



Central Valley Chapter - California Land Surveyors Association  
[www.californiacentralvalleysurveyors.org](http://www.californiacentralvalleysurveyors.org)

# THE Central Valley Chapter PRISM

Volume 2, Issue 6

November 2012

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Boy Scout Merit Badge:  
Scott DeLaMare (Coordinator)  
TrigStar:  
Bill Koch (Coordinator)  
Workshops:  
Chris Martin (Coordinator)

Up  
Coming  
Meetings!

**Date:** December 5, 2012

**Time:** 6:30 p.m.

**Location:** Perko's @ 901 North Carpenter Road, Modesto

**Speaker:** Rolland VanDeValk, CLSA Secretary/President Elect

**Topic:** CLSA Current and Future Issues

**HAVE A HAPPY THANKSGIVING  
MERRY CHRISTMAS  
& SAFE NEW YEAR!  
FROM THE STAFF OF THE PRISM**

## Announcements

### Local Surveyors become CFedS

Two local surveyors are now Certified Federal Surveyors (CFedS). Scott "Landon" Blake, a surveyor with KSN, Inc. out of Stockton, and Douglas Buck, Hetch Hetchy, are 2012 CFedS Graduates.

### Sacramento Chapter Golf Tournament

The Sacramento Chapter of CLSA announced their First Annual Night Golf Tournament. Bradshaw Ranch Golf Course, Friday, November 9th, Tee Off @ 6:30 pm. Please contact [Annette Lockhart](#) for more information.

### Central Valley Chapter to host L.S. Review Class

The Central Valley Chapter of the CLSA will be hosting an L.S. Review Class with plans of starting in November of this year. The class will be held weekly, with the first class to be on programming your HP 33s and 35s calculators. Details to follow.

### Chapter Waives 2013 Dues for Unemployed Members

At the October, 2012 meeting the Central Valley Chapter voted to waive chapter dues for any members (or new members) who have become victims of the current economic downturn and are unemployed. Please fill out the Membership Application, enter "Unemployed" on Line 7 for the Name of Firm, Agency or College, submit your application, and your 2013 chapter dues are waived.

[Click here for the 2013 Membership Application](#)

## Table of Contents

Classes, Training &	State News	Page 5
Continuing Education	Technology & Info	Page 8
Editor's Message	Classified	Page 10
CAD Tips & Tweaks	Picture of the Issue	Page 10
National News	Puzzle Page	Page 11

## Classes, training, and continuing education

CAD Masters — Civil 3D Introduction — [Register here](#)

December 3, 2012, Sacramento

December 19, 2012, Walnut Creek

January 2, 2013, Sacramento

January 14, 2013, Walnut Creek

January 28, 2013, Sacramento

CAD Masters — AutoCAD Level I — [Register here](#)

November 19, 2012, Walnut Creek

December 10, 2012, Sacramento

December 26, 2012, Walnut Creek

January 7, 2013, Sacramento

January 22, 2013, Walnut Creek

CAD Masters — AutoCAD Level II — [Register here](#)

November 19, 2012, Walnut Creek

November 26, 2012, Sacramento

December 17, 2012, Walnut Creek

January 10, 2013, Sacramento

January 28, 2013, Walnut Creek

# Mark Your Calendars

CAD Masters — AutoCAD Level III — [Register here](#)

December 13, 2012, Walnut Creek

ESRI — Designing Maps with ArcGIS — [Register here](#)

December 6-7, 2012, Online

December 19-20, 2012, Online

CLSA/NALS Conference 2013

March 23-27, 2013

Silver Legacy Resort & Casino, Reno NV

Central Valley Chapter CLSA — L.S. Review Class

Classes to be held weekly. Please see [Keith Spencer](#) or [Rich Brown](#) if interested. Registration and information is available on the [Chapter Website](#).

If you have information about a training or class, please submit to: [editor@californiacentralvalleysurveyors.org](mailto:editor@californiacentralvalleysurveyors.org)

## Editor's Message

### THE SURVEYOR'S OF TOMORROW

As I glance at Surveying as a profession, I see that the number of active surveyors is gradually dropping. So, I take a closer look. The profession itself is not a glamorous one. Yes, we get to play with fancy electronic equipment and work outside, but that is only a portion of the work required to do the job. First we get to go through piles of documents doing research, looking up deeds and easements and sometimes really old plats. Then when we get all the research completed we get to hike, sometimes for miles, packing our gear. Looking for a specific rock or tree, or maybe even a fence post. When we find what we are looking for, then sometimes we get to dig, and dig, and dig. All, this just to find something else we are looking for. Sometimes we find it, sometimes we don't. It's the thrill of the search! It can be pretty amazing, finding something that was set a hundred years ago. To find evidence of what was there before. That is the total rush!

Now, as our population grows, and we are forced to be closer together the era of the BIG parcel is coming to an end. People are moving to the country and parcels are getting smaller and smaller. I feel that the need for surveyors is greater than ever before. The problem I see is that most kids today don't have a clue as to what a Professional Land Surveyor is. We need to start education them while they are still influential. We all need to share our experiences, our passion, our stories. Go out and mentor a young person. Teach them about our profession. Show them all the "awesomeness" that it is to be a Surveyor. So let's recap my thinking a minute; you get to work with documents that could be hundreds of years old, work in the beautiful outdoors, solve complex math problems, understand and utilize boundary law and operate sophisticated electronic equipment. All to find monuments that were put in the ground by a professional surveyor before us.

When you take a closer look at our profession, I really don't see why we are not having to expand our schools that teach surveying. Why are our numbers going down and not up?

If you would like to comment on this topic or suggest another, please submit it to:

[editor@californiacentralvalleysurveyors.org](mailto:editor@californiacentralvalleysurveyors.org)

# CAD Tips & Tweaks

## An Introduction to AutoLISP—Part 2: Basic Data Types, *By Landon Blake, PLS*

### Introduction

Welcome to the second installment of *CAD Tips and Tweaks*. *CAD Tips and Tweaks* is a new regular feature of the *PRISM*, the CLSA CVC Newsletter.

As a reminder, all of the source code we discuss in this column will be released under open source licenses. All of the media content for the column will be released under a Creative Commons license. You can download the source code, text, and graphics for these articles from <http://www.cadprogrammermagazine.com>. You can visit that same site to view video tutorials that supplement the articles and to find links to resources where you can learn more about the topics discussed in the articles.

In this article we are going to look at the basic data types, or built-in building blocks, used to create AutoLISP programs. There are two (2) categories of basic data types we will discuss.

### Definition of Basic Data Types

Each basic data type in AutoLISP defines a standard set of characteristics for the simplest types of data you can store and manipulate in the AutoLISP programming language. Identifying a standard set of characteristics for each basic data type allows us to organize the data created and manipulated in our AutoLISP programs into categories and to define rules that explain how we can work with the data in each category.

Basic data types are different from more complex data types in AutoLISP because they stand on their own. They are the smallest building blocks from which other data types in AutoLISP are built. If you think of an AutoLISP program as an old fashioned university with beautiful brick buildings, basic data types would be the individual bricks.

### The Role of Basic Data Types

Basic data types play an important role in AutoLISP and in other programming languages. As mentioned in the previous section of this article, basic data types are the fundamental building block used to build the structures that represent objects or entities in the programming language. In AutoLISP basic data types are used to build structures that represent entities in a CAD drawing, but can be used to construct other useful structures to represent dates, measurements, and non-spatial attributes of drawing entities. Basic data types are used in several important ways in AutoLISP. The section of this article entitled “How Basic Data Types are Used in AutoLISP” provides more information.

### The Two (2) Categories of Basic Data Types

There are two (2) categories of basic data types in AutoLISP. The first category of data type is for numeric data or numbers, and the second data type is for text. We will discuss each of these categories in more detail.

There are two (2) numeric basic data types in AutoLISP. The first of these is the integer data type. Integer data types are used to store whole numbers, or numbers with fractional portions. 15, 150,236,522, and -236 are all values that would be stored as integers in AutoLISP. There are limits on the size of the numbers you can store in an integer. In more recent versions of AutoCAD the lowest integer you can store is -2,141,474,836,48. The highest integer you can store is 2,147,483,647. That seems like an odd limit, but it has to do with the way binary numbers are converted to the decimal numbers that humans are accustomed to using. The integer variables in AutoLISP are stored using 32 bits, which results in the numerical limits we just described. You can store larger integer values in AutoLISP, but these values will be converted to real numbers, which we describe next. The `getint` function, which can be used in AutoLISP to obtain an integer from the user through the command line interface, only accepts integers stored in 16 bits. That means the largest integers you can obtain through the `getint` function are 32,767 and -32,767.

The second numeric basic data type is called a real number. Real number data types store numbers with a fractional part, which are often called “floating point numbers” in computer programming and computer science. 2.1, 5.0, 32655.1, and -6225 are all values that would be stored as real numbers in AutoLISP.

There is only one (1) basic data type in AutoLISP used to store text. This is the string data type. The name “string” is used for the text data type because text can be thought of as a string of individual characters, whitespace, and punctuation. In fact, in many programming languages text is actually stored in an internal data structure that is very similar to a string. Using the name “string” to refer to textual data is a common in programming languages. “Yellow”, “This is one highly functional AutoLISP program.”, and “2258-2232-1088” are all examples of textual data that would be stored as the String basic data type in AutoLISP.

*Continued on page 6*



## National News

### Narrowbanding

#### The FCC's Narrowbanding Regulations

*On 1 January 2013, you must transmit data in one of two narrowbanding modes:*

- In 12.5 kHz channels (at any link rate)
- In 25 kHz channels at 19,200 bps

#### What does it mean?

ALL radios will remain legal and all licenses will remain valid as long as you transmit data in either of the above narrowbanding modes. Transmitting at 19,200 bps in the 25 kHz channel achieves the equivalent technology of transmitting at 12.5 kHz, according to the FCC. Operating in either of these narrowbanding modes will significantly reduce performance unless you use one of the new radio protocols developed for narrowbanding. The narrowbanding regulations do not affect receivers, so you can use a 25 kHz receiver with a 12.5 kHz transmitter.

#### Why did the FCC mandate Narrowbanding?

Public safety communications continue to evolve as more challenging user requirements and technology considerations put pressure on municipalities and their local public safety organizations to enhance and improve their systems. This evolution to other services such as data and video applications is increasing the demand for higher capacity channels and is driving the need for improved spectral efficiency for public safety spectrum allocations.

This was accomplished by reducing the single voice channel bandwidth from the traditional analog value of 25 kHz to 12.5 kHz. Data radios used in commercial applications must remain secondary to voice radios used for public safety. Not only must they operate with CSMA, on 1/1/13 they will be required to transmit either in 12.5 kHz channels ("narrow") or at 19200 bps in 25 kHz channels ("fast"). In this way, the availability of usable channels is effectively doubled or quadrupled in the same equivalent bandwidth. Narrowbanding, as the process has become known, is being used to improve spectrum efficiency especially in the crowded VHF high (150-170 MHz) and UHF (421-512 MHz) land mobile radio (LMR) frequency bands.

#### All 25 kHz radios will be illegal on 1/1/13?

This is true for voice radios, but is not true for data radios. You can continue to transmit data in 25 kHz channels if you use a link rate of 19,200 bps or higher.

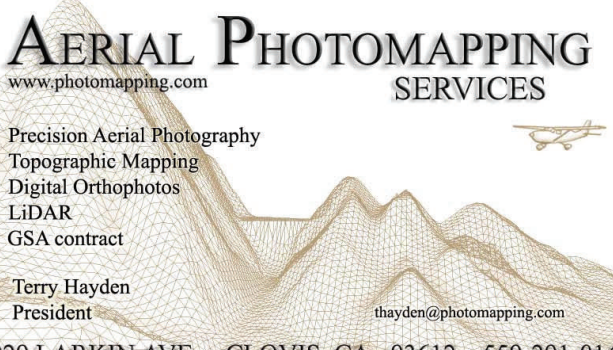
#### Does your radio operate in the 25 kHz narrowbanding mode?

Check with your supplier to determine whether your existing radio is narrowband-capable or needs replacement.

#### Radio license status on 1/1/13

You do not need to contact the FCC regarding existing licenses. Their expiration dates will remain unchanged and existing radios will remain legal as long as you transmit in either of the above narrowband modes. Note that on January 1, 2013, the Narrowbanding requirements will supersede the terms of any license and you will not be permitted to transmit in 25 kHz channels with a radio link rate less than 19,200 bps.

[\*\(Click for Complete Article\)\*](#)



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## State News

### The Surveyor as an Expert Witness

By Knud E. Hermansen, P.L.S., P.E., Ph.D., Esq.

A surveyor is often involved in litigation in the capacity of an expert witness. In the capacity of an expert witness, the surveyor performs three functions. First, the surveyor identifies, introduces, and authenticates documents and other information relevant to the disputed boundary. Second, the surveyor explains the relevancy of certain information and how the information is used to fix the position of the boundary. Third, the surveyor gives a conclusion — an ultimate opinion on the location of boundaries and other related matters. If the surveyor performs the first two functions with competence, the surveyor will establish their credibility with the court. A surveyor that appears credible will have their opinion accepted and relied upon by the judge or jury without necessarily a clear understanding or comprehension of the underlying facts and basis for the surveyor's opinion.

The client is well served by the attorney that spends some time evaluating the surveyor in their role as an expert. There are several facets of a surveyor and the services performed by the surveyor that the attorney should examine.

**There are numerous surveyors who are competent and respected practitioners, yet do not portray confidence and sagacity in stressful situations.**

One facet to be examined is the surveyor's ability to handle stress. Some surveyors do not make good experts because of their inability to handle stress. There are numerous surveyors who are competent and respected practitioners, yet do not portray confidence and sagacity in stressful situations. The terror of sitting in the witness chair coupled with the seemingly hostile attention of the attorney and judge often leave these surveyors struggling for simple thoughts, stumbling over words, grasping for answers, spitting out nonsensical responses, shaking uncontrollably, and sweating profusely. Many are the attorneys who left a courthouse convinced not only that the surveyor had botched the survey and testimony but must have committed all the unsolved crimes in the area given their demeanor on the stand. Given the technical nature of surveying and the difficulty in explaining technical testimony, a good demeanor is an important factor to cultivate. In complex and technical testimony such as required for boundary

*Continued on page 7*

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The advertisement features three overlapping map images. On the left is a technical survey map with various bearings and distances. In the center is an aerial photograph with a property boundary overlay and a text box identifying the property owner as "FERGUSON CATHERINE &amp; CHRISTOPHER". On the right is a street map showing a grid of streets including 11TH Ave, 12TH Ave, College Ave, and Brockway Ct. Overlaid on these maps are two call-to-action buttons: a blue one with a location pin icon and the text "LOCATE Any Property", and a red one with a download icon and the text "DOWNLOAD GIS Shape Files".

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## Basic Data Types,...cont from [page 3](#)

I would like to note here that numbers can be represented in AutoLISP as text, and text as numbers. We will learn more about this in an upcoming article on converting basic data types.

### Sneak Peek

In our next installment of CAD Tips and Tweaks will look at how basic data types are used in AutoLISP, and we explain how to store basic data type values in AutoLISP code.



CLSA EDUCATION FOUNDATION

## *Land Surveying Photo Gallery*

**Unique Historic Photos Now Available for Purchase! Order Today!**



Proceeds from the sale of photos benefit California Land Surveyors Association Education Foundation (CLSA EF) and will be used to fund scholarships for land surveying students.

CLSA would like to thank Bryant Sturgess for generously donating his collection of historic images.



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## The Surveyor as an Expert Witness, *cont. from page 5*

litigation, it is not uncommon for an incompetent surveyor to be judged a more credible witness because of their superior and calm demeanor rather than the the content of their testimony.

**The root of many deficiencies in professional services can be traced to cost conscious clients coupled with surveyors willing to restrict their services based on a price the client is willing to pay.**

An evaluation of the scope and depth of the surveyor's work should also be performed by the attorney. The root of many deficiencies in professional services can be traced to cost conscious clients coupled with surveyors willing to restrict their services based on a price the client is willing to pay. The purpose stated for the services also plays a role in the quality of the surveying service provided. The mortgage loan inspection used to obtain financing is a markedly different service than the boundary re-tracement survey used to prepare a description or erect improvements. In this regard surveyors are no different than attorneys. What attorney could honestly admit that they provide the same level of estate planning to the blue-collar worker with \$5,000 life savings as compared to the billionaire? What attorney spends the same time on a deed for a \$100,000 house as they spend on preparing a complaint starting a \$1,000,000 lawsuit? The point is that a survey performed for a timber harvest may not be sufficient to base an opinion on regarding a \$60,000 encroachment lawsuit that occurs many years later.

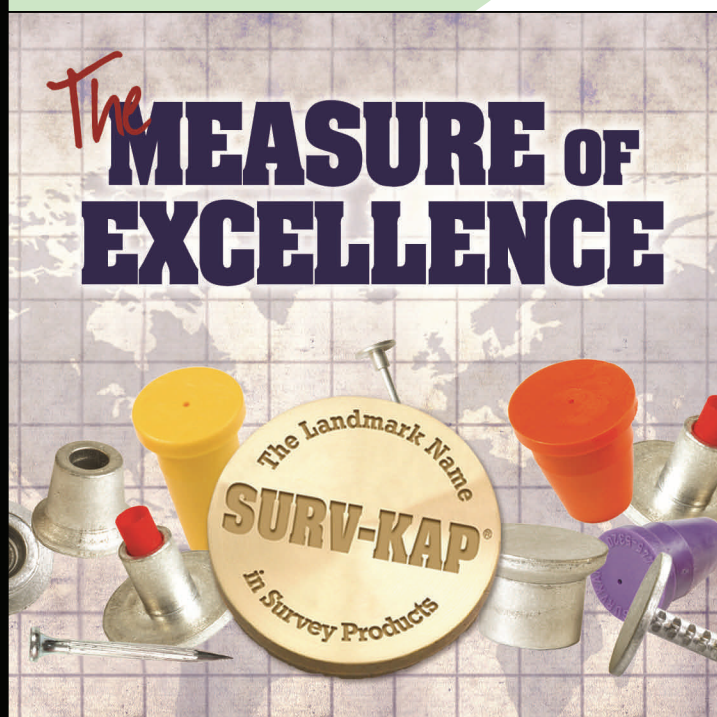
Also to be discovered by the attorney are surveyors who have arrived at an opinion without complete information or information that is not reliable, credible, or cannot be offered into evidence. An opinion formed without gathering or looking at all relevant information is usually determined to be untrustworthy and susceptible to impeachment. This situation is cause for the surprise of many experienced attorneys when they realize that the surveyor did not perform a complete search or limited the measurements to certain corner monuments that were convenient and failed to use others monuments more credible but less convenient.

For the surveyor to have had all the information but use it improperly is no less embarrassing for the attorney attempting to build a case on the testimony of the surveyor. There are numerous cases where the surveyor has testified at some length to the care and accuracy of their research and measurements only to admit they began their services at an unverified point indicated to the surveyor by the client. Equally problematic are the situations where the surveyor has relied entirely upon private records that clearly contradict the valid deeds recorded in the public records. In a few cases, surveyors have relied on procedures or priorities that do not conform to the rules of construction or priority of control established by the courts.

These problems oftentimes arise by oversight or mistake made by otherwise competent surveyors. In a few cases, the surveyor is simply not competent. Few attorneys are aware that licensing surveyors is a relatively recent event in many states and certainly was not foolproof in insuring competence of the individual before licensure. There are numerous surveyors practicing that have never had to take a test or prove their competency in order to obtain their surveyor's license. When licensing of surveyors began, persons that applied and could show sufficient experience or education where given a license to survey without testing or further verification of qualifications.

[\*\(Click for Complete Article\)\*](#)

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## Technology & Info

### GIS Basics for Surveyors

If recent technological trends have taught us one thing, it is that you should steer clear of the prediction game. Not too long ago it was widely anticipated that the Windows and Mac operating systems would soon be completely interoperable, that print media would become a relic of the past, and that surveyors would embrace GIS technology. If the truth be told, we're still anticipating these will eventually come to pass, but, in each case, we're not there yet. So, why are many surveyors reluctant to adopt a technology that, by many definitions, is a perfect complement to the tools they currently use?

There is a perception, sometimes justified, that GIS is an overly complicated discipline requiring a great deal of training and know-how, as well as a considerable financial outlay, to be employed effectively. While it is true that some GIS professionals see the democratization of their turf as a threat to their status and thrive on the notion that their field of expertise is inherently inaccessible to the masses, this situation is changing.

Call it the Google Earth Effect: The general populous is now more spatially aware, or at least aware of the existence of spatial technology and its usefulness, than at any time in the past. Not satisfied with simply viewing maps, many moderately tech-savvy citizens are delving into the art and science of interactive mapping technology and are reaping the benefits both personally and professionally. Accessible GIS software packages such as Global Mapper (recently acquired by Maine-based Blue Marble Geographics) offer an inexpensive and easy-to-use alternative to mainstream GIS offerings and dispel the notion that spatial technology is out of reach for most common folk.

When asked why GIS is not part of their workflow, the surveying community offers these three most-common responses: expense, difficulty of use, and, perhaps surprisingly, relevance or usefulness. It is the latter point that this article addresses, showing that there is room for GIS in the surveyor's toolkit.

*Continued on page 9*

# THE SUBDIVISION MAP ACT

*A One-Day Seminar in Several Locations*

**This seminar provides guidelines for effective use of the Subdivision Map Act.**

- New Legislative and Judicial developments in 2012
- Relationship of Map Act to other planning, zoning and development laws, and to CEQA
- When the Map Act applies (and when not)
- What kind of Map (tentative/final or parcel map) to use
- Certificates of Compliance, Lot Line Adjustments, Contiguity, Remainder Parcels
- Exemptions and Exceptions under the Map Act
- Life of Tentative Map
- Getting the most out of Vested Rights (incl. Vesting Maps, Development Agreements and Common Law Vesting)
- Conditions of Approval/Exactions/Dedications/Fees
- Creative mapping approaches
- Appeals/Judicial Actions

#### WHO SHOULD ATTEND?

Public and private planners, surveyors, engineers, public works and utilities staff, developers, builders, environmentalists, attorneys, project managers, architects, planning commissioners, city council and board members, property managers, zoning board members, neighborhood groups, and all others involved with the land use process.

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## GIS Basics...cont from [page 8](#)

### Basic Principles

Before outlining and describing some of the specific features and functions of a GIS that are of most value for surveyors, let me first define what exactly GIS is. Granted, there are many who navigate the often-tempestuous waters of higher education in order to answer that question, only to emerge more confused than when they enrolled, but in keeping with the underlying theme of this article a more straightforward definition is appropriate. Simply stated, a geographic information system is a tool for managing data in its locational context. Obviously, the specific purpose and intended use of a GIS will likely help refine this definition, but the underlying premise is the same regardless of industry or application.

For surveyors, GIS software can be a powerful asset in many aspects of the surveying process: from project planning to data management to map creation. As with any technology, however, GIS software will prove to be a wise investment only if it can be put to use effectively and is not simply left to collect dust on the shelf. If the application is overly complicated or requires a highly trained specialist to operate, it will likely be beyond the reach of the average surveying professional and may be more of a liability than an asset. GIS is a great first tool for any technology professional looking to step into the fray based on logical organization, intuitive interfaces, and instructive home screens that guide the users to accomplish their tasks.

The question of cost is also a factor. The decision to invest in GIS technology may come down to the likelihood of seeing a return on that investment, and, after factoring the initial purchase of the software, training, maintenance, and other costs, for many it's not worth the risk. There are inexpensive GIS products as well as many free sources of existing base data available that may help to allay these concerns, and they offer a means for non-GIS professionals to employ GIS functionality in their business processes.

[\(Click for Complete Article\)](#)

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## Classifieds

### Principal Land Surveyor Wanted

The Metropolitan Water District of Southern California is a consortium of twenty six cities and water districts that provides drinking water to nearly 19 million people in Southern California. Metropolitan's mission is to provide its service area with adequate and reliable supplies of high quality water to meet current and future needs in an environmentally and economically responsible way. Metropolitan's facilities include the 242-mile Colorado River Aqueduct, five conventional water treatment plants with a combined capacity of 2.6 billion gallons per day, nine surface water reservoirs, 800 miles of pipeline, and 16 hydroelectric power plants.

The Engineering Services Group, has one (1) opening for a Principal Land Surveyor within the Engineering Survey Team of the Infrastructure Unit.

[Click here](#) for information or to apply

*(posted on CLSA Forum 10-19-2012)*

### CAD Designer/Drafter Wanted

Bayside Solutions Staffing services for San Francisco and Sacramento employers and jobs seekers. Multiple openings for experienced, talented CAD Designers with a broad range of experience (Electrical, MEP, Commercial, and Industrial). This position performs all activities and functions of an Architect including preparation of schematic designs, programming drawings, functional space planning, and knowledge of MEP coordination for project / space configuration.

[click here](#) to apply

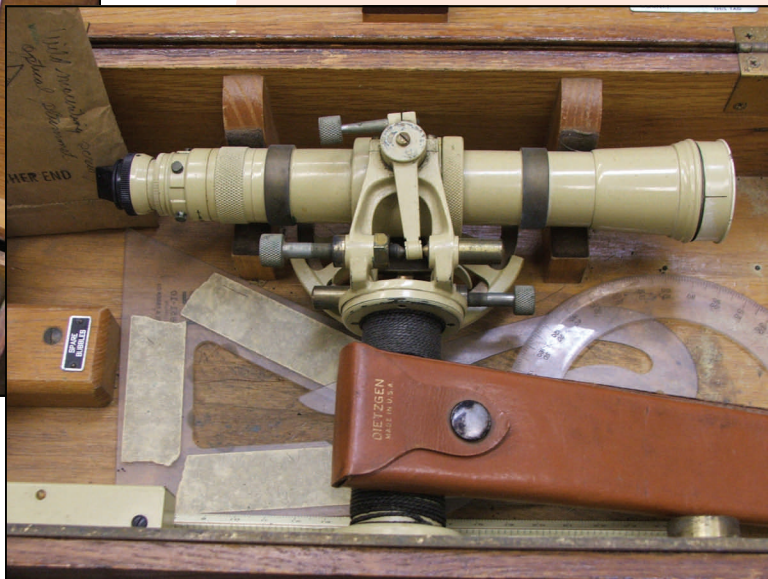
*(posted on Monster.com 8-14-2012)*

Have equipment to sell? Looking for a great deal? Check out the [CLSA Forums!](#)

### Picture of the Issue



K & E Geological Survey Alidade  
Model 5093A  
circa 1950's



Pictures courtesy of  
Stanislaus County Public Works

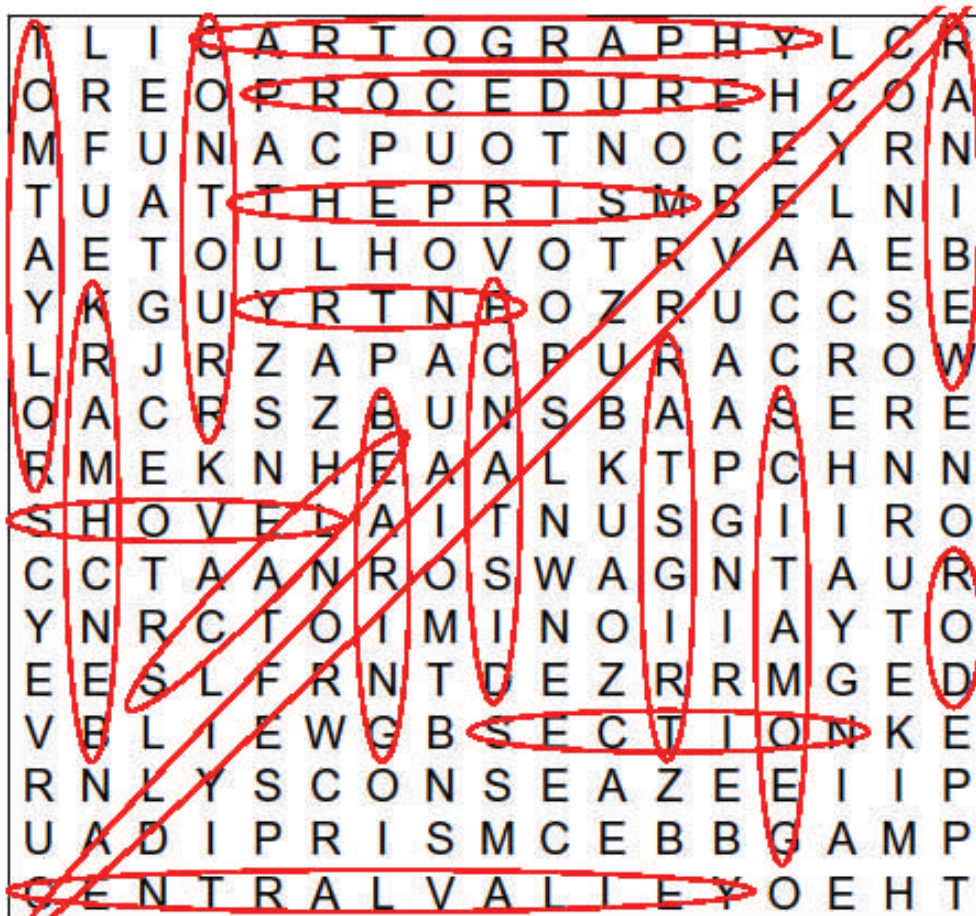
If you have a historic or interesting photo you would like to see in a future edition of The Prism, please submit to:  
[editor@californiacentralvalleysurveyors.org](mailto:editor@californiacentralvalleysurveyors.org)



# Puzzle Page

## Survey Firsts

1. Who was the first licensed Land Surveyor in the State of California?
2. What year was the first license issued for a Land Surveyor in the state of California?
3. Who was the first President of CLSA?
4. Who was the first County Surveyor of Stanislaus County?
5. Who was the first US Surveyor General?
6. What was the first college in the new world to issue Surveying Examinations?
7. Who was the first "Life Time Member" of the Central Valley Chapter of CLSA?
8. When was the first issue of The Prism released?
9. What two companies were the first to sponsor The Prism?
10. When was the first Subdivision Map Act released?



### Answers for September's puzzle

#### Terms of the Profession 2

1. ROD
2. DISTANCE
3. SHOVEL
4. CONTOUR
5. TOM TAYLOR
6. BEARING
7. PROCEDURE
8. SCALE
9. SECTION
10. CARTOGRAPHY
11. CENTRAL VALLEY
12. RENO
13. TRIGSTAR
14. BENCHMARK
15. WEBINAR
16. GEOMATICS
17. THE PRISM
18. ENTRY

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