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Alive!

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City and DWP Employees

PUBLIC WORKS

Survey Says!

Tony Pratt, Chief Surveyor, holds a GPS surveying unit in Potrero Canyon in Pacific Palisades. The Survey Division is helping build a new park here.

Tony Pratt, Chief Surveyor in Public Works/Engineering's Survey Division, keeps the City's boundaries clear and intact. It's one of the oldest functions of the City.

—SEE PAGE 6

Alive! photo by Tom Hawkins

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ALIVE! FEATURE

PUBLIC WORKS: ENGINEERING SURVEY DIVISION

Survey

Engineering's Survey Division, one of the oldest City departments, plays a critical role in determining where the City begins and ends, and helps keep construction projects exactly to their dimensions.

Information courtesy Public Works/Survey Division. Photos by Tom Hawkins, Club Photographer; John Burnes, Alive! *editor; Angel Gomez, Member Services Director; and courtesy the Survey Division.*

The Survey Division is the largest unit of over 20 groups operating within Public Works/ Engineering. The Survey Division operates under the direction of the Engineer of Surveys. For administration purposes, the Survey Division is one of the Staff Divisions headed by a Deputy City Engineer.

The Division has four district offices: Central (Piper Tech), the Valley (Van Nuys), Harbor (San Pedro) and West Los Angeles.

ABOVE RIGHT: Cast iron monument cover used to protect survey monuments set below the street. These are usually found at the center intersection of two streets.

Responsibilities

The Survey Division has four main responsibilities:

1. To provide the preliminary, topographic and planimetric data upon which the other divisions and districts base their designs for the maintenance, alteration and improvements of the City street, sewer and drainage facilities.
2. To protract the designer's lines and grades at full scale upon the surface of the earth to guide the builders in their construction of those facilities. In other words, the Surveyors take a project designer/architect's lines and superimpose them on the actual ground so the construction company can do exactly what the designer/architect has requested, and stay within the legal lines.
3. To establish and maintain the horizontal and vertical controls that assure that those facilities will fit together as one cohesive unit.

The Survey Division is also called upon to furnish analogous services for, among others, Airports, Rec and Parks and the City Attorney's Office. Through joint power agreements, the Survey Division conducts an occasional survey for an adjoining municipality or the for the County of Los Angeles.

4. All surveys require the same basic skills, but the number and kind of personnel, as well as the equipment required, vary according to the type of survey. The first step in acquiring survey data or services is to decide which general type of survey most nearly satisfies the needs of the job under consideration.

Types of Surveys

Principal survey categories are:

- **PRELIMINARY:** This includes all surveys that are primarily concerned with the physical aspects of the earth. Preliminary surveys usually include the location of all existing buildings and underground and overhead improvements at a site. When the City or a private contractor explores or decides to build a project,

Says!

AT LEFT: Acting Survey Supervisor Cesar Bregaudit is reviewing the construction plans with Survey Party Chief I Eric Ramos. The project will convert an alley west of Cosmo Street and south of Hollywood Boulevard into a pedestrian walkway.

ABOVE: The survey crew is using an optical level to verify plan elevations on the Cosmo alley project.

Central district survey crew at work on the First Street Bridge project.

the Survey Division begins a preliminary survey to set the parameters.

- **CONSTRUCTION:** The Survey Division sets the horizontal and vertical construction control for Public Works construction projects. Staking (placing of wooden stakes which are referenced by tall thin sticks at precise locations) includes street improvements, sewers, storm drains, bridges and City buildings. While construction is under way, surveys are taken constantly to make sure the project is being built according to legal land ownership, and also according to the exact dimensions of the architect's plans.

- **CONTROL:** Control Surveying provides reference points which are used to determine lines of land ownership, either public or private. Over the centuries, the City has placed markers called monuments, often made of brass, that mark reference points or lines of ownership. These permanent markers are called on again and again to keep the lines from shifting as the soil changes, or projects are built. The City's lines must be kept permanent and unchanging, and that task is left to the Survey Division. Keeping this under control includes both physical surveying and keeping clear records of the monuments for future reference. ■

Survey Field Offices

Public Works/Engineering's Survey Division operates out of five field offices: Central (Piper Tech), Downtown (Figueroa Plaza), West Los Angeles (Barrington), the Valley (Van Nuys) and the Harbor area (in the old San Pedro City Hall building).

San Fernando Valley (Van Nuys)

The Valley District Office is working on several current projects: The Sheldon Arleta Landfill (Cesar Chavez Recreation Complex) and the Van Owen Bridge Project, and the Aliso Canyon Park Development.

The Survey Valley Office staff (from left): Mark Chevalier, Survey Party Chief 1, 8 years of City service; Mark Kindig, Acting Survey Supervisor, 11 years of City service; Frank Garcia, Survey Party Chief 1, Club Member, 11 years of City service; and Rose Chin, Field Engineering Aide, 5 years of City service.

Front row, from left: Rose Chin, Field Engineering Aide; Oscar Penado, Survey Party Chief 1; and John Tosto, Land Surveying Assistant. Middle: Mike Van Egdom, Land Surveying Asst.; Frank Garcia, Survey Party Chief 1; and Mark Chevalier, Survey Party Chief 1. Top: Dave Tovmasyan, Land Surveying Assistant; Dan Zehfuss, Survey Party Chief 1; Gor Mkrtchyan, Survey Party Chief 1; Charlie Bustamante, Land Surveying Assistant; Justin Kent, Field Engineering Aide; and Chaz Lindley, Land Surveying Assistant. Not pictured: Victor Orshan, Survey Party Chief 1; Boris Soltanzadeh, Field Engineering Aide; Jeff Rada, Land Surveying Asst.; and Jaime Jimenez, Survey Party Chief 1.

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THE *ALIVE!* INTERVIEW

Surveyors, and Mt. Rushmore

Tony Pratt, Chief Surveyor for the City, talks about the function and importance of surveying.

***Alive!*: Thanks for giving us your time today, Tony. First, let's get your official title, please.**

TONY PRATT: Sure. My Civil Service title is Engineer of Surveys, although some of my predecessors and I prefer the term Chief Surveyor.

And how long have you been with the City?

TONY: For 29 years, all with the Bureau of Engineering, Survey Division.

Chief Surveyor Tony Pratt (right) shows Club CEO John Hawkins a survey field book from the 1800s.

How did you get into this profession? What made you want to do this for a living?

TONY: Like many, if not most surveyors, I sort of stumbled across the profession. I started working weekends for a private surveyor, went back to school and took surveying classes at Pasadena City College. Based on that experience and education, I was able to take the City exam and get a job at the entry-level position, Field Engineering Aide.

In a nutshell, what are your duties as the Chief Surveyor?

TONY: I direct the work of a relatively large Division of 74 (currently) land surveyors, who are engaged in all aspects of field and office land surveying activities.

An Ancient Science

Why is surveying important?

TONY: Wow, don't get me started, I'm biased!

It's a really old profession, right?

TONY: It is, very old. Surveying dates back to at least Babylonian times, and I think it can best be described as the art and science of measuring and mapping land. While the entire scope of the occupation is vast, it all eventually boils down to determining where land boundaries are located. Without this service, railroads and

— CONTINUED, PAGE 8

THE *ALIVE!* INTERVIEW — CONTINUED

Chief Surveyor and Club Member Tony Pratt.

streets could not be built in their right of way or skyscrapers on their proper parcel of land, and it would even be tough to keep your fence off of your neighbor's property.
We like to joke about Mount Rushmore, calling it three surveyors and some other guy!

Really? They were surveyors before they were presidents?
TONY: Yes. Theodore Roosevelt was the only president on that mountain who was not engaged as a surveyor at some point in his life.

Kinds of Land Surveying

So, there are three different kinds of land surveying here in the City, right? Pre-construction, construction and control.
TONY: To answer this question, I'll divide surveying into two broad categories: construction surveying, and boundary or property surveying.

Okay.
TONY: Construction surveying, for which a preliminary or design survey of the pre-construction site conditions is often required, involves the "laying out" of a wide variety of fixed works. Fixed works are things such as roads, buildings, pipelines, airport runways, dams, bridges, flood control channels, etc. All of these items and many others are established for both horizontal and vertical (elevation) location by surveyors.
Boundary surveying involves the creation or retracement of real property boundaries.

Boundary surveys determine where one person's land ends, and another's begins.
TONY: Right, or where one city ends and another begins. Real property or land must either be described by writings or mapped. It also must be locatable on the earth's surface. The describing or mapping and locating of property are the exclusive province of the surveyor. For all surveys, points of known location or control points are needed to place the new construction or property corners in the correct location.

And these points of known location can be the "monuments" that you showed us earlier – those brass disks embedded in the ground that mark a certain point that you've recorded.
TONY: That's right. That's one way of doing it.

How many monuments are there in the City?
TONY: There are approximately 96,000 street intersections where we have established center monuments. These monuments define the direction and limits of the public streets and in-turn location of all public and private parcels of land adjoining the streets. Each center monument also has "ties" or reference points that are set, usually in the curb, and can be used to reestablish a center monument should it be destroyed.
The information about each street intersection is drawn up in field books and is made available to all private and public surveyors. This is a process that has continued uninterrupted for more than 150 years. This continual perpetuation of the original monuments is a primary factor in the relative ease of establishing property boundaries in the City of Los Angeles. Because of the long history and pedigree of our monumentation, it is somewhat unusual in the City for litigation to be needed to settle a boundary dispute. We also maintain a vertical or elevation control network that consists of thousands of benchmarks from which public and private surveyors use to derive elevations and grades for construction projects. The benchmark network also allows for Los Angeles residents to pay the lowest possible rates for flood insurance administered by FEMA.

Surveying can be small or can cover the whole planet, right?
TONY: Yes. Control surveys can be small, local projects, or they can increase in scope to encompass cities, states, nations or even the entire globe. The satellites in the GPS constellation – in the earth's orbit -- are an example of known control points on a global scale. Our center intersection monuments provide local, block-by-block control, but they're also a part of a Citywide network that is the foundation for the GIS mapping products in wide use in the City.

You have books and maps pinpointing the locations of all the control points?
TONY: Right. Those are the field books. Going back 150 years.

ABOVE: Club CEO John Hawkins holds holds a monument stored in a Survey Division warehouse that's ready to be installed on a City street. The City has more than 96,000 monuments similar to this one installed in the City.

ABOVE: A Survey Division drill rig crew installs a monument into a City street.

The Instrument

That brings up another question, but we'll get to that in a minute. Let's talk about this – lots of people see surveyors in or near the street every day looking into the box on top of the tripod. Can you explain that a little bit?
TONY: Sure. Modern survey instruments electronically record the location of features on the earth's surface, which can be used to produce maps. The instrument can also lay out new construction features such as streets and buildings. Most surveying instruments are now used in conjunction with a data collector. The data collector is essentially a rugged field computer that communicates with the surveying instrument and is capable of receiving or providing information that the surveyor uses to complete his or her work.

How does one train to be a surveyor?
TONY: There are several two-year community college certificate programs and also four-year degree programs at a number of schools. Of primary importance is on-the-job training. The necessary field and office experience requirements to sit for the state licensing exam are extensive and take years to complete. I'm proud to say that we currently have 16 staff members who are licensed land surveyors by the Board of Registration for Professional Engineers and Land Surveyors.
In addition to the licensed surveyors on staff, I should also mention that the majority of the rest of the staff possesses Land Surveyor-in-Training (LSIT) certificates issued by the State of California and granted after passing a comprehensive exam. For a surveying organization, this indicates that we have a very knowledgeable workforce with expertise in many facets of surveying. The dedication of the staff is evidenced by the feedback I receive from the public and our other clients and the fact that the phone continues to ring with new and challenging requests for surveying services!

A Big Project

What are your biggest or most important projects?
TONY: One recently completed project that comes to mind is the Valley Boulevard Grade Separation. This was a multi-year endeavor that eliminated the need for cars to stop for trains as they traveled on the very busy Valley Boulevard. Long before the construction even started, we won a prestigious award for the right-of-way mapping, which depicts properties and rights that must be acquired prior to construction activities. During the construction phase, our surveyors were frequently praised for their problem-solving ability related to the many issues that inevitably come up on a large project such as this.

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The Basic S

Have you ever been driving down a street, and you see (usually) men peering deeply into an instrument on a tripod, staring at another (usually) man holding a small mirror on a pole? Or looking at some tall, thin sticks?

You're looking at surveyors at work.

Eugene Ching, Land Surveying Asst., 6 years of City service, carries the load on this surveying expedition.

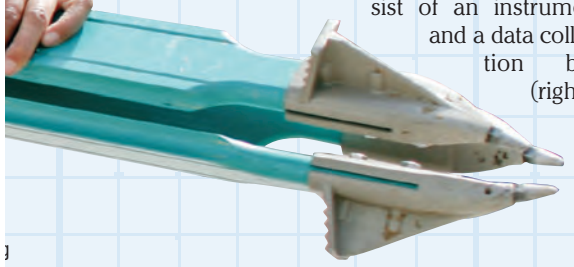
c Setup

Here's how surveying works, in its most basic form:

1. Surveying maps the surface of the earth. When you see a City surveying team, they are literally mapping the parts of the earth that are owned and/or within the City of Los Angeles.

2. The City has placed more than 96,000 "monuments," or markers, embedded throughout the City. These monuments demarcate the legal, property or other lines, with many exact locations or actual monuments dating back to the 1800s. These monuments are the key to most surveying expeditions.

3. A basic survey often starts with known monuments along the centerline of streets at an intersection. A surveyor sets up a surveying rig (as shown above). Modern rigs consist of an instrument and a data collection box (right).



ying

Survey crew at work collecting data that will be used for engineering the new Wilshire Bus Only Lane project.

4. A surveyor places the instrument over a known monument in the middle of the street, and the location (in longitude, latitude and elevation) is recorded.

5. The surveyor then manually points the instrument to another surveyor who's holding a small, round "retro" reflector (not shown), which is placed on top of a different monument with its coordinates previously surveyed and recorded. This reflector can be several feet or several hundred feet away from the main instrument.

6. The main instrument shoots a beam to the reflector and determines the second location (in longitude, latitude and elevation). If those second coordinates agree with reference coordinates recorded previously, then the coordinates are locked in as correct, and a baseline is established. You must have at least two known points to survey.

7. After this point, the surveyors can begin surveying for whatever new project they are working on. Are they mapping for a widening of the road? Then the main surveyor can turn the instrument in any direction (without moving the legs of the tripod) and set and record new monument points. The surveyor then can report those new points back to the project engineer to tell that engineer, for example, how much room he or she might have to widen the road.

Eugene Ching, Land Surveying Asst., holds an optical level, another piece of equipment used in surveying.

8. Any point along the surface can be mapped with traditional instruments as long as the points are within line of sight. Modern GPS equipment is opening up new surveying possibilities. In that case, the only line of sight necessary is to the sky.

9. This example is a very basic model. Surveys can, and usually do, get more complicated. But all surveys begin with those first two known points. The explorations can continue after that. ■

Survey Field Offices

West Los Angeles (Barrington Avenue)

The West L.A. District Office has several major projects, including the Potrero Canyon Slope Stabilization and Park Project, in which a major section of the Pacific Palisades bluff is being stabilized and turned into an extension of an existing City park.

FROM LEFT: Paul Morrison, Survey Party Chief 1, 16 years of City service; Damon Hill, Acting Survey Supervisor, 31 years; Hektor Dino, Field Engineering Aide, 3 years; and Gary Giesseman, Survey Party Chief II, 27 years.

LEFT: Mike Joyce, Survey Party Chief I, 25 years of City service, explains the slope that the City wants to create in the Potrero Canyon Project. He's in the on-site construction trailer.

ABOVE: Many hundreds of thousands of cubic yards of dirt will need to be moved on the Potrero Canyon Project.

ABOVE: Rick Allen, Field Engineering Aide, 25 years of City service, explains the surveying portion of the Potrero Canyon Slope Stabilization Project to *Alive!* editor John Burnes.

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THE *ALIVE!* INTERVIEW — CONTINUED

History of City Surveying

Let's talk about history. Does surveying in the City predate the City itself? Does it go back to the Spanish land grants?

TONY: The founding of the City is a very interesting story, which, as indicated on the City seal, occurred in 1781. The initial surveying and mapping of the City came later but still prior to statehood in 1850. A survey was needed to define lots prior to the City's first auction of lots in November 1849. The proceeds from the sale were needed to finance improvements to the new City, and to this day we are still involved in the sale of surplus City property. The City employed Army Lt. E.O.C. Ord for this first survey, and I suppose you could say that we have been following in his footsteps since then.

Chief Surveyor Tony Pratt (right) explains the research process to Club CEO John Hawkins.

Other Departments

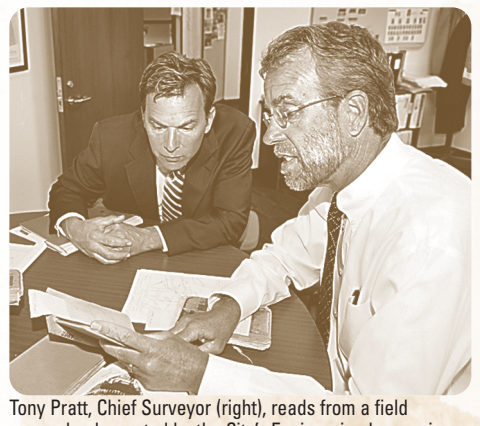
You do a lot of work on your own, but you also work at the request of the other City departments. What are those circumstances?

TONY: Over the years we have worked for other Departments for a variety of reasons. Taking the Dept. of Airports for example: Not long after I started at the City, we provided approximately 30 surveyors to the Dept. of Airports for the construction of new runways, parking structures and the second-level roadway [all at LAX]. More recently, we completed a GPS control survey at LAX, which will provide a reference basis for all of their future construction activities. We have done many surveys for the City Attorney relating both to civil and criminal matters. We just finished a survey for the LAPD inside the Biltmore Hotel and depicted the stairways and elevation differences between floors. I could go on and on, but I guess the bottom line is that we are the City's surveyors and, with the exception of the DWP, have worked for everyone. I should note that DWP does make daily use of our work product, which is the center intersection monuments and elevation benchmarks that we talked about before.

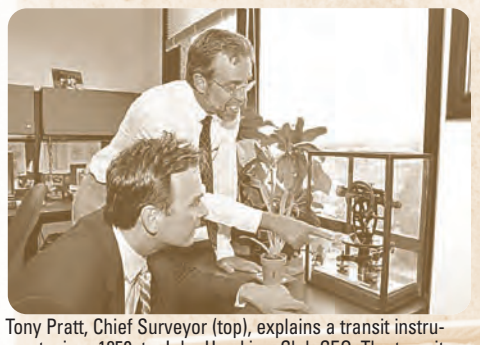
Right. Tony, thanks for your time today and over the last few days. It's been really interesting!

TONY: You're welcome. ■

Tony Pratt, Chief Surveyor (left), explains a dumpy level, circa early 1900s, to John Hawkins, Club CEO. The level was used by, and remains the property of, the City in its survey services.



Tony Pratt, Chief Surveyor (right), reads from a field survey book created by the City's Engineering bureau in the late 1800s.



Tony Pratt, Chief Surveyor (top), explains a transit instrument, circa 1850, to John Hawkins, Club CEO. The transit was used by, and remains the property of the City in its survey services.

The Survey Division files extend back into the past. Here, Mark Santistevan, Survey Party Chief II at the Harbor District Office, references a survey field book dating from 1911. He says he has used field books dating back to the 1890s.

City still

Survey Field Offices

Harbor (San Pedro)

The Harbor District Office, with three employees assigned to it, is responsible for all City projects south of Imperial Highway. A major current project is the Marshall Court Road Construction Project. Major recent projects include the Peck Park redevelopment project and the Terminal Island renovation.

From left: Art Cordero, Acting Survey Supervisor, Club Member, 25 years of City service; Mark Santistevan, Survey Party Chief II, 23 years; and Froilan Naro Jr., Survey Party Chief I, Club Member, 23 years.

Central (Piper Tech)

The Central District Office is the largest of the field offices and supports five survey crews. A current main project is the First Street Bridge Project, in which the City is widening the bridge over the L.A. River to accommodate the Gold Line transit line and additional lanes and walkways.

Cesar Bregaudit, Acting Survey Supervisor, with John Hawkins, Club CEO.

In the Central Warehouse, Don Ariza, Land Survey Asst., 21 years of City service (left), explains a monument (a brass marker) and its cast iron cover to John Hawkins, Club CEO.

Jeffrey Bruce, Land Surveying Assistant, 22 years, in front of a mobile office.

Nick Turner, Land Survey Asst., 5 years of City service.

From left: Eric Ramos, Survey Party Chief I, 6 years of City service, and Jeffrey Bruce, Land Surveying Assistant, 22 years.

Paul Blechert, Survey Party Chief I, 22 years of City service.

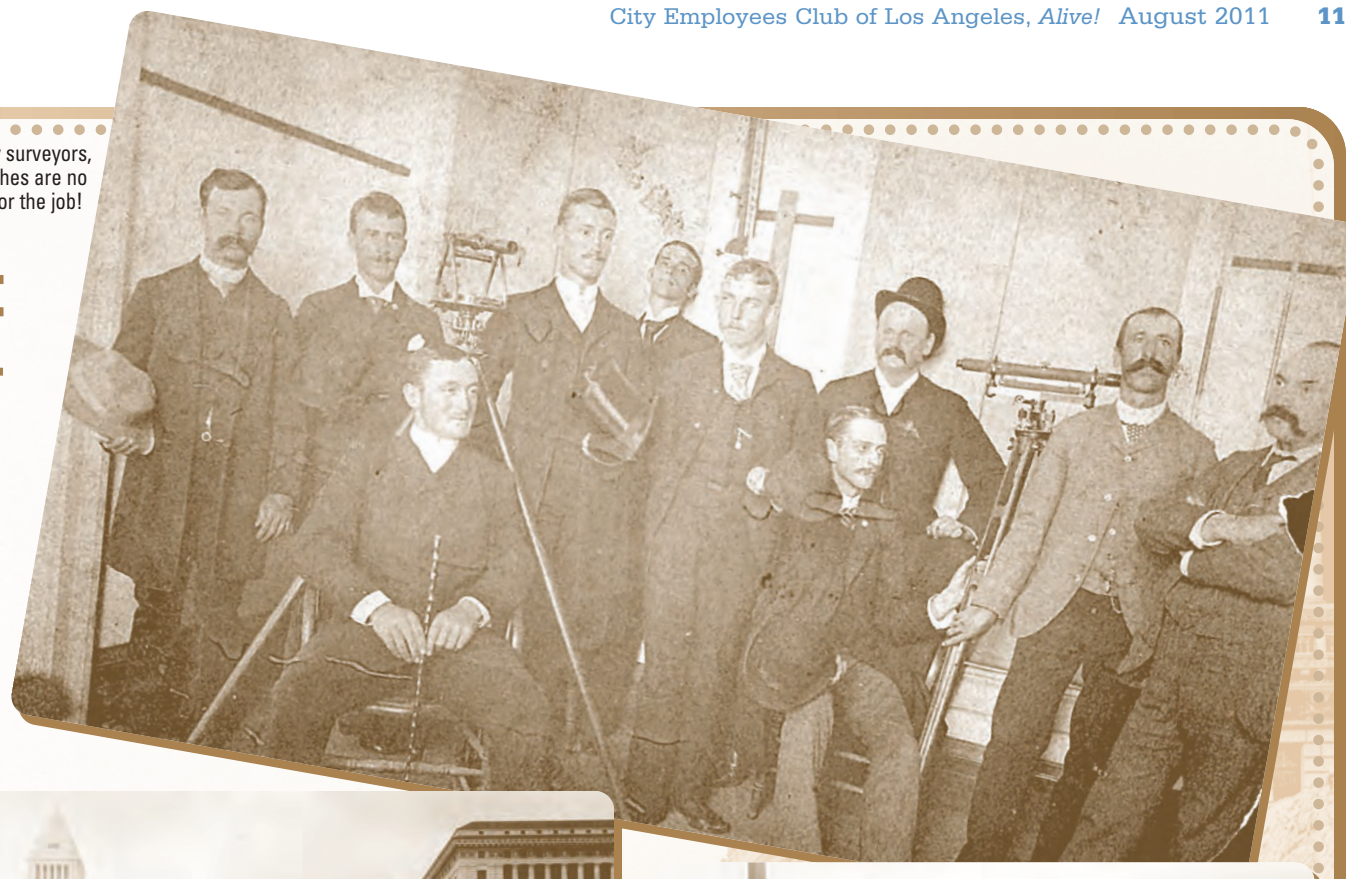
John Salistean, Field Engineer Aide, 2.5 years of City service.

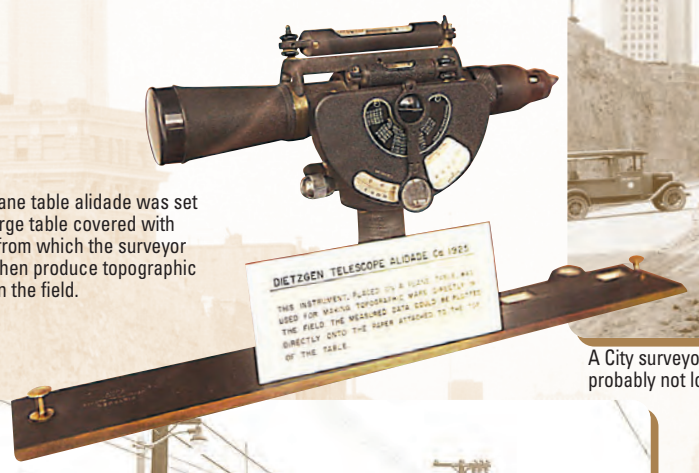
AT RIGHT: City surveyors, circa 1888. Moustaches are no longer a requirement for the job!

City Surveying: **A Brief History**

Surveying as a function of the City began when the City hired Army Lt. Edward Ord to make the first official map of Los Angeles.

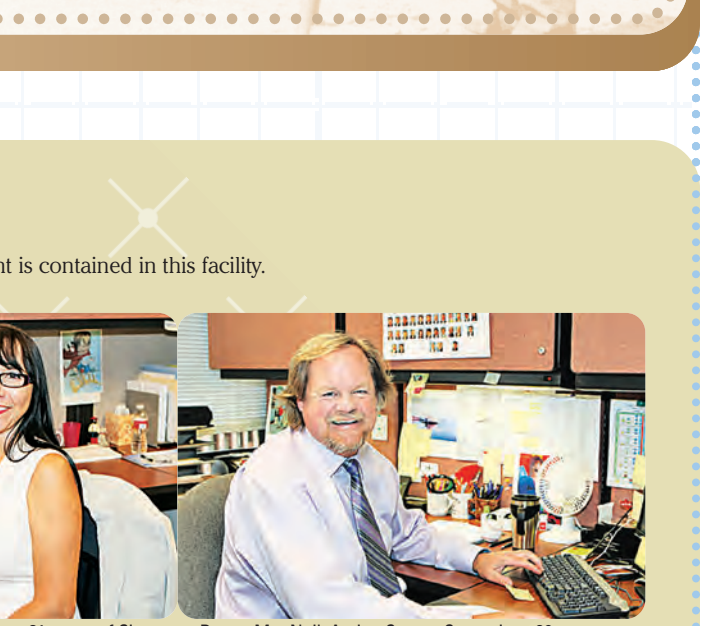
The first City Surveyor was George Hansen who was elected in 1855. Later City ordinances alternately created and abolished the City Surveyor and City Engineer positions with the final establishment of the City Engineer occurring in 1889. The year 1885 is considered the founding date of the Survey Division within the Bureau of Engineering. The Survey Division still uses field survey books drafted in the late 1800s. ■





This plane table alidade was set on a large table covered with paper from which the surveyor could then produce topographic maps in the field.

A City surveyor maps out Spring Street in the shadow of City Hall, probably not long after City Hall was built.



City survey crew providing staking for new curbs.

City survey crew establishing the center line intersection of the streets. A cast iron monument cap, still in use today, is seen at the left and is anchoring the "homemade" traffic safety flag.

City crews performing precise leveling operations circa 1930's.

Headquarters

The chief administrative offices are located at 201 N. Figueroa St. downtown in the Figueroa Plaza building. All executive management is contained in this facility.

Research Section: Vincent Shavers, Field Engineering Aide, 30 years. "Every project has to be researched," he says. "It's detective work."

Jim Lantry, Asst. Division Manager, Club Member, 23 years of City service.

Lupe Mendoza, Secretary, Club Member, 31 years of City service.

Danny MacNeil, Acting Survey Supervisor, 29 years of City service.

Subdivision Mapping Section, from left: Nick Turner, Land Surveying Asst., 5 years of City service; Chris Yip, Survey Party Chief II, Club Member, 21 years; and Magdi Soliman, Survey Party Chief I, Club Member, 12 years.

From left: Tawfik Shafik, Survey Party Chief I, Club Member, 20 years of City service; Art Cordero, Survey Supervisor, Club Member, 25 years; and Ken Ta, Land Surveying Asst.

Utility Section, from left: Brian Szramowski, Survey Party Chief I, 18 years of City service; and Robert Salerno, Field Engineering Aide, 11 years.

CAD Section (not pictured):
Edwin "Lewie" Miller, Survey Party Chief, and Shawn Stevens, Field Engineering Aide, were in training when *Alive!* visited. Catch up with you soon, guys!