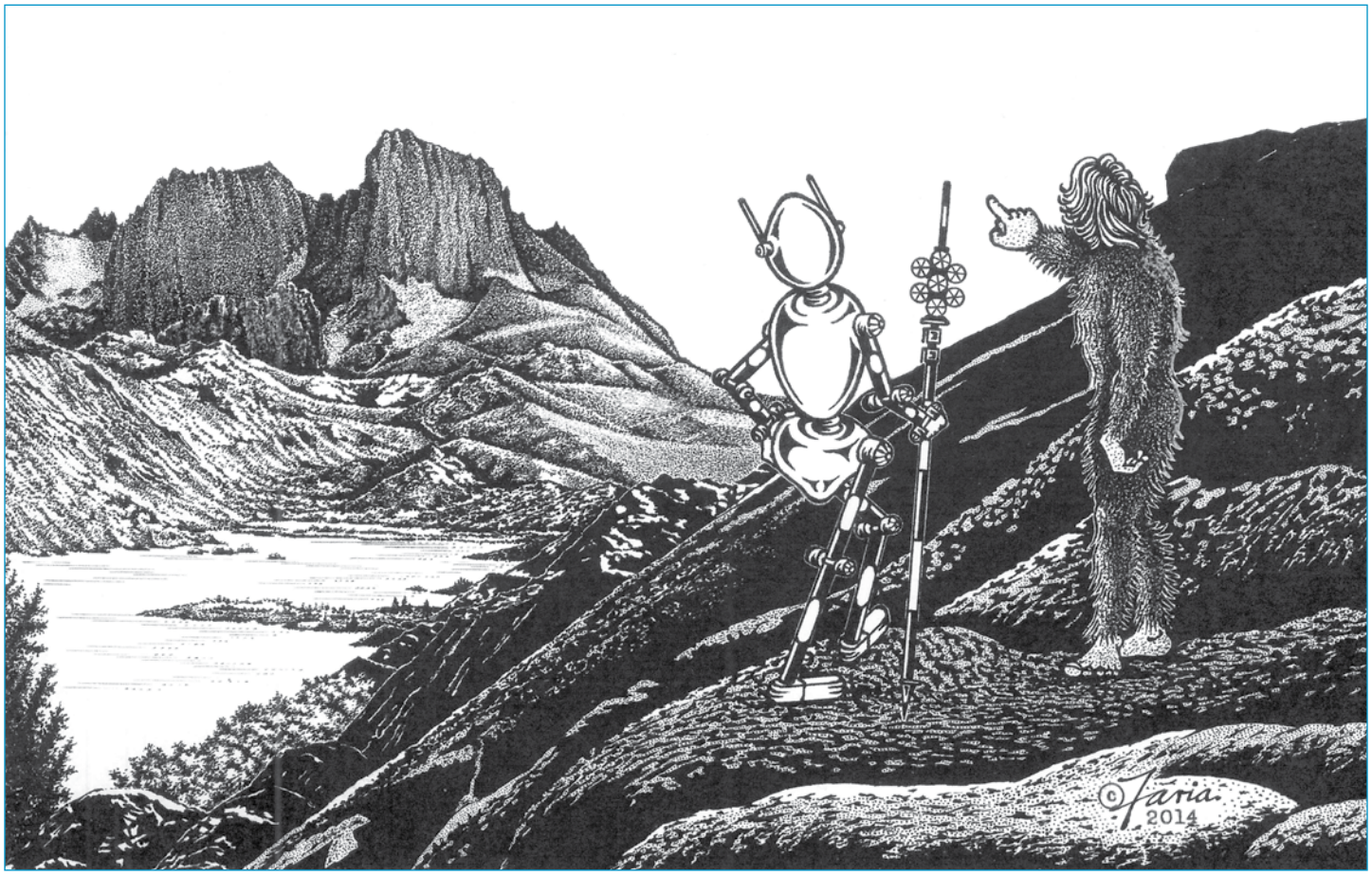
"GPS must be wrong. My plans say that this is the corner of the Co. Ltd. building, so this must be it."

James L. Jensen, PE, QSD/P



Submit your caption for the below cartoon to clsa@californiasurveyors.org by February 10th.

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



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