

The California Surveyor

No. 93

The Voice of the Land Surveyors of California

Fall 1990





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The California Surveyor

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

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

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

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SUSTAINING MEMBERSHIP

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EDITORIAL MATERIAL

All articles, reports, letters, and contributions are accepted and will be considered for publication regardless of the author's affiliation with the California Land Surveyors Association, Inc. Contributions submitted on floppy diskette medium is encouraged. For compatibility, disks should be 5¼ inch, MSDOS (IBM compatible) format. We can accept ASCII text files or word processor files from the following programs: WordPerfect, Microsoft Word, Windows Write, Multimate, DCA (Displaywrite III and IV), Wordstar, Xerox Writer, and Xywrite.

EDITOR

Jeremy L. Evans, P.L.S.

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Opinions or assertions expressed in articles in this publication do not necessarily represent the official views of the Association.

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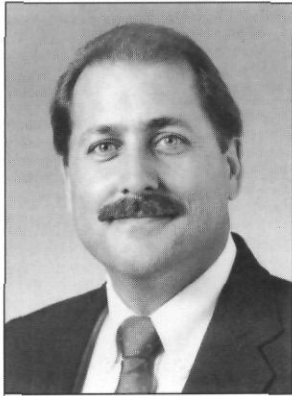
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President's Message

WE HAVE JUST passed the half-way point of my term and it seems that the time has flown by. In retrospect, I have observed that the first half of this year has been legislatively significant. It seems that everyone and their brother are in line to see how much of the land surveyor's practice they can take for themselves. Dorothy Calegari, CLSA's Executive Director, and I agree: We cannot recall a year with as much legislative activity directly affecting the land surveyor since 1979 (with SB 2).

Review the events of 1990: AB 4138, SB 2503, SB 2503 (Revised), and the Board of Registration's procedures and hearings regarding the Civil Engineers' special two-hour test plan, based on their blue ribbon committee (composed of Civil Engineers) task analysis, answered by pre- and post-1982 Civil Engineers. If this doesn't wake you up to the fact that our profession is in jeopardy, then you might as well stay asleep. If you are awake — and aware of these and other subtle, and not so subtle, events that are transpiring in the Civil Engineer expansion effort — then you must realize that the way to protect our practice, and add evolving technologies to our practice, is to be active in, and reactive to, current legislation.

We were fortunate this year to have defeated SB 2503, with the help of those who took the time to phone and write the legislature opposing this bill. This success was also due to the efforts by Board of Registration members Jim Dorsey, P.L.S., and Bill Mackey, acting on behalf of the Board of Registration's Land Surveying Special Committee. Without their help, we probably would not have killed this bill. In this instance, CLSA was on the side of the Board of Registration in opposing this legislation. We have not been so fortunate with AB 4138, but due to the above efforts, the committee that heard AB 4138 in

the legislature has amended the bill, requiring a utility company to have a person authorized to practice land surveying in their employ. *Although the bill would require that person to be in responsible charge, it is silent about the requirement of his or her signature and seal on legal descriptions.* AB 4138 has now passed the Senate floor and CLSA will continue to oppose this bill by taking actions such as, but not limited to, requesting that the Governor veto the bill.

SB 2503 (Revised) amends an existing law — Section 6755.1 of the Professional Engineers Act — which requires specific questions to be answered by an applicant to prove competency in the area of seismic and engineering surveying principles, prior to registration as a civil engineer. Under existing law, these questions are required to be a separate part of the Civil Engineer examination. Applicants must prove their competency by successful completion of this part of the examination with a passing score, which is set by the Board. The new bill would change the law by allowing this second part examination (wording changed to "examination" from "questions") to be scored with the second division examination; the aggregate passing score, established by the Board, would determine whether the applicant has proven competency in all areas tested, *instead of proving competency in the specific area of practice as required by existing law.* This means that if an applicant had a very low score in the special exam (seismic and engineering surveying principles), it could be added to a high score in the second division examination. Under the proposed amendment, an applicant in such a situation might pass an exam he or she would otherwise fail under the current law — this situation technically bypasses the special examination requirement.

To protect the public health, safety, and welfare, we must initiate legislation this year to require that the overlap areas of Civil Engineering and Land Surveying be equally tested, in

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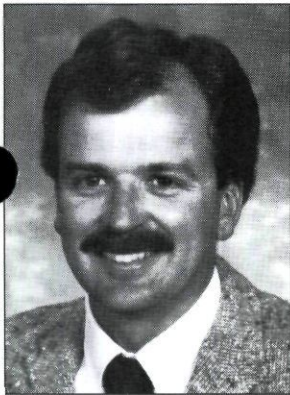
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From the Editor

MAKE ME THE SURVEYOR GENERAL AND I WOULD . . .

. . . . **Require the legislature** to rewrite the Subdivision Map Act. The organization of the S.M.A. is, at best, chaotic, and the yearly revisions will only continue to make things worse. I'd also like to see the S.M.A. simplified, but I'll settle for reorganization for now. I'm constantly asked about certain provisions within the S.M.A., and, while I can usually give an answer without looking at the S.M.A., trying to find the actual reference section can take a considerable amount of time.

. . . . **End the "war"** between civil engineers and land surveyors. Where I work, this conflict doesn't exist beyond a little good-natured harassment. However, I am constantly reminded by many surveyors that civils have no value to the land surveyor and should not be trusted or associated with in any way. I agree that there have been problems in the past between civils and surveyors, but, like it or not, civils cannot survive without surveyors and surveyors cannot survive without civils. It's time we become a team.

. . . . **Review the qualifying experience** for the land surveyor's exam. It seems to me that too much emphasis is placed on the qualifying experience and employment history, and too little emphasis is placed on the references filled out by four practicing surveyors who have knowledge of the applicant's abilities. These references are the most important part of the applicant's package and should be treated as such.

. . . . **End the constant discussion** you find in all survey publications regarding professionalism, and how to attain it, and begin actually acting as professionals. I have a real problem with calling ourselves professionals (the L.S. Act was amended several years ago to allow land surveyors to call themselves Professional Land Surveyors) when we probably haven't earned that title from our performances with the public. Until the time comes when we are hired by Joe Q. Public for our abilities and talent, and not for our low bid, we do not deserve to call ourselves professional.

. . . . **Applaud Caltrans' requirement** that all their party chiefs be licensed by 1994. All party chiefs are project managers while working on a job site. They supervise the people on their crews, deal with contractors and/or land owners, make daily decisions on how a task should be accomplished, and generally act as an extension of the office management in the field. Their conduct and performance can make or break a project. Recognizing the need to have professionals running a field crew is a giant step in the direction of gaining our standing as true professionals. ⊕

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Comity Licensure for Land Surveyors

By Gerald R. Hurlbert

**Program Manager
Board of Registration for Professional
Engineers and Land Surveyors**

THE CALIFORNIA State Board of Registration for Professional Engineers and Land Surveyors approved the following motion at its April 27, 1990 meeting:

Move that California's Board of Registration for Professional Engineers and Land Surveyors acknowledge that the NCEES examination for Land Surveyors is not comparable to the California state-specific Professional Land Surveyor Examination and that comity will be granted to applicants who, in addition to the existing requirements, shall also take and successfully pass the California state-specific 8-hour Professional Land Surveyor Examination. In order not to harm those who are already in due process and to give sufficient notice thereof, this change shall take effect on July 1, 1990.

In order for Land Surveyor licensees of your jurisdiction to be considered for licensure in California as a Professional Land Surveyor without passing the 8-hour Professional Land Surveyor Examination, their applications including fees and experience records must be submitted to the California Board by close of business June 30, 1990. It is not required that they submit all of their references by this deadline; however, they are expected to expedite submittal of those items.

Any Professional Land Surveyor comity application received after 5:00 AM, June 30, 1990, will require the applicant pass the 8-hour Professional Land Surveyor Examination. The final filing date for all applications for the 1991 examination is December 7, 1990. ⊕



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A Surveying Degree For A Professional Land Surveyor

By Michael R. McGee, P.L.S.

IN 1987, AFTER 16 years of private practice as a Licensed Land Surveyor, I made a decision to step out of the mainstream and pursue a formal education in surveying. It did not occur to me until sometime later that what I had taken for granted may be of interest to others — why I made the choice, how I got to this point, and how others might do the same.

I got into surveying like most surveyors — not by design, but rather by circumstances and fate.

As a kid, I enjoyed construction — that is to say, building dams across small creeks. When people asked me what I wanted to be when I grew up, I answered, "I want to be a dam engineer."

My first job out of high school was a rear chainman on a county survey crew. The job title was Engineering Aid, so I thought at the time I was on my way to becoming a "dam engineer." The first day on the job was cutting brush for a slope stake crew. All through the day, the party chief would perform mental aerobics in his head, rattling off numbers, and the rodman was constantly kicking out chunks of earth while searching for that "perfect" place that would make the party chief happy. Surveying seemed, to this kid, something like magic.

That night, I went straight to the library and checked out every book I could find on surveying — all two of them. That was the beginning of my surveying education.

Over the next several years, I read every book I could find, attended seminars and conferences, and joined ACSM and CLSA. I took the opportu-

nity to learn from every source available to me. The trouble was, and still is, the more I learned, the more I realized how much I did not know!

I started surveying with a 30" transit and a 300' tape. Today, we use GPS and EDM's that directly display x, y, and z coordinates. It used to be that the most sophisticated thing on a survey crew was the "ingenuity and expertise" of the party chief. Today, the equipment is so sophisticated that many of us have no idea how it actually functions, and

Knowledge gained gives you the ability to exclude from your thinking that which is not necessary, where ignorance renders you helpless to include that which may be essential.

almost anyone can be quickly trained to point and push buttons.

We used to communicate in English and analyze our numbers based on our gut feeling. Today, we communicate with computers in Basic and "C" language, and find ourselves overwhelmed with information calculated to sixteen places, "significant" or otherwise.

I sent my computer back to the factory for upgrades so many times, that the last time I didn't understand what came back. Advertisements in professional magazines were using buzz words and acronyms that everyone else seemed to understand but me. It was either that, or we were all

fooling each other. The need for an "educational" upgrade was becoming more and more apparent.

In 1985, Dr. Nader and Dr. Crossfield made a presentation at a CLSA Board of Directors meeting on the educational program at California State University of Fresno. The presentation was impressive, as were the Fresno graduates I had met along the way through CLSA. A seed was definitely planted; the idea of a Bachelor of Science Degree in Surveying began to emerge.

After 10 years of establishing a business in my community and finally figuring out how to make a profit while working less than 50 hours a week, I decided to give it all up. I'm sure some thought I was crazy. I thought it was a nice way to have an early midlife crisis.

However, this was very much a business decision. I fully expect to receive a substantial return on my investment. In fact, I have already seen a return in terms of professional contracts, profits, and personal satisfaction — all as a result of creating opportunities by choosing to continue my education.

The first semester was the hardest. Adopting to a regimented way of life, having deadlines dictated to you daily, sometimes having to bite your tongue, tolerating seemingly unnecessary subject material and conforming to a system that wasn't designed for the returning Licensed Land Surveyor. Not easy for a group such as ourselves who tend to be very individualistic.

The program is focused on the younger students just out of high school or with a few years at a junior college. Professors have a tendency to approach classes at a high school level of maturity, although there were a fair number of older students, and four licensed surveyors, in the program during the time of my attendance.

CONTINUED ON PAGE 8

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Surveying Degree . . .

CONTINUED FROM PAGE 7

A four-year Surveying Degree is not for everyone. It requires a philosophical as well as a professional commitment, and a lot of work. You will work harder in school than you ever will in the real world. You have to — it's an investment of time and resources. You must be committed to doing the very best you can, or you negate your whole purpose: to improve and advance your ability to be, or to become, a professional land surveyor.

Don't misunderstand me, obtaining and continuing one's education through local classes, seminars, professional organizations, and self-study is a valid choice. The best way to obtain one's education is an individual choice, so long as you continue to do so. Speaking for myself, choosing to attend CSU Fresno was a good one.

School will change the way you think. Least squares is a good example. I always thought that least squares was a very precise method for adjusting traverses. I did not understand it and thought it too complicated for the likes of me or my type of work. I know now that least squares is a general method for handling errors. When applied to the adjustment of field observations, it is much easier to use than the Compass Rule. It is better at detecting errors and statistically qualifies your measurements. There are many other examples. GIS, GPS, geodesy, and computers are no longer the mystery they used to be, and magazine advertisements don't seem nearly so intimidating these days.

When I entered Fresno, I had some very definite ideas on what surveying education should be about. Two years ago, I would have said the program was heavy in photogrammetry, light on boundary, and too concerned with subjects irrelevant to the real world. Now I know that overall boundary outweighs photogrammetry, but more important, the program's purpose is to educate the surveyor in a broad background, based more on science and theory rather than training. It is within this context that high standards are maintained for earning a comprehensive degree in surveying. After graduation, it is the students' responsibility to pursue training and specializations in boundary, photogrammetry, geodesy,

or whatever interests them. The degree gives them the "tools" to do so.

In May 1990, I had the honor of graduating with eighteen of my peers at CSUF — a small group that represents about half of the candidates for a Bachelor of Science Degree in Surveying Engineering in the United States in 1990. The engineering aspect of this degree means we have the same math and science background required for civil, mechanical, or electrical engineers. The surveying aspect means that we have stepped beyond engineering into a specialty where technology and the needs of society are accelerating our profession at an unprecedented pace into the 21st century.

I have no regrets, and feel the sacrifice has been well worth it.

The following suggestions may assist those who may be entertaining thoughts of pursuing a four-year degree in Surveying:

General Education: Complete as much general education as possible at local colleges, then concentrate on surveying classes after transfer.

Substitutions: Classes taken locally may often be substituted for required curriculum. Prepare a letter with transcripts detailing class content for faculty review.

Life Experience: Classes can be challenged for "Credit by Examination." For each class, a letter should be prepared detailing related experiences and workshops with copies of projects for submittal to the Survey Program Coordinator for review.

Be objective in relating your experiences or "your way," and be open to new ideas and approaches. After all, the reason you go to school is to learn from others; take what you get, and when you leave, put it together so it works for you. Last, and not least, be prepared to lower your standard of living.

Pursuing a lifelong education often begs the question "why do I need to know this?" The answer is this: Knowledge gained gives you the ability to exclude from your thinking that which is not necessary, where ignorance renders you helpless to include that which may be essential. In other words, "what you don't know can hurt you."

Michael R. McGee, a Past President of CLSA, is the owner of McGee Surveying in San Luis Obispo, California. ⊕



LETTERS TO THE EDITOR

Correction to Previous Letter

This letter is a follow-up regarding the article on "Tagging Untagged Monuments" in *The California Surveyor*, Summer 1990 issue.

There is a one-word typographical error in the article in the copy of our letter to Reid Penland which completely changes the meaning of the letter and leaves the reader with the opinion that the Board's 1974 position was 180 degrees from its actual position. In particular, the word "not" was added to the third paragraph of that letter.

The paragraph should read:

"As you suggested, the item was probably in a 1974 newsletter published by the Board and did reflect the Board's opinion at that time."

I understand that *The California Surveyor*, Fall 1990 issue is being compiled at this time and you will try to get this information in that issue.

Thank you for your help.

Sincerely,
Gerald R. Hurlbert
Program Manager
Board of Registration for Professional Engineers and Land Surveyors

Contribution Acknowledged

On behalf of the Cal Poly Kellogg Unit Foundation, Inc., and the students, faculty, and staff of Cal Poly Pomona, we are happy to receive your association's gift of \$2,500 to the Civil Engineering Department.

We appreciate your kind support of Cal Poly Pomona and your interest in higher education.

Sincerely,
Ronald R. Simons
Acting Associate Vice President for Development and Alumni Affairs,
California State Polytechnic University Pomona

Continuing Education Supported

This letter is a reply to the letter from Mr. Andy Johnston concerning compulsory continuing education. I am not one to preach on a soap box. However, as Chairman of the Education Committee and a strong believer in the need for compulsory continuing education, I feel I must reply.

Mr. Johnston is not the only surveyor in the State to express concern over this issue. Instead of responding directly to Mr. Johnston's letter, I am going to respond to the general complaints lodged against compulsory continuing education. These complaints generally fall into three categories. First, it is unprofessional and demeaning to require continuing education. Second, classes will be too expensive for those in remote areas or in

private practice, and will only benefit the people running the seminars. Third, continuing education will not resolve the major problems within the land surveying profession.

Professionalism is not gained by passing a test and receiving a Land Surveyor's License; this is when the drive to become a professional should start. I have read some excellent definitions of a "professional" presented by people who spend much time trying to come up with the absolute description. I would not attempt to present a definitive description of a "professional"; all I can do is say how I view my professional role. One aspect of that professional role is to stay current with the teachings and ideas of my profession. My own experience has taught me that there is a wide gap from what I would like and should do, to what I end up doing. Often, to do what should be done, I need some impetus, such as a deadline or requirement. Most surveyors live in a world that has many things competing for their time. It is often easier to put something off until tomorrow or next year, especially if it takes a full day or two of that precious time. Requiring education is no more demeaning than requiring the land surveyor to sign their name to their work; in both cases it is the impetus to do what is professionally right.

The professional status of Land Surveying is based on our mental and intellectual skills. These skills are not honed by the daily routine work

LETTERS CONTINUED ON PAGE 10

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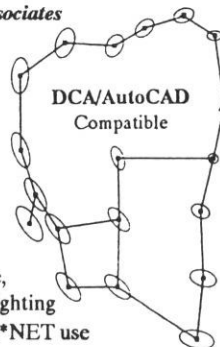
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Letters . . .

CONTINUED FROM PAGE 9

within the office. We must always be challenged to stay professional. Beyond being challenged, we must stay current. Land surveying is an evolving profession. It is not static, based on specific formulas, as many of the engineering professions are. The Acts that cover much of our work are modified annually. How we resolve boundaries is based primarily on case law that changes daily. The scope of our work is being dramatically changed. New technology is not changing how we do our work, it is changing the work we do.

Concerns have been brought up over the limited number of courses available. The reason there is not only a large variety is that these seminars must cover a wide spectrum, often to entice people from other professions. This is due to the low percentage of local licensed surveyors that attend any given seminar. Obviously, with compulsory continuing education, attendance would increase, thereby allowing for a

greater variety of seminars and classes. The State of Florida currently has compulsory continuing education; 69 classes are approved under required courses and 52 under elective courses. Some of these courses are correspondence courses, some are sponsored by universities and community colleges, some by state and national associations, and others by seminar companies such as P.O.B. I think anyone who puts on a successful seminar has as much right to make a fair profit as I do when I complete a survey. A larger demand for seminars should create higher quality seminars.

The cost of courses, and the time spent attending them, is minor, and should be considered our professional responsibility. If one looks at the proposed requirements that have been presented to the Board of Directors, the amount of time necessary to meet the education requirements work out to one hour per month. I personally do not see this as overburdening my responsibility to promote and maintain professionalism.

Many have commented on the idea

of voluntary continuing education. From my point of view, we have had voluntary continuing education for years. Adding meaningless unit values to classes and seminars will not get the majority of land surveyors to attend.

Continuing education may be achieved through many vehicles besides seminars and classrooms. Units can be acquired through membership and participation in professional associations. Some people see this as a means to fill the association coffers and promote cliques. I cannot believe that the people who share such a view have ever participated in associations. Some of the best knowledge I have gained has been through interaction at association meetings. The exchange of information and ideas between peers promotes a professional attitude within the land surveying community.

Education is only one aspect of a professional land surveyor. It is not a panacea for our profession, it does not solve all our woes. Unethical surveyors will still be unethical and incompetent surveyors will still get around the law. The Board of Registration

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will still have its problems with enforcement. Problems are solved one step at a time. This is a first step that must happen before further steps can be taken.

John Donne said "No man is an island." Yet, many surveyors like to think of themselves as "islands," not trusting other land surveyors or any kind of educators, wanting to be left alone to do "their" type of land surveying and not be bothered by pressures from the outside. Many surveyors are self-educated and feel that is the only way surveyors should be educated. Many believe in the theory of "on-the-job" training through the school of "Hard Knocks." There is nothing professional about using clients to learn from your mistakes. The pressures from the outside come not from professional associations, but from time and progress. The question is, do we, as a profession, want to put our head in a hole and wait until other professions cover the rest of us up, or do we want to determine and direct the course of our profession?

Yours truly,
Tom Mastin

LETTERS CONTINUED ON PAGE 31

President . . .

CONTINUED FROM PAGE 4

breadth and depth, to ensure that persons practicing in these areas are competent. This, and other legislative issues, both active and reactive, are facing our profession. It takes your participation and effort to protect our practice and keep it in stride with new technologies.

It is important for each member (and chapter) of CLSA to be legislatively aware and visible. Contact your legislators and voice your position on the issues facing us. It is too late to talk to your assemblyman or senator at the eleventh hour if he or she does not know who you are. Establish and maintain contact now, letting our legislators know about CLSA — who we are and what we do. Support our legislators, both through votes and monetarily, so they understand that we are interested in our State, in our profession, and in protecting the public interest.

To those who have written, phoned, and otherwise supported our efforts, I express my thanks on behalf of CLSA and the profession. To those who have not, I say: Wake up and smell the coffee before the house burns down around you. ⊕

"Professional" Land Surveyor Seal

IN RESPONSE TO INQUIRY to the Board of Registration regarding enforcing the requirements of Board Rule No. 411(b), the following response was received from Gerald R. Hurlbert, Program Manager, Board of Registration for Professional Engineer and Land Surveyors:

"Board Rule 411(b) (Section 411(b) of Title 16, Chapter 5 of the Administrative Code) states in part that the seal shall be of the design shown. The design depicted includes the words "Licensed Land Surveyor."

Section 8701 of the Professional Land Surveyor's Act states in part that: "whenever reference is made to a land surveyor by any statute, it shall be construed as referring to a professional land surveyor."

It is our opinion that the words "Professional Land Surveyor" may be substituted for the words "Licensed Land Surveyor" on the seal pursuant to the requirements of Section 8701." ⊕

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The Early Days of Electronic Surveys

Or . . . Goldurnya, This Hernia'll Learnya

By Andrew Gibson

[Editor's Note: A short history of EDM's from a slightly different perspective.]

I AM SECOND to none in my admiration for the great surveyors of the past — Major Rogers, the famous football player who originated the pass of that name; R. Plumb, who invented the device for ascertaining the vertical; Arpents de Neige, who gave us the snowshoe. Tortured in the summer by blackflies, in the winter by iceworms, they dragged their chains and links, their pits and mounds, to and fro across the Canadian wilderness, creating the survey fabric which today provides steady employment to tens of thousands of litigation lawyers — not to mention judges, surveyors, and manufacturers of tranquilizers.

What would they think if they came back today to see the survey tools available to us? Errors once made painstakingly by logarithms can now be made instantaneously. A single draftsman has now been replaced by a machine and two repairmen. Scrap metal can be unearthed far more quickly with an electronic finder. Our modern post office can often rush plans to the clients before the deal closes.

But it is with the distance measuring devices that there has been the greatest progress. With a ten-pound total station, a survey person can spray rays around a property, store megabytes of irrelevant data, and then speed back to the office, where the high priests will retrieve them and utter their incantations. In less time

than it took to decipher the Rosetta Stone, there may be a revelation. The awful power of this field tool can be appreciated when it is realized that all this can be done without using either hemisphere of the human brain.

Yet it would be a mistake to conclude that this perfection was attained quickly, without cost in human suffering. I must ask all of you to observe a moment's silence for those pioneer

*Errors once made
painstakingly
by logarithms
can now be made
instantaneously.*

heroes who, thirty years ago, staggered under the weight of the prototypes of today's featherweights. They deserve to join Rogers, Plumb, and deNeige on surveying's Honor Roll. Who are they? Modesty, my only vice, precludes any mention of one name; it will suffice to say that by their hernias, ye shall know them.

It would have been gratifying had the EDM been invented by some exhausted surveyor or technician who, looking wearily across a valley, thought of the line cutting needed, and decided to invent a Geodimeter. Alas, the honor goes to a Swedish physicist interested not in the distance from A to B, but in the speed of a light beam travelling between them. It was known to be, at some 300,000 km per second — quite brisk — but he wanted it exactly.

He developed an electronic shutter which could interrupt a beam millions of times a second. By using different

shutter speeds and matching the reflected light with a constant, the exact number of pulses and fractions thereof needed to cover the double distance could be calculated. Then, using the precise first order distance supplied by the surveyors, he now had the definitive speed he wanted. Somebody then realized that the device would work in reverse — the now known speed of light could be used to measure an unknown distance. The Model 1 Geodimeter, probably weighing several tons, was impractical; but AGA, an innovative Swedish firm with a lot of irons in the fire, developed Model 2, which weighed little more than a grand piano. But, with its great range and first order precision, it was soon in use by outfits with deep pockets and lots of employees, such as government mapping agencies. Model 3, while lighter, was still too cumbersome to be practical for private work, and the profession had to wait for Model 4, which appeared about 30 years ago, and was marketed by — are you ready for this? — the AGA Steel Radiator Company, in Ajax, Ontario.

The basic instrument was an 18" cube weighing perhaps 50 pounds; with it came a heavy transformer and a tangle of cables. These were in stout wooden boxes, one for each side of a pack horse, no doubt. Next came a truck battery, tripods, prisms, and, of course, a theodolite. In all, at least 200 pounds.

There were other problems beside the weight. The chief among them was that since it used visible light, it had to work almost entirely at night. Also, it would freeze up in cold weather, and, in damp conditions, was liable to go haywire. Sighting was very difficult. It frequently went out of adjustment and had to be laboriously centered. Finally, each measurement involved a

20-minute calculation using a series of dial readings.

The young AGA engineer who had been given the Geodimeter detail, but who was really a radiator man, was an adaptable salesman, and he made light of such difficulties. Especially the night work. "So little traffic!" he pointed out, "So peaceful!"

In fact, Geodimeter users became accustomed to exciting days — or rather nights. Perhaps, mistaken for cattle rustlers, they would be pursued by sheriffs, or, even worse, by homicidal ranchers. Perhaps they would be working along highways after the pubs closed. Perhaps their flashlights would give out on a dark night on a cliff face. Perhaps they would be paddling a canoe, loaded with all their precious equipment, through the blackness of an unfamiliar lake. Perhaps they would be doing a wintertime urban control survey using the jetstream tops of the highest buildings. Perhaps, a mile from the road, at 2:00 AM, the battery would give out, or the Kerr cell would have to be adjusted, or a cow would topple the reflector tripod on the other side of the valley, or the night dampness would raise Cain with the circuitry. And perhaps, in the depths of a Canadian winter, with the trees snapping all around, the operator's blood would congeal, his fingers become as spikes, his feet as bricks.

Since all this has undoubtedly reduced you to tears, I must comfort you by adding that there were compensations. The Model 4, in fact, worked properly most of the time, giving results as precise as do today's instruments. There was much satisfaction in being able to produce such unprecedented accuracy.

After some years of slaving in these electronic salt mines, users were saved from the spavins by the arrival of the Model 6 which, if cumbersome by today's standards, could do most of its work in the daytime. It weighed about 32 pounds, was self-contained and was carried in a light plastic pack which, however, had one serious defect. It was smooth and as slippery as a banana peel. I still break out in a cold sweat when I recall falling over backwards during a winter survey in the Rockies and plunging, arms and legs flailing helplessly, towards a precipice. Fortunately, before Model 6 and I sailed into the depths, we were stopped by a tree, since which time I

have had to use a larger hat size and am an inch shorter.

It was thought at the time that, except for the above tendency to turn into a bobsled, the Model 6 could hardly be improved upon. But then came lasers and infra reds; the weight, power consumption, and price went down; and the long calculations became direct readouts. Now we have one pound EDM's and 10 pound total stations featuring instant distance, angle and slope readouts, data storage, and such exotica as integrated COGO mathematical functions, resection and area computations, and 500-data-block modules.

"Where will it all end?" I thought when I saw an announcement in *Northpoint* for a seminar named "The Invasion of Total Stations," conducted, presumably, by R2D2. Will total stations be miniaturized to the size of chocolate bars? Will they be voice-activated, even talk back? ("Put a new battery in, dipstick!") Will they feature built-in plotters so that the plans can be handed to the client as soon as his credit card is entered into the attached money module (optional)?

And can the satellite or inertial systems be far behind? Will the party take off in its inertial helicopter, punch in coordinates, and relax while their iron bars hone in on the corners?

I don't know. But I plan to stick around to find out, so I have to stay healthy. Let's see — for breakfast, yogurt, wheat germ, 12-grain cereal, skim milk. For lunch, melba toast, watercress . . . Oh, the hell with it. Pass the cheesecake.

Andrew Gibson is an honorary member of ACSTTO, now living in retirement in Ganges, British Columbia. Reprinted from *The Ontario Land Surveyor*, Fall 1989. ☺



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Metes and Bounds Descriptions

A Red Flag Forewarning Possible Subdivision Map Act Violations

By Robert E. Merritt

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REAL PROPERTY lawyers often must determine whether parcels described by metes and bounds are valid parcels under the California Subdivision Map Act (Govt C §§66410 - 66499.37). The issue is significant because conveyance of a parcel created in violation of the Subdivision Map Act can lead to rescission of the transaction or a damage claim by an injured third party. Govt C §66499.32. Public agencies becoming aware of the violation may withhold permits or record a notice of violation. Govt C §66499.34. Not to be overlooked is the fact that violation of the Act is a criminal offense. Govt C §66499.31.

This article explores the approach taken by the Subdivision Map Act and case law in determining the circumstances under which metes and bounds parcels can be sold, leased, or financed. It also offers advice on the approaches attorneys can take when they encounter a metes and bounds parcel. Reference to metes and bounds parcels also includes land described by the federal rectangular system of surveys, records of survey, and old land division maps that lack any official status, *i.e.*, in essence, any description other than reference to a filed subdivision map. All statutory references in the article are to the Government Code, unless otherwise noted.

Historical Perspective

It has been said that much of California's history from about 1850 to 1880 is reflected in her land policy. Pitt, *California Controversies* p 86 (1968). The Treaty of Guadalupe Hidalgo, signed in 1848, ceded California to the United States and stipu-

lated that property rights of Mexicans would be "inviolably respected." Treaty part VIII. (Contrary to popular belief, the treaty did not actually recognize the validity of Hispanic land grants.) Following California's admission as a state in 1850, more than 12 million acres, comprising the great rancheros and pueblo lands, were claimed under Spanish and Mexican land grants. Staniford, *The Pattern of California History* pp 180 - 181 (1975). These claims were adjudicated in lengthy and bitterly fought litigation.

Land in the public domain (roughly 71 million acres) represented the largest block of land in California. Although available to settlers in 160-

When faced with having to determine whether a metes and bounds parcel complies with the Subdivision Map Act, the attorney should inform the client of the possibility that the parcel is illegal

acre parcels under the federal Homestead Act of 1862, much of this land ended up in the hands of speculators and large landowners, who often acquired titles by forging deeds, bribing public officials, and taking advantage of various loopholes in the law. Also, considerable acreage in the public domain consisted of deserts, grazing land, forest, and watershed. As such, it was not easily settled. Other large tracts of land (over 11 million acres) were granted to the railroads under the

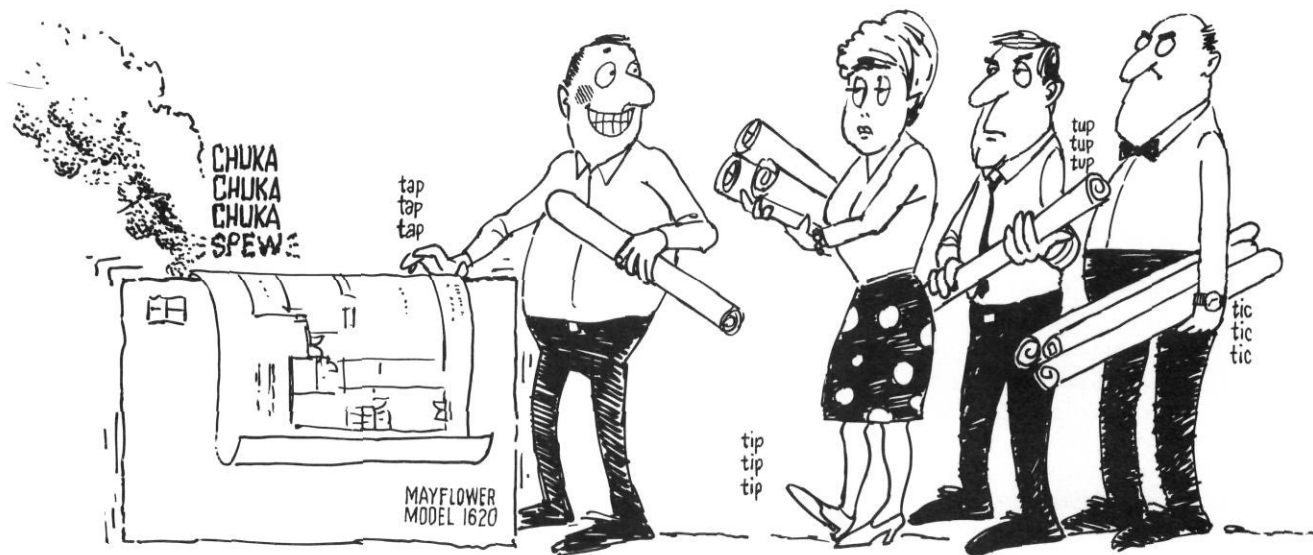
federal Pacific Railroad Act of 1862 to promote construction of a transcontinental railroad. As one historian has noted, California's experience after two decades produced a distinct but complex land pattern. A few men came to control a large portion of California lands. In 1870, there were 22 owners of 70,000 acres or more apiece who together occupied as much land as 23,000 owners with 500 acres or less. Staniford, *The Pattern of California History* p 183.

From this pinnacle of land consolidation, the process began to reverse, and, over the years, these early landholdings have become increasingly fractured. The footprints of these fractures can be found as assessor's parcels on county assessors' maps. In many cases, the resulting parcels are not adequate in terms of access, area, design, or improvements to be developed. On the other hand, fairness requires some concern be shown for the reasonable expectation of landowners and their successors who acquired parcels from these divisions. Thus, there are significant public policy questions involved in determining which parcels resulting from these divisions should be recognized as valid under the Subdivision Map Act.

The Legislative Approach

The main purposes of the Subdivision Map Act today are (1) to encourage orderly community development by providing for the "regulation and control of the design and improvement of subdivisions" (§66411; *Pratt vs. Adams* (1964) 229 CA2d 602, 606, 40 CR 505, 508), and (2) to ensure that subdivision design and improvement are consistent with applicable local standards for development type and density, public health, and environment, and adopted specific and general plans (§66474(a) - (g)). However, the Act has not always had these

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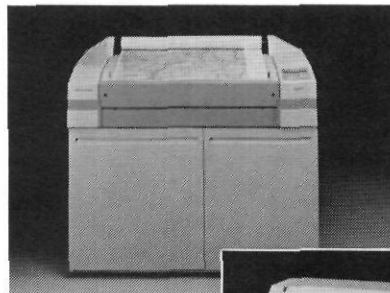
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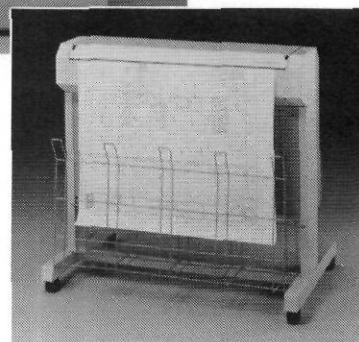
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Red Flag . . .

CONTINUED FROM PAGE 14

concerns as its foremost goal. Initially, the legislature simply provided for "[a]n Act requiring the recording of maps of cities, towns, additions to cities or towns, or subdivisions of lands into small lots or tracts for the purposes of sale." Stats 1893, ch. 80. It was not until 1937 that the Act actually took on its present form. In that year the Act received its present title, prohibited the sale of subdivided land without prior governmental approval, and authorized local governments to regulate "design and improvement" of subdivided property. Stats 1937, ch 670. See also California Subdivision Map Act Practice §1.2 (Cal CEB 1987).

Over the years, the legislature has attempted to define criteria by which a metes and bounds parcel will be regarded as "legal" — meaning that it can be sold, leased, or financed without a map being required. The approach taken in the Subdivision Map Act is to assess the legality of a parcel based on the circumstances surrounding its creation. This is logical when the standard furthers the purposes of the Act. Unfortunately, the language of the Act intended to deal with these issues is vague and has led to considerable confusion. The legislative approach to metes and bounds parcels is found in three sections of the Act, discussed below.

Government Code §66499.30(d)

This provision has been part of the Subdivision Map Act since 1943 (it was formerly Bus & P C §11538). Subsections (a) – (c) of §66499.30 prohibit any person from selling, leasing, or financing parcels for which a map is required before an appropriate subdivision map has been filed. Subsection (d) creates an exemption from those provisions. For convenience, it will be referred to in this article as the "prior-compliance exemption." The exemption applies to:

[A]ny parcel or parcels of a subdivision offered for sale or lease, contracted for sale or lease, or sold or leased in compliance with or exempt from any law (including a local ordinance), regulating the design and improvement of subdivisions in effect at the time the subdivision was established.

It would appear that the reference to "any law" has two implications

with respect to the Subdivision Map Act: First, while the reference obviously includes earlier versions of the Act, other laws may suffice as long as their effect was to regulate design and improvement. An example would be a zoning ordinance which required lots created by a subdivision to meet certain standards. Second, some early versions of the Act will not qualify because they were concerned mainly with the recording of maps, not design and improvement.

*For the lawyer,
parcels described by
metes and bounds and
similar references
should be a red flag,
warning of a possible
violation of the Act.*

According to the California Attorney General, California's early versions of the Act involved little more than requiring that an accurate map be filed. It was not until 1929 that "actual regulation" began, with the prohibition against conveying parcels not approved by local agencies coming in 1937. 64 Cal Ops Atty Gen 549, 551 (1981). In any case, it would seem the burden is on the landowner in a particular case to establish that the law under which the subdivision was created meets the test of the prior-compliance exemption.

Also, there is a question as to the meaning of "design" and "improvement." The meaning of these terms under the Subdivision Map Act was first stated in 1937 (Stats 1937, ch 670) and has been changed significantly to expand their scope over the years. Today they are found in §§66418 and 66419. In determining the applicability of the prior-compliance exemption, would a court apply these definitions, and at what point in time? There are no cases under the prior-compliance exemption which help answer this question, but, in the author's opinion, design and improvement should not be applied as strictly defined. Rather, the law in question should be measured by whether there was some local agency

control over the way in which the subdivision was configured, and the adequacy of improvements to accommodate the development which might be generated by the subdivision. This approach does not require a constant reevaluation of parcels from time to time based on the changing meaning of these terms.

One weakness of the prior-compliance exemption is that it makes no reference to financing. This omission is no doubt an oversight which occurred in 1974 when financing was added to §66499.30(a) as part of the recodification of the Subdivision Map Act into the Government Code. See Stats 1974, ch 1536. Even this change was late in coming since financing was added to the definition of subdivision in 1965. See Stats 1965, ch 1180, §7.

The simplicity of the approach taken by the prior-compliance exemption has appeal. It validates parcels only when they have been created consistent with the purposes of the Subdivision Map Act, and, without more, seems adequate to address the problem. It is ironic that in later years the legislature felt compelled to adopt a more complicated approach (§66451.10), when a workable solution was only a few pages away.

Government Code §66451.10

This section grew out of the great merger controversy that arose from *Hill vs. City of Manhattan Beach* (1971) 6 C3d, 98 CR 785. In *Hill*, the supreme court held that two lots, created by an unregulated lot split, merged into one parcel when the zoning was changed so that the two lots could no longer qualify under minimum square footage building requirements. Following *Hill*, the California Attorney General attempted in several opinions to clarify the circumstances under which lots merge. See 56 Ops Cal Atty Gen 509 (1973) and 59 Ops Cal Atty Gen 239 (1976). Finally, in 1976, the legislature enacted the first merger provisions of the Subdivision Map Act, which provide standards under which substandard lots will merge.

In the course of providing for merger of legal lots, the legislature felt compelled to address the question of when a parcel will be considered valid under the Subdivision Map Act. The result was §66451.10(a) (formerly §66424.2), which states as follows:

CONTINUED ON PAGE 18

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CONTINUED FROM PAGE 16

Notwithstanding Section 66424 [which defines "subdivision"], except as is otherwise provided for in this article, two or more contiguous parcels or units of land which have been created under the provisions of this division, or any prior law regulating the division of land, or a local ordinance enacted pursuant thereto, or which were not subject to those provisions at the time of their creation, shall not be deemed merged by virtue of the fact that the contiguous parcels or units are held by the same owner, and no further proceeding under the provisions of this division or a local ordinance enacted pursuant thereto shall be required for the purpose of sale, lease, or financing of the contiguous parcels or units, or any of them. [Emphasis added.]

Several things are noteworthy about this section, which will be referred to as the "nonmerger exemption." First, the legislature overrode the effect of §66424, which defines "subdivision" for purposes of the Subdivision Map Act, and triggers the mapping requirement under §66426. The definition of subdivision includes any division by a subdivider of contiguously owned land for the purpose of sale, lease, or financing, *even if the land consists of parcels shown on a recorded subdivision map*. It is the prior-compliance exemption which then exempts the division of legally created parcels from further requirements under the Act. Although the reference in the nonmerger exemption to §66424 does not seem necessary because the prior-compliance exemption would have protected these parcels from further mapping requirements, the inclusion of this language reveals a legislative intention that parcels meeting the test of §66451.10 were not subject to further mapping requirements.

The nonmerger exemption only comes into play when two or more parcels are under common ownership. When there is an isolated metes and bounds parcel, the presumptions under §66412.6 (discussed below) may apply to protect the owner from a violation of the Subdivision Map

Act, or the prior-compliance exemption may be available.

The main difficulty with the nonmerger exemption is the phrase, "not subject to." Does it mean that the parcels are valid if no law governed their creation? Or does it mean that, to be valid, the parcels must have been expressly exempt from laws regulating the division of land? For example, the version of the Subdivision Map Act in effect in 1929 excepted from its regulations maps prepared under local subdivision regulations which divided land of four acres or less surrounded on three or more sides by dedicated streets. Any person claiming to hold the subdivided land under the exception could bring a special proceeding in superior court to confirm its applicability. Stats 1929, ch 837, §1. Given public policy concerns in this area, common sense tells us that the latter interpretation, requiring an express exemption, is correct. The entire regulatory scheme of the Act would be frustrated if all unregulated land divisions from the time California became a state in 1850 (or before) were viewed as creating legal parcels. It would afford recognition to thousands of parcels which lack any means of access or provision for improvements needed for development. Also such an interpretation would be inconsistent with the prior-compliance exemption, discussed above.

Likewise, the courts have concluded that legal parcels do not result from the mere absence of regulation. In *John Taft Corp. vs. Advisory Agency* (1984) 161 CA3d 749, 207 CR 840, reported at 8 CEB RPLR 43 (Mar. 1985), the court was asked to determine the validity of three federally surveyed parcels that had been patented as a group to James A. Gibson, Jr., in 1895 under the Homestead Act. In 1980, John Taft, successor in interest to these parcels, conveyed two of them to separate individuals without complying with the Subdivision Map Act. The county responded by filing a notice of intention to record a notice of violation under §66499.36. The trial court, relying on the former version of the nonmerger exemption and on the prior-compliance exemption, found that the surveyed lots were separate and distinct parcels because at the time the patent was issued, the conveyance was not subject to any California laws regulating the division of land.

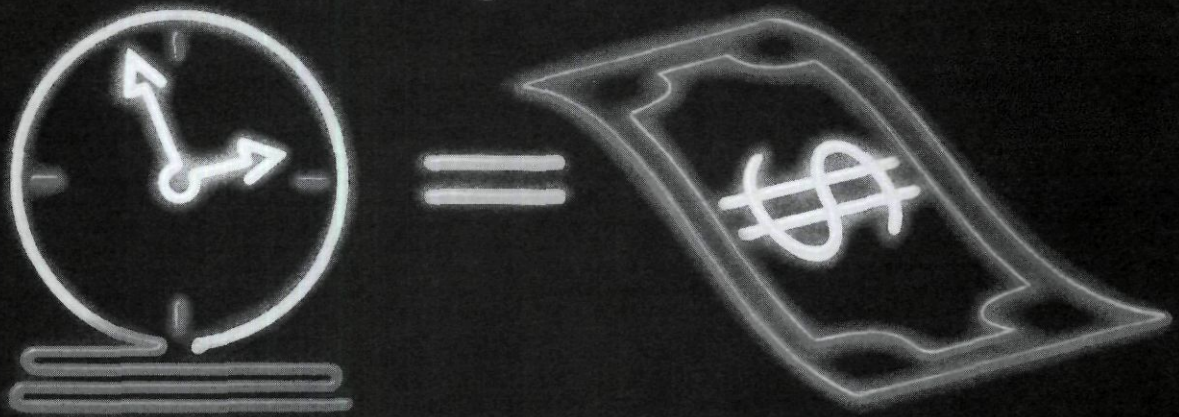
The court of appeal reversed. It found that the purpose of the federal survey laws, under which the parcels were created, is to facilitate the conveyance of public land to one or more owners by establishing the geographic location of the land on a descriptive map. The purpose of the Subdivision Map Act is distinctly different, *i.e.*, to implement high standards for orderly community development and to bring under its umbrellas as many transfers or conveyances of land as possible in order to facilitate local regulation of the design and improvement of subdivisions. Accordingly, a subdivision created under the federal survey laws is not exempt from Subdivision Map Act regulation under the nonmerger exemption.

Taft not only rejects the idea that unregulated divisions create valid parcels, it also emphasizes the fact that regulated divisions will create valid parcels only if the regulation furthers the purposes of the Subdivision Map Act and not some unrelated purpose. As with the prior-compliance exemption, this emphasis on the purposes of the Act raises questions about whether compliance with early versions of the Act, which did not focus on design and improvement, would create valid parcels.

The theory underlying *Taft* was recently reaffirmed in *Hays vs. Vanek* (1989) 217 CA3d 271, 264 CR 652, reported at 13 CEB RPLR 49 (Feb. 1990). Vanek owned 630 lots covering 40 acres known as the Shady Brook Subdivision. The lots were shown on an "arbitrary office map" recorded in 1926. At issue was whether the lots could be sold without compliance with the requirements of the current Subdivision Map Act. In holding that the lots were not legal parcels, the court took note of the 1907 Subdivision Map Act in effect in 1926 and determined that the arbitrary office map omitted material information required of a valid subdivision map in 1926. Vanek had also contended that the parcel was valid under a "grandfather clause" which appeared in the 1929 version of the Act. That clause exempted subdivisions which had been staked out and in which sales or contracts of sale had been made. The court found that argument untenable (217 CA3d at 289, 264 CR at 662):

CONTINUED ON PAGE 20

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The clear purpose of the so-called "grandfather" clause is to protect developers who have detrimentally relied on an earlier state of the law. That purpose is hardly served by allowing later purchasers of property which has never been sold in subdivided form to take advantage of an exemption. In such cases, the later purchaser placed no reliance on the prior state of the law. On the other hand, the salutary purposes served by the Subdivision Map Act would be frustrated if a simple staking out and selling of a handful of parcels in the late 1920's could exempt all land in the subdivision 60 years and several owners later from any subdivision regulatory requirements. In simple terms, the purpose of the statutory exemption does not support a conclusion that it runs with the land.

Government Code §66412.6

This section establishes two conclusive presumptions (collectively, "the

presumptions") that certain parcels were "lawfully created." It is divided into two subsections. Subsection (a) establishes the presumption for parcels that were created before March 4, 1972, if they complied with any local subdivision ordinance or there was no local ordinance in effect regulating the division of four or fewer parcels. Subsection (b) ignores the original status of the parcel at its creation (as long as it was created before March 4, 1972) and establishes the presumption for parcels acquired by any subsequent good-faith purchaser for value. Although the parcel is conclusively presumed to have been lawfully created if the good-faith purchaser test is met, the owner must obtain a certificate of compliance or conditional certificate of compliance before developing the parcel.

The March 4, 1972, date is significant because it was the effective date of the McCarthy Act amendments to the Subdivision Map Act (Stats 1971, ch 1446). These amendments are largely responsible for changing the character of the Act, making it a major land-use statute. Among other things, the amendments required a parcel map for divisions of four or fewer parcels. Before this change, the re-

quirement of a parcel map for these divisions was left to the dictates of individual cities and counties. Thus, if the city or county did not have a local subdivision ordinance regulating divisions of four or fewer parcels, those divisions went unregulated.

The purpose behind the presumptions is to protect owners who acquire parcels created before the Subdivision Map Act regulated divisions of four or fewer parcels (*i.e.*, March 1972). The protection is required because the Act creates remedies of rescission and damages in favor of those who acquire property that has been divided, "or which has resulted from a division" in violation of the Act. Govt C §66499.32. It enables the owners of parcels to conduct a minimum of research into the parcel's history to see if the presumption is applicable, and, if it is, be assured that in conveying the parcel they will not become liable.

The statute is unclear whether the "subsequent purchaser" provision in §66412.6(b) is satisfied if one purchaser in the chain of title satisfies the test of acquiring the parcel for valuable consideration without actual or constructive knowledge of a violation, even though the current owner may know of the violation. Given the purpose of the presumptions, it would seem that the owner should qualify as an innocent purchaser to take advantage of the presumption. In any case, the significance of this question is blunted by the requirement that the owner obtain a certificate of compliance or a conditional certificate of compliance before development of the parcel.

The certificate of compliance requirement under subparagraph (b) provides a way to establish of record the existence of facts giving rise to the presumption. It also allows the local agency, through issuance of a conditional certificate of compliance, to impose conditions that would have been required at the time the owner acquired title to the parcel (assuming, of course, that the parcel was not legally created). The fulfillment of these conditions can be postponed until development is to occur. Govt C §66499.35. The Subdivision Map Act indicates, but does not expressly state, that parcels subject to a conditional certificate of compliance can be legally conveyed. (See the reference to a

CONTINUED ON PAGE 22

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The 3DF system is ideal for many "pointing" applications. In aerial photogrammetry, where aircraft heading, attitude and GPS data are required, the Ashtech 3DF removes the need for INS.

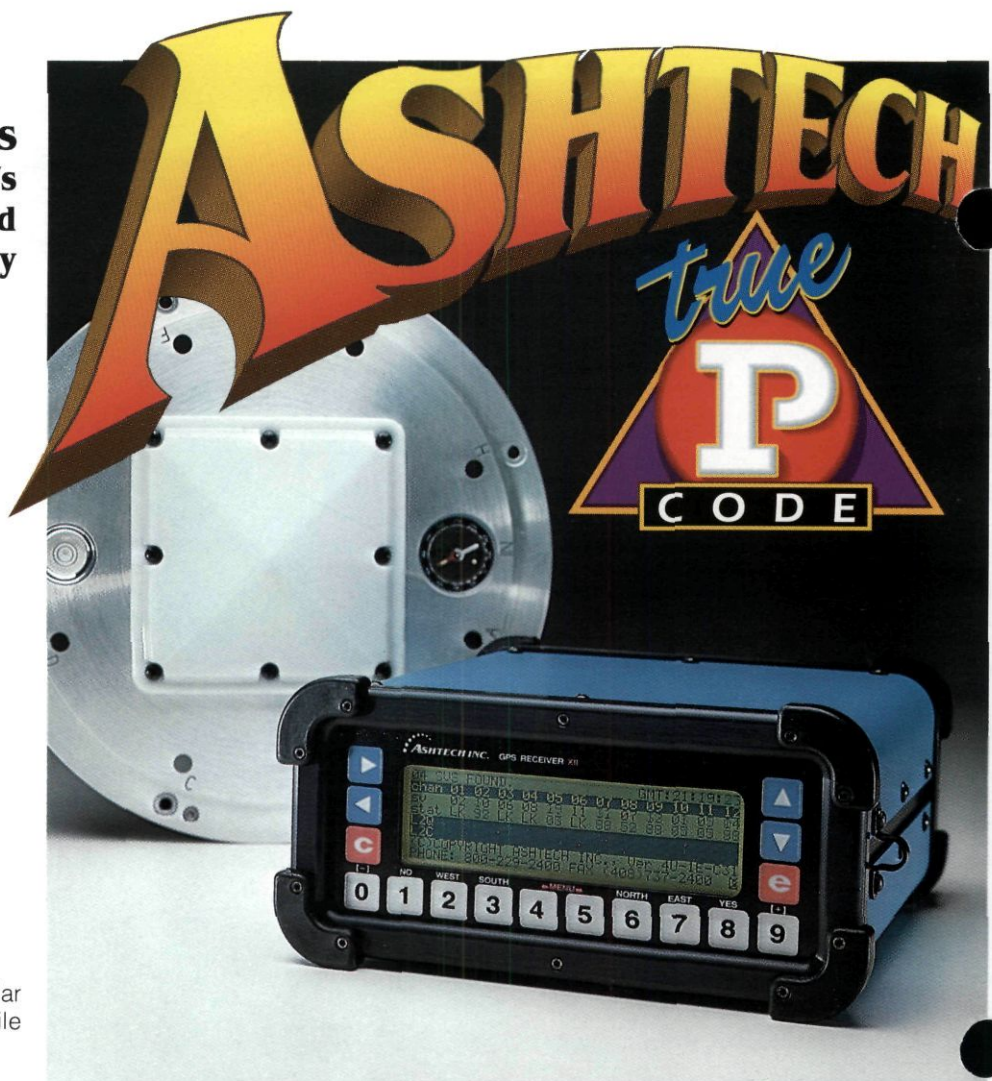
The Ashtech 3DF is not affected by magnetic fields or Schuller effects; it operates anywhere in the world, including the polar regions, with an accuracy of about 1 milliradian (3.5 arc-seconds).



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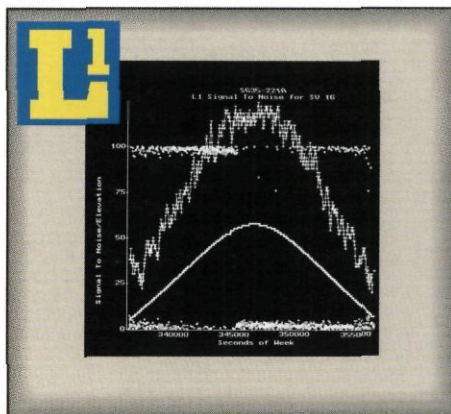
Ashtech continues to add modular performance options to all versatile Ashtech XII GPS receivers:

New Enhanced Dual-Frequency

Enhanced module extends 12 channel L2 tracking below 10° elevation in all dual-frequency receivers delivered after 1 Aug. 1990. It is available as an upgrade option for earlier receivers.

"True" P-Code Tracking Correlation

Factory option offers the complete processing gain, full carrier-phase wavelength and jamming immunity performance of "true" P-Code tracking. This module will be available in the 4th Quarter 1990 to fit all existing dual-frequency Ashtech XII receivers.



GPS TRACKING SIGNALS

GPS receivers must generate matched codes in order to track the satellites. The L1 frequency includes both C/A and P-Code components while L2 includes only P-Code information.

Single-frequency GPS receivers track L1 signals via C/A codes; dual-frequency receivers require more sophistication in order to track the complex P-Code. Dual-frequency measurements permit removal of ionospheric refraction errors.

"TRUE" P-CODE TRACKING

Ashtech's P-Code module offers 12 independent "true P-Code" channels engineered to fully utilize the advantages of the P-Code component: complete processing gain, full-length (25cm) L2 carrier phase and inherent immunity from jamming.

Ashtech's P-Code tracking is based on correlating satellite information with a receiver-generated P-Code instead of a "pseudo-correlation" approach.

During those rare occasions when P-Codes may be scrambled (Anti-Spoof or Y-Code) by the GPS Control Segment, Ashtech XII receivers automatically switch to "codeless" L2 tracking.

The 12-channel P-Code module added to the enhanced Ashtech codeless L2 option provides the ultimate in GPS survey performance.

The Ashtech "true P-Code" tracking module will be available during 4th Quarter 1990 for all current Ashtech XII receivers equipped for dual-frequency operation.

NEW ENHANCED DUAL-FREQUENCY

Ashtech's new enhanced L2 codeless tracking provides substantial improvement in L2 signal reception, allowing satellite tracking down to 10° elevation.

Since the tracking geometry of GPS satellites improves at lower elevations, Ashtech's new dual-frequency enhancement will significantly improve results for static, kinematic and pseudo-kinematic surveys.

The two graphs on the opposite page illustrate the tracking signal strength and elevation angle of a satellite for both L1 and L2. In both cases, the closeness of the dots to 0 and 1 level indicate confidence in determining the whole number of carrier cycles between carrier phase measurements.

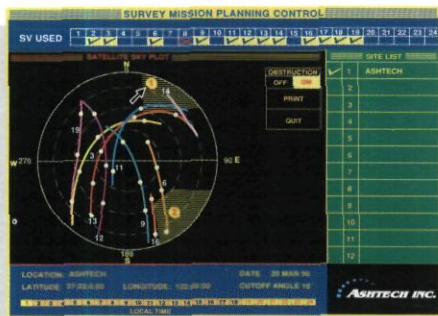
Notice the tight tracking of the L2 carrier below 10°; the dots contain the effect of the ionosphere.

A single antenna cable is now required for both L1 and L2 signals. The enhanced dual-frequency module is available now for all Ashtech XII GPS receivers, including the smaller M-XII.

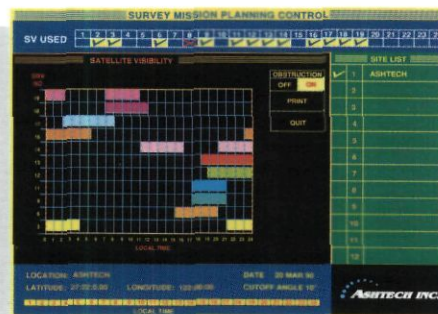
ASHTECH GPPS DATA PROCESSING

The most recent Ashtech GPPS-2 software expands the flexibility and reliability of any GPS survey employing static, pseudo-kinematic and kinematic tech-

niques. The menu-driven software offers fully automatic batch processing plus complete operator control over processing parameters.



Mouse-driven graphics add new dimensions to GPS survey planning and post processing. Satellite SkyPlot shows elevation and azimuth as well as site obstructions; Visibility Chart identifies local rise and set times.



Easy-to-use graphics and menu-driven user interface simplifies data processing and creation of survey reports and network adjustment files.

NEW DIMENSIONS TO GPS SURVEY PLANNING

Survey mission planning is "fun;" the flexible mouse-driven software sets new standards in operational ease, versatility and access to comprehensive site data. Sites can be selected from a world map display, pre-stored lists or by coordinates. Each site has its own, readily modifiable, obstruction plot. The visibility plots combine the effect of all obstructions at all sites.

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Ashtech XII receivers provide very fast measurement and recording rates; the receiver can collect data from 12 satellites, compute positions and record data as fast as **FOUR TIMES EVERY SECOND**... a rate ideal for fast kinematic and photogrammetry applications. The recording interval can be set from .25 to 999 seconds.

EXPANDED DATA LOGGING

The optional expanded data logging capabilities can store more than 200 hours of 6-satellite data at a 20-second recording interval. At 1-second intervals, in aerial photogrammetry for example, 10 hours of 6-satellite data can be recorded (2½ hours at a quarter-second interval).

Ashtech is committed to GPS and continues to add new levels of accuracy, portability and operational simplicity to the art and science of the geodetic survey.

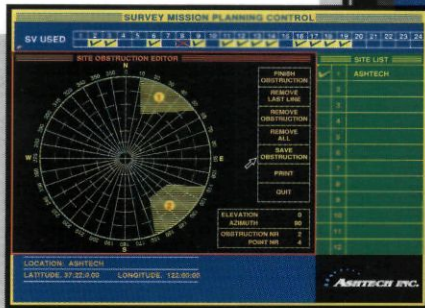
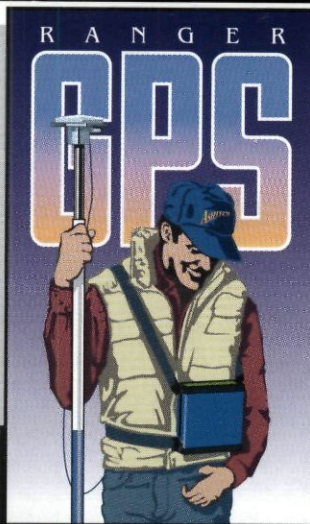


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The recorded data is easily used by several GIS programs and can be combined with USGS maps using US Census Bureau "TIGER" files for display with highways, roads and other local landmarks.

As your needs grow, you can upgrade the same receiver to conduct survey (static, kinematic and pseudo-kinematic), differential GPS, photogrammetry, dual-frequency and other enhanced Ashtech XII GPS options.

Post processing and mission planning software is included as part of the complete system.

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The same receiver can be upgraded to precision geodetic survey for single or dual frequency operation. It can also be connected to photogrammetry cameras for photo position control with the accuracy of a few centimeters without ground marks.

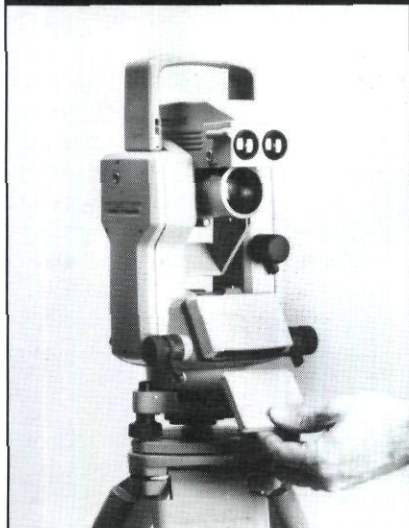


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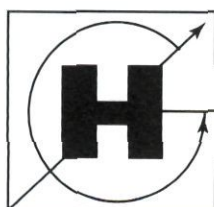
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vendee, grantee, or subsequent transferee in §66499.35(b).)

The extent of protection offered an owner by the presumptions is not readily apparent. To the casual reader, it might appear that, if a parcel were conclusively presumed to be lawfully created, it would have the same status as a mapped parcel and could be conveyed separately from other commonly owned property without proceeding under the Subdivision Map Act. However, this hasty conclusion would, in the author's opinion, be a grave mistake. The presumptions only protect an owner as long as that parcel is owned separately from adjoining land. Once the parcel comes under contiguous ownership with adjoining land, the separation of the parcel from the contiguous land will trigger a subdivision under the defini-

tion contained in §66424. At this point, a map will be required under §66426 unless (1) the parcel qualifies as a legal parcel under the nonmerger exemption (which by definition includes a parcel that qualifies under the prior-compliance exemption), (2) the map requirement is waived under §66428, or (3) the parcel is otherwise exempt from the mapping requirements of the Act.

If the lawfully created parcel is never combined in ownership with contiguous land, then the owner is protected from liability based on the subdivision that created it, and the parcel can be conveyed without proceeding further under the Subdivision Map Act because there is no subdivision under §66424 to trigger a map requirement. Accordingly there is no need to consider application of the nonmerger exemption or the prior-compliance exemption which both operate only when land is being subdivided.

Although no cases have construed the presumptions, there is considerable rationale for this interpretation. First, the presumptions do not override §66424. (Note that the nonmerger exemption does.) Second, the language of the presumptions uses the words "lawfully created" rather than stating that the parcels are legal, *i.e.*, may be conveyed without further proceedings under the Subdivision Map Act (compare the language found in the nonmerger exemption.) Third, *Taft* rejects the notion that legal parcels are created simply because they are unregulated at the time of creation. Similarly, in *Hays* the court points out that the purpose of "grandfather provisions" in the Act is to address the reasonable expectations of developers and that the exemption does not run with the land. See *Hays vs. Vanek* (1989) 217 CA3d 271, 289, 264 CR 652, 662. See also 56 Ops Cal Atty Gen 509, 513 (1973).

Sample Letter to Client Re: Subdivision Map Act Compliance

[Date]

[Name and address of client]

Dear [client]:

In reviewing the recent preliminary title report [or other document describing the real property, as appropriate], we noted that the real property which is the subject of the [sale/purchase/lease/financing] transaction is described other than by reference to a filed parcel or final subdivision map. This indicates the possibility that the property may have been illegally subdivided in the past and is not in compliance with the California Subdivision Map Act. Failure to address this question can, among other things, result in governmental permits and approvals being withheld, your transaction being rescinded, or recovery of damages. Also, violation of the Subdivision Map Act is a criminal offense. The fact that the property may consist of one or more assessor's parcels does not alleviate this concern.

We strongly advise that you check into the creation of the parcels that comprise the subject real property to determine compliance with the Subdivision Map Act and any applicable local subdivision ordinance. We can assist you in this investigation and advise whether it is desirable to obtain a certificate of compliance from the city [county]. While a certificate of compliance will protect you from a Subdivision Map Act violation, there are some drawbacks to applying for a certificate of compliance which should be discussed before proceeding. We suggest you contact us to discuss the likelihood of a Subdivision Map Act violation in your particular transaction and the various options available if there is cause for concern.

Very truly yours,

[Signature]

Addressing the Problem

It is important to be on the lookout for metes and bounds parcels in real property transactions. The conveyance of a parcel which has been divided in violation of the Subdivision Map Act will give rise to remedies by other parties to the transaction, including rescission and damages. Govt C §66499.32. In addition, a public agency may spot the violation and institute proceedings to record a notice of violation (§66499.36), or refuse to issue permits for development of the property (§66499.34). Any property described by metes and bounds, federal survey, record of survey, or by reference to a map other than a properly filed subdivision map should give rise to further inquiry. However, it should be noted that early versions of the Act allowed land to be divided for subdivision purposes by records of surveys. See, *e.g.*, Stats 1937, ch 670, §§4, 10. These subdivisions are legal today under the nonmerger exemption and the prior-compliance exemption.

When faced with having to determine whether a metes and bounds parcel complies with the Subdivision Map Act, the attorney should inform the client of the possibility that the parcel is illegal and seek authorization to pursue the matter. If the client does not want to incur the time or expense to check into the validity of the parcel, the

CONTINUED ON PAGE 24

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Mike Fornaca, Costa Mesa, CA
Paul D. Fredrickson, Fresno, CA
Chuck Freeman, Huntington Beach, CA
George H. Gergis, Garden Grove, CA
Keith F. Gilbert, Costa Mesa, CA
Cynthia R. Graziano, Tustin, CA
Evelyn D. Grechuta, Anaheim, CA
Andrew W. Grechuta, Anaheim, CA
Douglas E. Hammerstrom, Seal Beach, CA
Stuart Hayre, Huntington Beach, CA
Deonn DeFord, Irvine, CA
Peter Jensen, Newport Beach, CA
Patrick W. Joyce, Balboa, CA
Kevin K. Kirby, Huntington Beach, CA
Brian Koontz, Huntington Beach, CA
James M. Kuhns, San Diego, CA
Paul F. Lampert, Long Beach, CA
Michael J. LeCompte, Santa Ana, CA
Jessie James Maramba, Santa Ana, CA
Jeffrey A. Masterson, Laguna Hills, CA
Victoria J. Matthews, Cypress, CA
Harold Muckey, Laguna Hills, CA
Kenneth Olvey, Long Beach, CA
Truong Pham, Costa Mesa, CA
James C. Russo, Costa Mesa, CA
Nidal Salman, Fresno, CA
Joyce Setty, Clovis, CA
Charles B. Shaw, Los Angeles, CA
Steven R. Teske, Westminister, CA
Mike Tooley, Rancho Santa Margarita, CA
Hiep X. Vu, Fountain Valley, CA
Jeff Walden, Costa Mesa, CA
Craig S. Whaley, Santa Ana, CA
Thomas S. Williams, Huntington Beach, CA

Red Flag . . .

CONTINUED FROM PAGE 22

attorney should explain to the client the consequences of a Subdivision Map Act violation. It is always best to communicate this information in writing. A sample letter for this purpose is shown on page 22.

Once the attorney is authorized to pursue the matter, he or she must pinpoint the date of the parcel's creation and determine whether there was a local subdivision ordinance in effect which regulated the division creating the parcel. A title company can run the chain of title to determine the parcel's origin. The city or county in which the property is located should be able to supply the version of any local ordinance in effect at the time of the parcel's creation. This information will often answer the question. For example, if the parcel was created out of a larger parcel without a map in 1955, and the applicable county subdivision ordinance expressly exempted from mapping requirements subdivisions of four or fewer parcels in 1955, then the conclusive presumption of §66412.6(a) would apply. In addition, even if the adjoining parcel is owned by the same person, the nonmerger exemption should allow the parcel to be conveyed without obtaining a subdivision map because the parcel was expressly exempt from the local ordinance.

Often the answer to these questions is not so clear. In those cases, it is advisable to request a certificate of compliance under §66499.35. Note that if the owner is relying on §66412.6(b) (the good faith purchaser presumption), a certificate of compliance is required before development of the property can occur. The issuance of a certificate of compliance is a form of estoppel certificate binding on the local agency and comparable to a map in establishing the legality of a parcel. See §66499.35(d). There is some risk to the client in asking for a certificate of compliance because it raises the question of the legality of the parcel with the city or county. The city may find that the property is not in compliance with the Subdivision Map Act and issue a conditional certificate of compliance. The conditional certificate may impose conditions requiring dedications, im-

provements, and payment of fees that must be satisfied before the property is found to be in compliance. Although the property can be conveyed based on the conditional certificate of compliance, it cannot be developed before the conditions are met. See §66499.35. This procedure should be called to the client's attention so the client can weigh the risk of proceeding without a certificate against the possibility of a violation existing.

The attorney may wish to investigate obtaining title insurance covering the legality of the parcel. Standard CLTA and ALTA owners and lenders policies do not insure the legality of parcels under the Subdivision Map Act because of a standard exclusion applicable to governmental laws regulating the use and enjoyment of the land. However, most title companies will issue an endorsement affording coverage, but only if the parcel is shown as such on a duly filed subdivision map or has been determined to be valid in a certificate of compliance. If this is the case, there is little purpose in paying the extra premium for the endorsement.

Conclusion

Determining the validity of metes and bounds parcels under the Subdivision Map Act is no mean feat. Emerging case law focuses on whether the parcel was created in a manner consonant with the purposes of the Act. The case law has also been helpful in reconciling the various provisions of the Act that address this issue. Because of the difficulty of making such determinations, increased use of certificates of compliance seems warranted. For the lawyer, parcels described by metes and bounds and similar references should be a red flag, warning of a possible violation of the Act. The failure to heed this warning could result in liability to client and attorney alike.

Robert E. Merritt received his A.B. from Sacramento State College in 1963 and his J.D. from the University of California at Berkeley (Boalt Hall) in 1966. He is a partner in the firm of McCutchen, Doyle, Brown & Enersen, San Francisco, where his practice emphasizes land use and other real property matters. Mr. Merritt and his partner, Daniel J. Curtin, Jr., are the authors of *California Subdivision Map Act Practice* (Cal CEB 1987). ⊕



Here's Some Important Information About CLSA

The goal of the California Land Surveyors Association is to promote and enhance the profession of surveying, to promote the common good and welfare of its members, to promote and maintain the highest possible standards of professional ethics and practice, and to elevate the public's understanding of our profession. CLSA represents all land surveyors, whether they are employees or proprietors, whether in the public or the private sector.

Representation

■ **LOCAL:** Your local chapter represents you in local issues. Through your chapter representative to the State Board of Directors, the individual member can direct the course CLSA will take. ■ **STATE:** The surveyor is represented at the state level through an active legislative program, legislative advocate, and liaison with the State Board of Registration. ■ **REGIONAL:** CLSA is an active member of the Western Federation of Professional Land Surveyors. This federation is composed of associations throughout the western United States and addresses regional issues. ■ **NATIONAL:** Through institutional affiliation with the National Society of Professional Surveyors and the American Congress on Surveying and Mapping, CLSA is represented at the national level.

Education Opportunities

CLSA presents annual conferences which provide technical and business programs, as well as exhibits of the latest in surveying and computing technology. Seminars and workshops are presented to assist in continuing education. CLSA publishes the *California Surveyor* magazine and the *CLSA News* to keep the membership abreast of changing legislation, legal opinions, and other items which affect our profession.

Business and Professional Services

CLSA provides a fully staffed central office which is available to answer questions or to provide up-to-date referrals concerning legislation, educational opportunities, job opportunities, or other issues concerning our membership. Health and professional liability insurance programs are available to members.

Join CLSA Today!

Application for Membership in the California Land Surveyors Association

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Santa Rosa, CA 95405-9990

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* First year's annual dues are to be prorated from date of application

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 \$ 60.00 ASSOCIATE MEMBER: Any person who holds a valid certificate as a Land Surveyor in Training.
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 Dues (prorated* from above) \$ _____ + Entrance Fee \$15.00 = Total Amount \$ _____
 Check enclosed I authorize charge to my Master Card Visa Expiration Date _____
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CSU Fresno Annual Conference

By Brett K. Jefferson, P.L.S.

IMAGINE THAT you invited ten of your friends over to your house for dinner and each one brought an unexpected companion. What would you do? Well, that's what happened recently to the Fresno State students at their 29th Annual Conference in January. The students expected to increase last year's attendance of 250 by 10 to 15 percent. They almost doubled that amount, which included about 100 walk-ins. At the last minute the students were able to change the seating arrangements and exhibitor layout to accommodate the crowd. It is particularly amazing since early in the fall the students found that campus facilities would not be available for the conference this year, and other arrangements would be necessary.

I had the honor of serving as the conference chairman and it is gratifying to see the event a success. A total of 426 land surveyors, exhibitors, students and faculty members attended the conference and contributed to its success. So I ask, who says surveyors don't support their profession or continuing education? CLSA's motto is "Educate, Communicate, and Legislate." This conference certainly contributed to the continuing education of a large cross section of land surveyors at a reasonable expense.

CLSA played a major part in the conference success story. Dorothy Calegari, CLSA Executive Director, helped with the marketing effort for the conference and we appreciate her assistance in fulfilling the "communicate" part of the CLSA motto. Also, CLSA conducted their January Board of Directors meeting and installation of new officers at the conference,

adding a flavor of prestige to the event.

ACSM should not go unnoticed either. The Northern California Section helped to sponsor a GPS workshop prior to the official conference opening. Eighty-two surveyors attended the classroom and late-night, hands-on sessions. The Northern California Section also conducted their January Board of Directors meeting and installation of new officers in conjunction with the conference.

The land surveyor-at-large comes to this conference to educate himself, and the conference speakers fulfill that need. They donate their time and personal funds toward that goal. Special recognition for their dedication to the

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profession is warranted. John Dailey, President of NSPS; Dave Goodman of Caltrans; Robert Ball of Coast Surveying; Paul Enneking of Psomas and Associates; David Grimes of Grimes Surveying and Mapping; Sean Curry of STARPLUS Software; Joseph Betit of Land Data Services; Gene Lafferty of Great Basin Aerial Surveys; Michael

McGee of McGee Surveying and Consulting; Vince Sincek of Western Land Surveying; Richard Lovering, President, California GIS Society; James McCavitt of the BLM; Andrew Bennelli of KaWES and Associates; Steve Deschenes of A/B Computers; Thomas Walker of Dynamic Concepts; and, of course, Joe Bell.

Another important facet of the conference is its dual purpose as a fund raising event for the CSUF Surveying and Photogrammetry Student Association, and to serve as a scholarship drive for upcoming land surveying students. A record number, and amount, of scholarships were awarded this year, totaling over \$17,400. Every student that applied for financial assistance through the conference received a scholarship. The student award winners and the contributors of the scholarships deserve recognition.

The following students were awarded \$200 conference scholarships: Bob Hagler, Bill Buller, Bill Weber, Mike Stevens, Linda Malcom-Lim, Gary Anderson, Calvin Henry, Bruce Tracey, Gary Hall. Brian Dodd and Joyce Setty were both awarded \$300 conference scholarships. Dan Bustamante was awarded a \$250 scholarship donated by Peri Cosseboom. Robert Davies was awarded a \$300 scholarship donated by George Erio. Stacey Meacham was awarded a \$200 scholarship donated by the Monterey Bay Chapter of CLSA. Scott Bryant was awarded a \$300 scholarship donated by Central Coast Chapter of CLSA. Ed Patton was awarded a \$300 scholarship donated by the Riverside/San Bernadino Chapter of CLSA. John Cardarelli received a \$400 scholarship donated by Martin Ron and Associates. Dana Trezise received a \$400 scholarship donated by the Los Angeles Chapter of CLSA. Mike Hartley was awarded the Neil Nelson Memorial Scholarship in the amount of \$500. Mark Meyer was awarded a \$500 scholarship donated by Majors Engineering. Don Triplett was awarded the John Pettley, Sr. Memorial Scholarship in the amount of \$500, donated by Pacific Land Seminars. Steve Frank received the Ed Griffen Memorial Award in the amount of \$500 donated by CLSA. Dave Murtha was awarded the Jim Adams Memorial Scholarship amounting to \$500, donated by CLSA.

Matt Webb received a \$500 scholarship donated by the East Bay Chapter of CLSA. Ken Paul was awarded a \$500 scholarship donated by the Orange County Chapter of CLSA. Jason Belskus and Eugene Muse both received a \$500 scholarship donated by the Southern California Section of ACSM. Carol Morales was awarded a \$650 scholarship donated by the Northern California Section of ACSM.

Katrina Creel received a \$1000 scholarship donated by J.F. Davidson. Elliot Hlavka was awarded a \$1000 scholarship donated by Psomas and Associates. Brian Thionnet was awarded a \$1000 scholarship donated by the California Foundation for Land Surveying Education. Barbara Littell received the Northern California Chapter of ACSM Members Award in the amount of \$1000. Sam Walker received CLSA's Annual President's Scholarship in the amount of \$1000. Lorraine Amenda received the Annual Conference Exhibitor's Scholarship amounting to \$1200. Finally, Brett Jefferson was awarded the S.E. Faculty Outstanding Student Award in the amount of a \$1500 scholarship.

One of the purposes of funds raised from the conference is to assist in the publication and distribution costs associated with the *Foresight!* Newsletter. The newsletter is put together by students in the surveying program. This is no small feat given their busy schedules. Several students were recognized for their contribution and effort to the success of the newsletter. These were Katrina Creel, Carol

Morales, Scott Bryant, Lorraine Amenda, and Brett Jefferson.

There are two awards that are not scholarships that are presented each year at the conference. The first is an award selected and presented by the

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and amount,
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totaling over \$17,400.
Every student that
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assistance through the
conference received a
scholarship.*

students, "The Outstanding Instructor Award." This year the students elected to present this award to Mr. Bill Anderson, P.L.S., an instructor at Fresno State, in recognition of his years of service and contributions to education and providing practical knowledge to students in the program at CSUF. The second award is annually presented to the individual recognized as a leader in promoting the profession of land surveying and the education of its elite membership. The award is named after the founder

of the Surveying Engineering Program at CSUF, Mr. Ed Kulhan, and represents a history of outstanding contributors to the direction and development of land surveying. This year, Mr. Paul Cuomo, Immediate Past President of CLSA, is the honored recipient of the Ed Kulhan Award; congratulations, Paul.

We would like to thank all of the people who contributed to scholarships this year; with the rising cost of education you can rest assured that the donations are greatly appreciated. In addition, we would like to thank KaWES and Associates for sponsoring three students and three graduates to attend the conference and awards banquet.

The 29th Annual Surveying Engineering Conference was a success. Beside the scholarship awards, the proceeds from the conference help to finance many of the surveying and photogrammetry student activities. The activities include supporting the group's bi-annual *Foresight!* newsletter, offsetting transportation expenses to send students who receive regional or national fellowships and scholarships, and supplementing travel expenses for members to attend annual conferences such as CLSA, ACSM, and ASPRS. The students extend their thanks to all of the attendees and exhibitors. We look forward to seeing you all next year as we celebrate three decades of bringing the academic and professional worlds together. ☉

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CSU FRESNO GRADS

We are organizing a CSU Fresno Surveying and Photogrammetry/Surveying Engineering Alumni Association for the purpose of creating a forum for the exchange of ideas, providing support for CSU Fresno students and faculty, and establishing an alumni scholarship program. We are planning our first meeting at the 30th Annual CSU Fresno Conference, January 25th and 26th, 1991, at the Hilton in downtown Fresno. Please send your name, address, telephone number, and year of graduation to:

CSU Fresno S&P/SE Alumni Association
c/o Dept. of Surveying Engineering
School of Engineering
California State University, Fresno
Fresno, CA 93740-0094

[Optional: \$25.00 1990 Association dues made payable to CSUF S&P/SE Alumni Association. Monies received will be used towards scholarship(s) at the 1991 CSUF Conference.]

Risk & Liability

By David A. Wahlstrom

RECENTLY, I attended a seminar in Houston, Texas, on the use of total stations and data collectors. During the seminar, which was sponsored by a local vendor, a speaker indicated that a total surveying system (total station, data collector, and computer system) was available for less than \$40,000 and that no surveyor worth his or her salt should be without one.

On my way back to my office, I wondered how many surveyors can afford to invest in a total surveying system. And I thought about the articles that have appeared in various ACSM publications in the last few years validating the use of a compass and chain. Can I (or is it even possible to) reconcile these two positions?

First things, first. Should I, as a professor of surveying and mapping, advocate the use of total stations and data collection? When I asked my senior students that question, all responses I received focused on an old Massachusetts legal case wherein a tugboat company had failed to place radio receivers on its tugs (*The T.J. Hooper*, 60 F.2d 737 [2d Cir. 1931]). The tugs, along with their barges, sank during a storm. The barge owners argued that had the tugs been equipped with radio receivers, they would have been advised to put into port before the storm. Circuit Judge L. Hand stated:

"Indeed in most cases reasonable prudence is in fact common prudence; but strictly it is never its measure; a whole calling may

have unduly lagged in the adoption of new and available devices. It never may set its own tests, however persuasive be its usages. Courts must in the end say what is required; there are precautions so imperative that even their universal disregard will not excuse their omission [Citations omitted].

"But here there was no custom at all as to receiving sets; some had them, some did not . . . Certainly in such a case we need not pause; *when some have thought a device necessary, at least we may say that they were right, and the others too slack* [Emphasis added]."

How does this relate to surveying? Let's say you made an error in a survey and are being sued for negligence for erroneously setting a corner (the note keeper transposed digits in a distance to a side shot). It appears to me that you may be in trouble. After all, *T.J. Hooper* is still good law and appears to announce a test for whether new technology should be used. Consider the following: If the technology is available and affordable, would the mistake have been discovered, and hence not committed, if the technology had been employed?

With respect to availability, any contemporary surveyor will admit that total stations and data collectors are readily available and employ a proven technology. In fact, they appear to be in their second or third generation. Recognize also, that little consideration needs to be given to whether you like the way they operate or whether they do things in the order to which you are accustomed.

In terms of affordability, while *T.J. Hooper* did not suggest that it was a factor, many practitioners will argue

otherwise. But, as the seminar speaker indicated, this equipment is not a liability, it is an asset — it makes money for you (not to be overlooked is the fact that it doesn't talk back, doesn't take Mondays off because of a tough weekend, etc.).

Finally, would the error have been discovered more easily had new technology been employed? To my knowledge, I am unaware of a data collector that would transpose numbers. Hence, in this simple case, I think we can agree that the error would not have been committed. Before going any further, reflect on the errors you have made over the last few years. Would those same errors have been committed if you had used modern technology? Obviously, the answer is going to vary depending on the nature of the error. However, I would suggest that at least some skeletons would not be there if modern technology had been used.

Ironically, I received the March issue of the ACSM journal, *Surveying and Land Information Systems*, while

Does your billing method reward you properly for using modern technology? Do you benefit from being able to get the job done quickly? More importantly, does the resulting fee relate properly to the potential liability?

preparing this article. The article, *Chicago Title Insurance Co. vs. Iowa*, by Donald K. Wall, reported on the company's unsuccessful attempt to be granted injunctive relief from Section 515.48(10) of the Iowa Code, which specifically prohibits in-state sales of title insurance. The article should be required reading by anyone who feels compelled to champion the cause of title insurance companies. To quote from the trial record:

"Q: (to Chicago Title Insurance Company) Is it a correct statement then that in those five years [1969, 1970, 1971, 1972, and 1973], roughly adding up approximately \$370,000.00 worth of premiums obtained on property in Iowa, that not a single dollar has ever been paid to an insured?

"A: From my knowledge that is the answer, that there has not been money paid to the insured." (See also *Chicago Title Insurance Co. vs. Huff*, 256 N.W. 2d 17 [1977]).

How many of you have been "bargained down" when a title insurance company has contacted you to do a boundary survey? It's always in the purchaser's interest, right? Do you think, for one moment, title insurance companies are really interested in saving the purchaser money? If you do, then you haven't taken a close look at a closing reconciliation form recently. For instance, how can you justify the use of couriers for moving every piece of paper!

While I agree with Wall that title insurance companies generate land surveying work, I question whether it is the type of work in which a professional surveyor would be interested. After all, title insurance companies and surveyors are in the same business — they are shouldering risks associated with the transfer of real property. Doesn't it make sense that surveyors be compensated on a similar basis?

One more item with respect to title insurance companies: Have you ever been asked to perform an update of a previous survey at a reduced price? Do title insurance companies update their original policies, or do they issue new ones? The next time a representative from a title insurance company asks you to perform an updated survey, tell them you would like to bill the client on the same basis the company is using. After all, the fee should relate to liability exposure. Also, don't overlook the fact that another surveyor would have to charge for an original survey. Remember, it is neither unethical nor unlawful to be rewarded for maintaining good survey records and plat files. Furthermore, I do not think there is such a thing as an updated survey. After all, liability exposure is being renewed with each issuance of a certified plat.

I wonder how many surveyors really understand the magnitude of risk as-

CONTINUED ON PAGE 30

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Risk & Liability . . .

CONTINUED FROM PAGE 29

sociated with boundary surveying. Granted, not too many cases make it to court in any one year. As a result, we'll never be able to determine the extent of settlements.

P.O.B. magazine published results of a questionnaire on litigation in "Surveyors Speak Out" in the January 1988 issue. Thirty-eight percent of the respondents indicated they had been involved in litigation relating to a professional liability.

Cook Consultants Inc. vs. Larson, 700 S.W. 2d 231 (Tex. App. 5th Dist. 1985) should be reviewed, as it carefully outlines the measure of damages due an injured client. Briefly, Larson shared a common boundary with Bates. Bates brought an action against Larson because of Larson's alleged encroachment on Bates' land. The judge ordered Larson's house re-

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technology.
(In the alternative, we
had better
not make a mistake.)*

moved and Larson abided by the judge's decision without contacting Cook. Following demolition of the house, Larson brought suit against Cook Consultants. The trial court found for Larson, who had alleged gross negligence on Cook's part, and awarded her \$32,150 in actual damage and \$230,000 in exemplary damages.

Cook appealed and the Court of Appeals reversed the decision (*Cook Consultants Inc. vs. Larson*, 677 S.W. 2d 718 [Tex.App. 5th Dist. 1984]). Larson then appealed and the Supreme Court reversed the Court of Appeals decision and remanded the case to the Court of Appeals for a redetermination of damages (*Larson v. Cook Consultants Inc., et al.*, 690 S.W.2d 567 [Tex. 1985]).

On remand, the Court of Appeals sustained the original award of actual damages to Larson by the jury. The amount, not \$32,150, but \$30,500, rep-

resented the diminished value of her home on the date of demolition (*Cook Consultants Inc. vs. Larson*, 700 S.W. 2d 231 [Tex. App. 5th Dist. 1985]). Fortunately for Cook, the court deleted the award of exemplary damages.

The impact of this case on practicing surveyors is that awards will be made based on present-day, real-property values, not on the real-property value the day of the survey. Consider the impact of this opinion in such places as Orange County, California, where real-property values are appreciating at a rapid rate.

How are you pricing your services? Respondents to a 1989 *P.O.B.* questionnaire indicated that they used an hourly rate and billed their clients accordingly. Do you suppose the court is going to be sympathetic based on the method of establishing fees? Also, will your client remember how "reasonable" you were when he or she is injured and the only easy way of being made whole is to initiate a suit? Interestingly, not a single respondent indicated that the fee based on percent of property value was used. One respondent stated, "A fee based on percent of property values is extremely unfair to the client and in no way relates to the surveyor's liability exposure or time spent on the job."

Does your billing method reward you properly for using modern technology? Do you benefit from being able to get the job done quickly? More importantly, does the resulting fee relate properly to the potential liability? If the answer to any of these questions is no, then maybe it is time to reevaluate your choice of billing methods.

It seems to me there are only two ways to properly price professional services: Charge a lump-sum fee for the project, or charge a percentage of the improvement's value or the purchase price.

I have always favored the use of the lump-sum method. It provides a firm budget figure for the client, and rewards me for being a good manager and for using modern methods and technology. I think, however, it is time to make a transition to a percentage basis. For example, a surveyor's professional fee might represent one percent of the purchase price of a property.

A crucial issue that affects credibility and costs in the profession is the hotly debated question of whether a four-

year degree should be required to practice. Think about it! Eventually, the costs of obtaining a degree would be reflected in raised rates for services and would be more than offset by increased professional prestige and credibility.

Sadly for all of us, some of us do not value formal education. For ex-

*We have a right
to make money —
in fact, if we are not
making money,
we should be
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shoulder all the
responsibility!*

ample, in my own state, Texas, the registration board is working to rescind the law requiring a four-year degree. It is interesting that the law in question, which went into effect September 1989, does not affect anyone applying for registration before 1996.

So, how does this all tie together — or does it? From my perspective, the following appear to be true:

- We must use new technology (In the alternative, we had better not make a mistake.)
- If we make a mistake, we may not know the cost of that mistake until it is discovered.
- We have a right to make money — in fact, if we are not making money, we should be letting someone else shoulder all the responsibility!

One final note: I originally planned on calling this column "New Hope for Sufferers of BASS (Battered and Abused Surveyor's Syndrome)." However, my spouse was concerned with the nexus between fishing and surveying. I now have an answer: If you charge what you're worth, you will have more time for fishing!

David A. Wahlstrom is director of the Intergraph Training Center and associate professor of surveying and mapping at the University of Houston. Wahlstrom is a registered surveyor and professional engineer in New York and Indiana. ⊕

Letters . . .

CONTINUED FROM PAGE 11

BLM SURVEYS APPROVED

This letter is to inform you of cadastral survey plats approved by the Chief Cadastral Surveyor for California during the second quarter of FY 90, January 1 through March 31, 1990.

These plats are now on file in the Survey Records Office, Bureau of Land Management, California State Office, 2800 Cottage Way, Room E-2841, Sacramento, California 95825.

TOWNSHIP	APPROVAL DATE	TYPE OF SURVEY
T.36N. R.3W. M.D.M.	02/05/90	Dependent Resurvey
T.16S. R.21E. S.B.M.	02/16/90	Retracement & Metes-and-Bounds Survey
T.31N. R.5W. M.D.M.	02/21/90	Survey (Swasey Drive in Section 7)
T.17S. R.7E. S.B.M.	02/23/90	Corrective Dependent Resurvey
T.25S. R.19E. M.D.M.	03/19/90	Dependent Resurvey and Subdivision
T.23N. R.4E. M.D.M.	03/23/90	Supplemental Plat (Sect. 20)
T.3N. R.4W. S.B.M.	03/23/90	Supplemental Plat (Sect. 19)
T.3N. R.4W. S.B.M.	03/23/90	Supplemental Plat (Sect. 30)

You may circulate this letter among your membership as well as publish it in your bulletin if you so desire,

Sincerely,
Clifford A. Robinson, Chief
Branch of Cadastral Survey
U.S. Dept. of the Interior
Bureau of Land Management. ⊕

How to Write Better Letters

YOU CAN IMPROVE the quality of your letters if you follow these simple guidelines:

- **Have a purpose** for your letter. Ask yourself, "What do I want my reader to know or do as a result of reading my letter?"
- **Analyze your** reader. Ask what the reader already knows, has asked you, or should want to know.
- **Make an** outline. Make it brief. Include a beginning, middle and close.
- **Write or** dictate fast. Dictating quickly prevents you from derailing yourself. If you're using a word processor, don't be tempted to use the easy editing capability. Revise later.
- **Talk to** your reader as you go. Use the reader's first name and the second person pronoun "you" frequently.
- **Keep your** first paragraph short—about four lines at most.
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The Evolution of Large, Full-Service Firms

By James W. Crabtree and Steven A. Jones

Introduction

Today, the surveying and mapping industry in the United States is enjoying the greatest period of growth since the 1960's, when the design of the interstate highway system boosted requirements for its services. Concurrent with this growth has been a trend for companies to become large, full-service organizations — either by internal growth or acquisition — that perform all phases of a project from data acquisition to digital mapping and data conversion.

The trend toward large, full-service surveying and mapping firms is the result of several forces in the marketplace:

- The increased sophistication and cost in surveying and mapping technology.
- A diminishing work force of skilled professionals.
- The need for diversity to minimize risks and to smooth out the seasonal peaks and valleys of the revenue base.

Background

Historically, private sector surveying and mapping has been a cottage industry with only a few large firms. The majority of businesses have been organized to offer personal service at a local level and not to undertake major, multidiscipline projects over a broad geographic area. Those few large firms that offered a full range of surveying and mapping services typically evolved from aerial photography operations begun after World War I.

In the late 1930's, photogrammetric equipment was imported from

European manufacturers and fledgling mapping operation were begun. It was the impetus of World War II that really started the growth in the industry. During that era, U.S. manufacturers began producing equipment, and additional private firms were launched to serve the needs of the military.

Concurrent with this evolution, surveying and mapping specialists emerged in the related field of geophysical exploration. The largest single push in the industry came after World War II from wartime techno-

Today, the surveying and mapping industry in the United States is enjoying the greatest period of growth since the 1960's.

logical advances and from the influx of relatively large numbers of individuals who received training in mapping and related tasks.

In the last 45 years, hundreds of small- to-medium-sized surveying and mapping companies have been formed. Natural selection keeps the ranks thinned. While some continue as small operations, a few have grown to full-service companies that are now becoming major forces in the industry.

Current Marketplace

In the 1980's, the creation of land information systems and automated mapping and facilities management systems has exponentially increased the demand for spatial data in digital form. This new market, coupled with a regionally healthy demand for traditional surveying and mapping

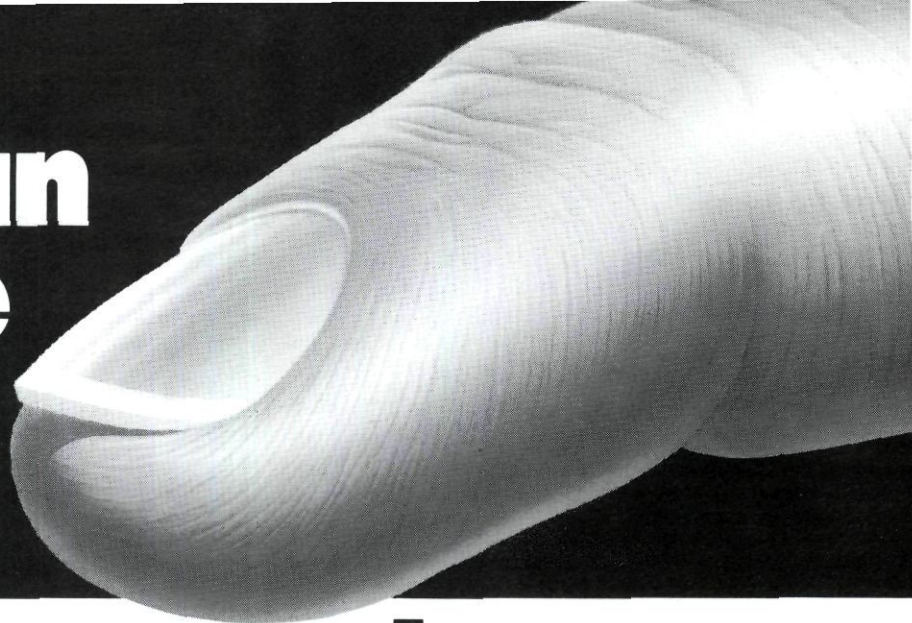
services in support of infrastructure development, has caused an increased growth in the industry in most areas of the country.

Some firms that are dependent on the energy business for work, either directly or indirectly, have suffered in the last half of the 1980's, along with those who have failed to keep up with the rapid advances in technology. On the whole, however, the industry is experiencing an era of unparalleled expansion.

In addition to a healthy level of domestic U.S. surveying and mapping activity, substantial international requirements contribute to the overall market volume. One significant source of work has been generated by land reform. The governments of many developing nations of the world are recognizing one of the primary demands of their indigenous populations is the individual ownership of land. To address this need, many countries are utilizing foreign grants or loans from international development banks to implement land identification and titling programs. These programs facilitate the identification and transfer of individual parcels. Other programs being undertaken in developing countries, which generate substantial surveying and mapping activities, include resettlement, natural resource exploration and development, as well as massive irrigation and agricultural development projects. Large, multi-discipline companies are generally better able to secure and perform these demanding projects than are consortiums of smaller firms. It is frequently necessary to compete with surveying and mapping groups outside the United States that are of a quasi-governmental nature and which have some level of government subsidy. For a private-sector U.S. firm to survive in this market, it is

CONTINUED ON PAGE 34

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Evolution . . .

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Market Forces at Work

Technology

The equipment needed for efficient performance of large surveying and mapping projects has become increasingly complex and expensive. Most smaller firms have turned to specialized companies to fulfill many of their requirements, while the larger firms have all the major service elements within their direct control as in-house operations.

In the aerial photography field, for example, camera systems have become increasingly intricate and costly. Current standards often call for cameras with an image-motion compensation feature to facilitate the use of finer grained, slower speed films that offer increased image resolution. These cameras cost more than twice as much as the previous generation.

In the surveying field, spinoffs from military technology have caused tremendous changes in the way field measurements are made, beginning in the 1950's with the development of electronic distance measurement equipment, and in the 1960's with the refinement of radio positioning techniques. Additional technological advances continued in the 1970's. Simultaneous developments in the complementary technologies of satellite surveying and inertial navigation enabled the development of highly productive automated surveying methods. With the launch of the prototype GPS satellite constellation in the early 1980's, the advanced technology methods that had been in the hands of government agencies or specialized firms began filtering down to the smaller companies. The effect of this technology dissemination on the larger firms has been to encourage research and development into more sophisticated and efficient hardware, and methods, in order to retain a competitive edge in the marketplace.

In the photogrammetry segment of the market, the use of analytical stereoplotters is now the rule rather than the exception. In 1981, only 38 percent of the mapping firms provided

computer supported mapping. In 1988, that figure grew to 54 percent. The cost of these systems requires the use of more than one shift a day to amortize the equipment, and the maintenance of a backlog of work to keep the instruments fully productive. This high production requires a staff dedicated to business development.

In a Capabilities Study for 1989-90 sponsored by the Management Association for Private Photogrammetric Surveyors (1989), 58 service and consulting firms were profiled. Identified in the profiles were categories of high-cost, sophisticated equipment that the firm possessed, such as aircraft, forward-motion compensating aerial cameras, Global Positioning System and Inertial Survey System technology, airborne laser systems, and orthophoto production equipment. Each of these technologies requires capital investments in excess of \$100,000. Where, previously, a firm would have committed to one of these technologies (78 percent in the study), 45 percent of the firms offered two or more.

Investment in specialized equipment, development of proprietary methods, and achievement of economies of scale are increasingly best undertaken by large concerns. Indeed, companies that offer a full range of services — including aerial photography, field surveys, photogrammetry, and cartography — must necessarily be large in order to address each of these disciplines with up-to-date capabilities.

Work Force

Statistics from the Department of Labor indicate trends toward serious shortfalls of trained personnel in the architecture, engineering, and surveying professions. While it is difficult to isolate surveying enrollments at universities, they closely parallel civil engineering enrollments, which have seen a 25 percent decline since 1981.

This decline in people entering the profession is partly due to demographics. The "baby boom" population spike has passed, and only 1.3 million people will enter the work force in the 1990's, compared with 3 million during the 1970's. Combined with the reduced number of trained personnel available, many firms have senior-level professionals who entered the work force just after World War II and are now ready for retirement.

To attract skilled personnel from this dwindling work pool, companies have to offer better compensation packages and career opportunities. Only the larger, full-service firms have the resources and diversity available to meet these requirements.

Revenue Base

The present growth in mapping service companies has tended to center on stereocompilation or cartographic data conversion work, rather than surveying or aerial photography, because the office tasks are much easier to manage profitably. The tasks of field surveyors and aerial photography have been peripheral but essential activities.

The surveying and mapping endeavor must deal with vagaries that do not often confront other industries. Seasonal weather dictates when projects can be performed and their schedules. Field surveys face a myriad of additional problems, such as transportation, access, permitting, and even solar flare activity.

These restrictions all tend to impose seasonal variations on the revenue base. Smaller firms are forced to lay off significant portions of their staffs during these dips, often when they need that expertise for writing proposals to secure new work. The larger, full-service firms can have personnel cross-trained in several disciplines and can move them to projects with different schedules or to projects overseas. The key phrase here is "full service," as several firms with large revenue bases have not been able to survive in the current market because they were too specialized.

The larger firms have additional incentive to maintain diversity in their revenue base. Many of these firms are publicly traded and rely heavily on economic stability and the rising value of their stock. Investors are disinclined to gamble their money on firms that exhibit hard-to-understand swings in revenues and profits.

Conclusion

The surveying and mapping industry today can be compared to the U.S. airline industry after it was deregulated. Numerous small companies will find it harder to survive as forces in the market will drive companies to expand and diversify, either through growth or mergers and acquisitions. Increasingly, almost all

phases of large projects will be done by these larger, diversified companies. Smaller companies will have to find specialized markets, and only a few medium-sized companies will be left.

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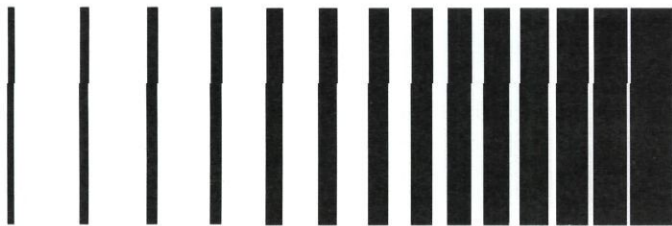
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Don't Miss the Boat

By David A. Nystrom

GOVERNMENT agencies and industries worldwide are turning to geographic information systems (GIS) to automate everything from straightforward mapping activities to the spatial display of complex earth-science analysis. GIS technology allows us to process and interrelate a variety of data not possible before its appearance. The technology provides extremely efficient and cost-effective ways to capture, store, manipulate, analyze, display, and disseminate spatial and descriptive data.

The modern surveyor is increasingly concerned with engineering problems related to such issues as zoning restrictions, environmental-impact limitations, and land-use monitoring. GIS offers the surveyor new tools to make enlightened decisions about how we should plan and manage these complex activities. With GIS, spatial information from paper maps, aerial photography, satellites, field surveys, and reams of descriptive records can be entered into a computer as overlays representing property parcels, political boundaries, natural features, land use, demographic data, and transportation networks. And information can be com-

bined and analyzed in ways never before possible.

These types of activities are natural GIS applications that commonly use GIS to analyze a wide variety of spatial data to look for, define, and devise solutions for surveying and mapping problems. Many of these problems must be solved quickly and require spatial information from existing GIS data bases. Often, existing data must be refined, updated, or supplemented with new data to increase the utility of the data base for instant application.

GIS Projects are Multidisciplinary

Today's successful GIS projects require multidisciplinary participation. In fact, I believe this technology could do away with the expensive, heavily documented, and time-consuming process of preparing draft and final environmental-impact statements. With GIS technology, it is now possible to have a public hearing for a multidisciplinary environmental-impact project without having to produce volumes of documents.

If environmentalists, federal and state agencies, private industry, and the public all enter their data in a GIS, these public hearings could become lively, interactive forums for environmental-impact decision making. A project plan could be overlaid on base category data, and data sets of concern could be brought up to consider possible impact and to aid discussion of potential mitigation measures.

Unfortunately, despite the capabilities of GIS, I don't believe participants in environmental-impact hearings are quite ready to use this technology. If we could figure out how to change the attitudes of those involved, and the laws that govern environmental-impact assessment procedures, GIS technology could save much time and money.

With the decreasing cost of Global Positioning System (GPS) receivers, surveyors should be aware of the range of GPS capabilities and the GPS/GIS linkages being developed. GPS should reduce the amount of field survey work and time required to establish photo position control for regional mapping projects. However, GPS may not significantly alter the work associated with laying out or recovering ownership lines related to large-scale engineering projects for public and private land use, zoning,

and development. Numerous large-scale GPS/GIS pilot projects are being done to test the value of GPS for local engineering applications.

A recent cooperative project of the U.S. Geological Survey (USGS) and Environmental Protection Agency (EPA) was designed to test GIS results required to meet program needs and legal mandates of projects. The project involved using GIS and GPS technology to analyze large amounts of spatial data associated with a Superfund site investigation. The Old Southington Landfill in Connecticut was chosen as the pilot site. One objective was to test accuracy requirements and standards that will ensure the integrity of the spatial data and multicadastral analysis involved in Superfund site investigations.

A GPS survey was performed in and around the landfill to locate precise coordinates for digital stereocompilation and modification of the large-scale data sets. A full statistical spatial accuracy test is being performed to see how these GIS spatial data sets meet investigation requirements.

There are many other examples of how GIS will be used to help the

If environmentalists, federal and state agencies, private industry, and the public all enter their data in a GIS . . . public hearings could become lively, interactive forums for environmental-impact decision making.

modern surveyor and cartographer. By using spatial data analysis to examine critical engineering and environmental aspects of alternative routes, the best location for a new road or other transportation route can often be determined before setting the first survey stake.

The location and staking out of new construction sites can be accomplished

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most effectively with a GIS that lets the surveyor identify critical aspects of local geology, underground water supplies, and buried utilities. Typically, display and analysis of previously created spatial data bases reduces the time and expense of new, extensive field work. Environmental-impact limitations and physical-geography problems associated with the location and design of businesses and subdivisions can usually be addressed with GIS or computer-aided preliminary de-

*Clearly, GIS
technology offers new
income-producing
areas of work
and services for those
in the surveying
community
who wish to take
advantage of them.*

sign capabilities long before surveying begins. I believe a major role of the future surveyor will be to validate and refine spatial data on sites analyzed with GIS for critical and legal aspects of proposed engineering projects.

GIS and Land-use Data

Another interesting example of how satellite technology will merge with GIS capabilities is in the definition, refinement, and update of land-use data. It is now possible to merge satellite-derived land-use data sets with existing federal, state, and local GIS land-use data sets. This ability to merge such diverse data will allow us to deal more effectively with rapid land-use, zoning, and land-management changes that are occurring worldwide. There are numerous pilot projects within and outside USGS that are using recent image data to verify and update existing GIS land-use data.

The premise that all data in a given GIS are registered accurately to a common base is the foundation of GIS technology. It is imperative, therefore, that data entered into these systems

be collected according to rigorous standards. Surveyors and cartographers should be involved in developing and using these standards. There is also a need for surveyors to fill the new and growing demand for collection, registration, documentation, and certification of disparate data sets that feed many large-scale GIS.

Also, it is likely that court cases will soon test the validity of large-scale GIS data and that surveyors will be called on to verify the accuracy of data they have collected and certified.

Another interesting challenge is to devise a name for the integration and sharing of data and ideas from all disciplines. A definition of GIS is easy if you are just talking about the technology. But it is a far more difficult problem to define what is happening when multi-disciplinary ideas are shared. For example, at the USGS GIS Research Laboratory in Reston, Virginia, a geologist may have a modeling problem while analyzing some subsurface data that a hydrologist sitting at the next computer can answer by explaining what was done with a subsurface water problem. And a geographer or cartographer may be able to help in determining the best way to spatially display the results of the model.

Nick Van Driel, chief of the USGS GIS Research Lab, recently remarked that it is too bad the word "fusion" has taken on dubious connotations, because many GIS are creating a fusion of research ideas in a wide variety of disciplines.

The Future

Attendance at annual GIS/LIS conferences sponsored by ACSM, ASPRS, AAG, URISA, and AM/FM International is additional proof that the GIS field requires integration of disciplines. Just a few years ago, many would have laughed had they been told that these societies were going to work together to sponsor a single annual conference. Another example of integration is that the GIS/LIS '90 conference will be merged with the ACSM/ASPRS fall convention. The concept of the annual GIS/LIS meeting is a great contribution to this field. We should all work together in the multidisciplinary effort to make the GIS/LIS meeting an effective forum in which to share ideas.

In the future, I believe GIS performance will be substantially enhanced by incorporating and exploiting recent advances in GIS hardware and software, theoretical concept in hybrid and other data structures, graphic standards, and the use of standards for transfer of spatial data. Special attention will be paid to new methods of digital spatial analysis in digital cartography, map overlay analysis, quantitative geography, three-dimensional analysis and display, visualization, change detection, and dynamic time-series modeling. More and more, hardware and software vendors will stress not how they compete with each other, but how they complement each other.

Surveyors should pay special attention to the results of cooperative large-scale GIS pilot projects that are analyzing urban and transportation planning, facility site selection, environmental analysis, land-use change, and zoning, among others.

*Surveyors
should pay special
attention to the results
of cooperative
large-scale GIS pilot
projects*

The results of these pilot projects will demonstrate how surveyors can use new GIS analysis techniques to help work more efficiently. I believe that results of current GIS research and development and multidisciplinary applications projects are allowing us to make more informed decisions at the local, state, national, and international levels. Clearly, GIS technology offers new income-producing areas of work and services for those in the surveying community who wish to take advantage of them.

David A. Nystrom served as chief, Office of Geographic and Cartographic Research in the National Mapping Division, U.S. Geological Survey, from 1985 to February of this year, when he became executive vice president and director of U.S. Operations for TYDAC Technologies, Inc. in Arlington, Virginia. Reprinted from the *ACSM Bulletin*, April 1990. ⊕



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