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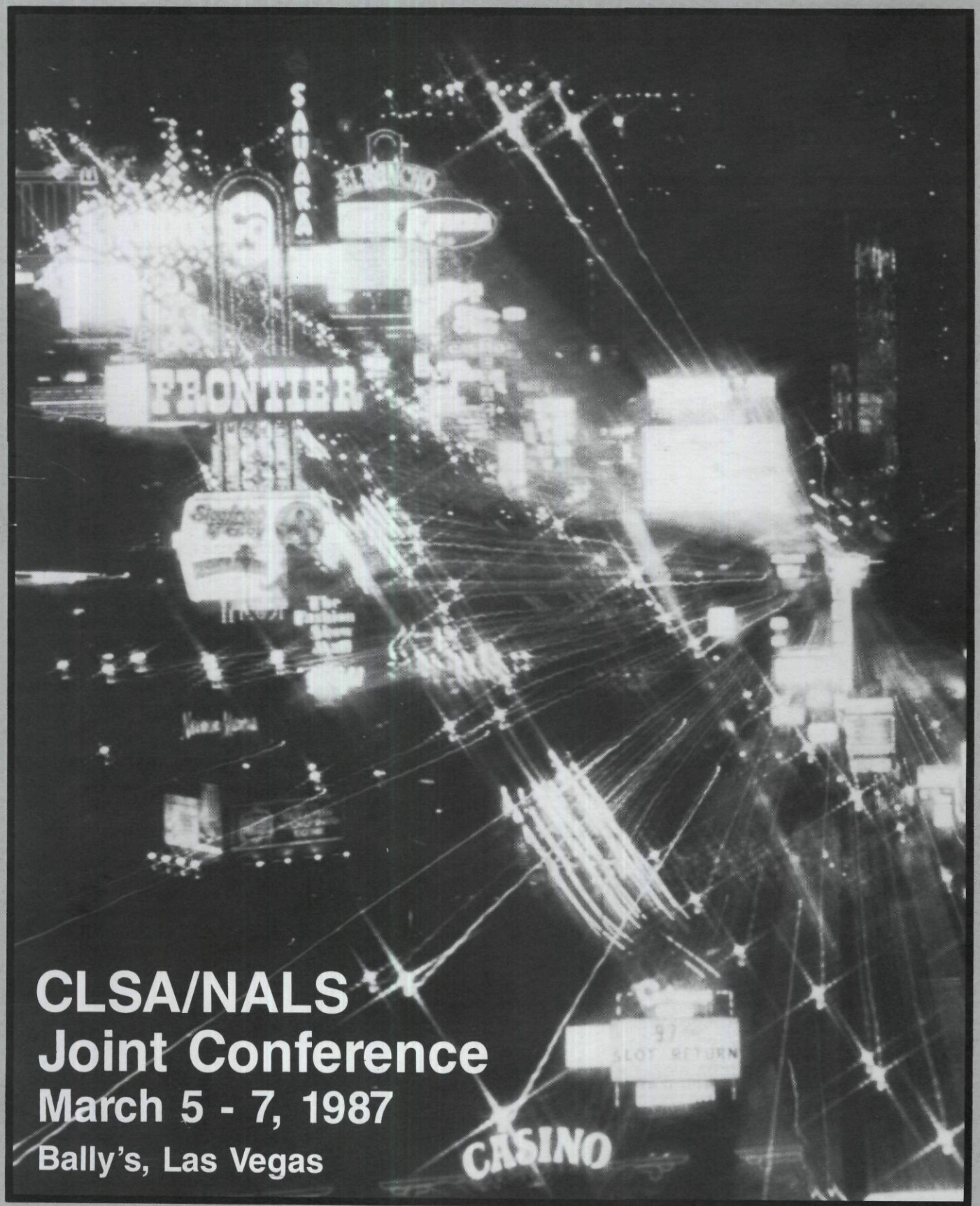
The California Surveyor

No. 84 The Voice of the Land Surveyors of California Winter 1986



CLSA/NALS Joint Conference

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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 and Land Surveyors-in-Training 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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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 meduim is encouraged. For compatibility, the following requirements should be met: 5¼-inch floppy diskette, PCDOS or MSDOS format, ASCII text files, and no formatting codes in the text. Material should be sent to *The California Surveyor.*

Editor:
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1023 San Carlos Drive, Antioch, CA 94509

Deadline Dates for *The California Surveyor*
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Articles, Reports, Letters, etc., received after the above mentioned date will be considered for the next edition.

President's Message

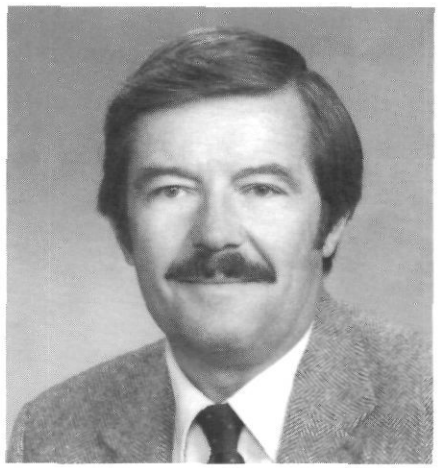
by Richard P. Siegmund, L.S.

As my term of President draws to a close, let us review the ground we traversed this year. Legislation started out the year with continuing work on S.B. 1680, coordinate legislation based on 1983 North American Datum. This bill was passed. Cal Council sponsored A.B. 3073, with C.L.S.A. support, which requires the Board of Registration to publish a roster every two years, issue an L.S. license to an R.C.E. who passes the L.S. Exam, and requires an L.S. to state the expiration of his license on maps, plats, reports and descriptions. This was passed into law. This law will now require an L.S. to sign and seal, with expiration date, all items prepared.

Communication was given a high priority. The newsletter was set to go out on a bimonthly schedule. Items of general information and new laws or regulations to keep up with the changing times were stressed. It is our desire that, in time, more information will be forwarded from each Chapter that can be placed in the newsletter. The L.S. Act was placed on the computer along with all Land Surveyor's names and addresses. We look forward to 1987 as being the year we begin to provide all members with a booklet having the roster of all Land Surveyors together with the L.S. Act and Board of Registration rules.

As I have stated before, education is the foundation of any professional. Three workshops were given this year in different parts of the state. The workshop-seminar program will be expanded in 1987 to more subjects and to more regional areas. The same topic can be given in four to six areas rather than just one or two. With the change in survey equipment and computers, keeping up to date can only be achieved by education. Our yearly conference provides a good opportunity to be brought up to date on equipment and computer methods. The education needed falls along the lines of title law, boundary retracement, court case law, contract preparation, dealing with law suits and business management. We have, a long time ago, learned the techniques of working with the survey equipment.

As we all mature in our surveying abilities, we begin to perceive the need of continuing to learn. In many cases, we do not need to learn more about what we are doing, but to learn more



about what is happening around us that affects our work. Understanding more about the title industry, photogrammetry's new advances, new laws, court decisions, tax laws, and local government, all play a role in your surveys. This all leads to being a professional, having the mental command of the project. The professional, as Webster states, is an occupation that uses scientific education, and mental abilities rather than manual labor. What may be confusing to some people is that it takes some labor to set the property corner stakes, but the math and science education coupled with the education of the law require professional training to determine the position of the property corner stakes.

The field survey techniques may be taught in the classroom and, once the experience has been gained, they probably will never be forgotten. Measuring angles and distances or the use of math to manipulate those angles and distances to a closed figure will change little. What is always changing is the law and how it affects what we do. Because of this, we must conclude that we must continue to educate ourselves and those working with us. As our world becomes more complex, change comes more often and is harder to keep abreast of. It is therefore logical that some form of continuing education is inevitable. The workshops and seminars that C.L.S.A. has provided in 1986 and the program for 1987, I believe, will begin to provided the continuing education needed.

Looking forward in time further, we must begin to realize that continuing education may become a requirement to renew your license. When and in what form no one yet knows. Think about your own continuing education. Are you doing all you can to improve your knowledge for your projects and for your clients? If not, 1987 may be the perfect time to start your continuing education, not because you have to, but because you need to, to complete your projects as a professional. □

1987 State President's Message

by Louis E. Rutledge, L.S.

Thank you! Thanks, to you the Professional Land Surveyors of California, for giving me the opportunity to serve you as President of the California Land Surveyors Association for 1987. This is the most gratifying honor that has ever been bestowed upon me. I am well aware of our twenty year history and the elite group of Surveyors that has held this position and that now, by your vote, I will become identified with. It is indeed an honor and a privilege for me to accept the position of president. And with your continued support we should have a successful year together. I can only hope that I am equal to the task; I know that you are.

Over this past year I have visited with many of you at your chapter meetings. This has given me the chance to talk with members and non-members of

our association. Through these talks I think that I know the direction you would like C.L.S.A. to take. I will attempt to lead us along the path that you have selected.

(continued on page 6)

Letters to the Editor

Dear Fellow Surveyors:

During some recent work in heavy brush and rough terrain in Shasta County, I came up with a solution to an old problem. Using an EDM and digital theodolite give us untold opportunities for ties to corners if we can see the prism. The problem is in getting the prism to the corner. In this particular spot the brush was almost impenetrable and the temperature over 100°F. The chainman had already had his wits scared out of him when he came nose to nose with a rattle snake while crawling on his hands and knees under the brush. We solved the problem by hiring a plane and loading it with popcorn. We gave the pilot directions to drop the popcorn in a line from our traverse point to the corner location about a mile away. When the popcorn hit the hot ground, it popped and built up a white trail above the brush. We equipped the chainman with snow shoes and it was a quick trip to the corner.

Very truly yours,
John C. Olson, L.S.
of Oscar Larson and Associates □

Dear Editor:

I take strong exception to certain statements made in the letter from Mr. David Eisenberg which appeared in the Fall '86 issue of *The California Surveyor.*

The executive officer of the Board of Registration, Harrison Hilt, was represented as stating that in the past, the L.S. exam was "graded on a curve with 70% of the examinees made to pass regardless of what they knew."

This has to be a misquote of Mr. Hilt. See the tabulation of L.S. exam pass rates for recent years which appeared in the Summer '85 Board Report [included below]. It is evident that prior to 1984 the pass rates ranged from 22.6% to 35.6%, **not** 70%.

Statistics aside, the implication forwarded by Mr. Eisenberg is that presently licensed Land Surveyors may or may not be qualified to practice. It is suggested that L.S. exams in years past were "set-ups," administered to pass a certain number of applicants rather than to test professional competence.

Speaking as a veteran of several different Board-administered exams, I can state without hesitation that none of them felt like "set-ups" to me. On the contrary, these exams represented some of the more challenging 8-hour workdays I have ever spent. I am confident in speaking for all Land Surveyors when I express resentment at the idea that we were "grandfathered in" under some sort of amnesty program

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Percentage Passing

Year	Land Surveyors	Structural Engineers	Scoring Method
1979	35.6	36.2	Norm-referenced
1980	22.6	26.5	Norm-referenced
1981	32.7	30.2	Norm-referenced
1982	26.4	29.7	Norm-referenced
1983	33.4	27.8	Norm-referenced
1984	7.6	11.0	Criterion-referenced

Message

(continued from page 4)

To make sure that we remain on the path of your choosing in the future, I am doing two things. First, in accordance with the By-Laws that you have enacted, I am charging the President Elect with the responsibility of communicating with the membership. It is hoped that through this line of communication we will know whether or not we are fulfilling your desires. Second, I am forming a Planning Committee. This committee shall be chaired by the President Elect, assisted by the Executive Director and the Immediate Past President, and charged with the responsibility of planning the direction that C.L.S.A. will follow in 1988. I request that you contact this committee and let it know of your concerns.

The major thrust this year will be directed toward achieving the one year goals adopted at the October meeting.

In the past your officers have become so involved with the day-to-day operation of the association that they have not been able to dissect the adopted goals and to lay out a program that will accomplish them. This in no way is meant to say that your elected officers have been derelict in their duties. One has only to look at the accomplishments of C.L.S.A. over the past few years to know that this is not true. Nor has the adoption of a new set of one year goals replaced the one, five, and ten year goals so painstakingly put together by the Administrative Matters Committee, chaired by Fred Kett, and adopted by your Board of Directors in 1985. What we are doing that has not been done in the past is to form several AdHoc Committees, assign them one goal each, and charge them with the responsibility of studying the goal and reporting back to the President's Advisory Committee with specific recommendations as how best to implement them. Appropriate action will then be taken and reported to the Board of Directors.

In addition to the foregoing I am dedicating myself to the improvement of the image of the Professional Land Surveyor in this state, and I am asking that each of you do the same. If you have not already done so, join with other professionals in your area and establish a standard of practice that not only meets the requirements of the local agencies, but that truly protects the general public.

If you are not a member of the California Land Surveyors Association, please detach the membership application form found in this publication, fill it in, and mail it today. If you are a member, get involved in your local chapter. There is no greater reward than the feeling of accomplishment acquired through joint effort. If you don't know the location of the nearest chapter, simply call central office at (707)578-6016 and it will furnish you with contacts, meeting dates, and locations. If there is no chapter within a reasonable distance we will assist you in establishing one. Bear in mind that the California Land Surveyors Association is *your* association. It is the only professional association in California that is devoted exclusively to the Professional Land Surveyor both in public and private practice. Your profession needs you.

It has been written and said many times that God helps him who helps himself. Help us help you. Become a participating member today. □

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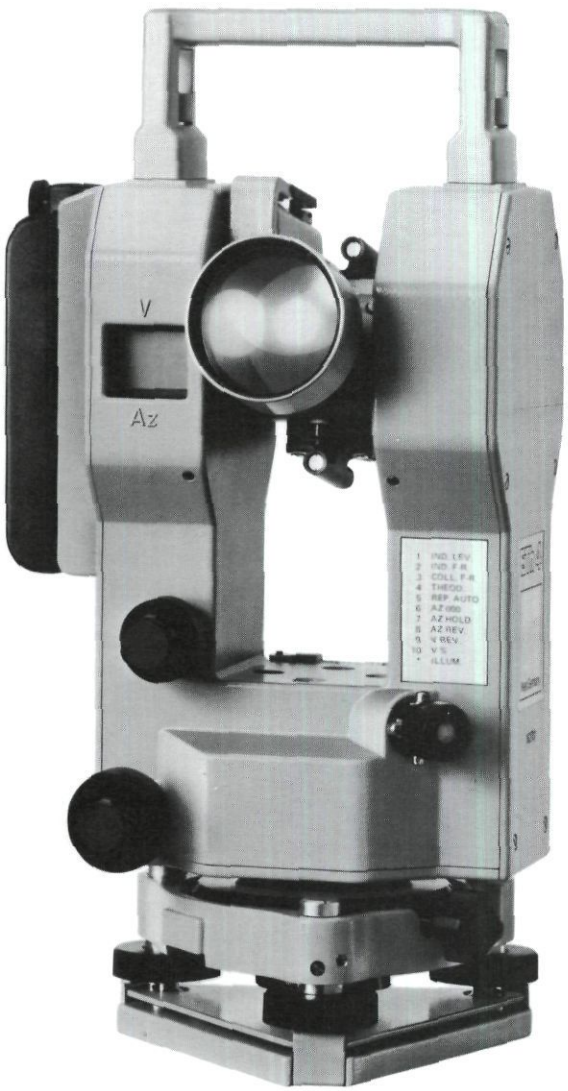

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Letters

(continued from page 6)

designed to produce large numbers of semi-qualified licensees.

More disturbing to me is Mr. Eisenberg's statement that there is an "old boy" network of surveyors who are deliberately making it tough for newcomers in the profession by manipulating the L.S. exam so as to yield a low pass rate. I quote, "the group of Land Surveyors in control of the examining process have (sic) judged past standards by which they were licensed to be unsatisfactory. Fine. Shift the goal posts. Just be up front about it."

There is no doubt that since 1984 the pass rate for the L.S. exam has changed significantly. However, the reason for this change is due to use of the criterion referenced ("absolute") test method, instead the norm-referenced ("curve") test method formerly used to determine the minimum passing score for the exam. The shift from the norm-referenced method to the criterion-referenced method is not restricted to the L.S. exam, nor is it even restricted to the other professional exams administered by the California Board. This is a nationwide trend which originated with the NCEE. The pass rates for *all* the license exams have been much lower, and the result has been widespread controversy throughout the entire professional community. (Just ask the engineers what they think of the pass rates for this year's exams.)

There may be room for debate as to whether the new test evaluation method is appropriate, or even valid, but it seems to me irresponsible to suggest that a "tacit policy" amounting to a conspiracy has been implemented by the so-called "Land Surveyors in control." In order to prove the existence of such a conspiracy, the first step would have to be a demonstration that the L.S. exam, and *only* the L.S. exam, has been subject to radical changes recently. Such a demonstration cannot be made because the facts will not bear it out.

One more point: in a climate of liability paranoia and public outcry for greater responsibility from practitioners in all professions, it is hard to make a case for easing the license requirements for Land Surveyors. Instead, common sense would dictate that higher standards matching contemporary conditions be put in place. Those surveyors who have been licensed for a number of years and have a current perspective derived from day-to-day practice at the professional level would logically have the most valid input as to what those standards should be. If practicing Land Surveyors don't know what it takes to qualify as a competent professional in today's world, then who does?

In conclusion, I would like to suggest that one of the best ways to get through this transitional stage in the licensing requirements of our profession is for all parties involved to get the facts straight and refrain from finger pointing.

Very truly,
Eric Froberg, P.E., L.S.
Deputy County Surveyor
Kings County, CA

Dear Editor:

On page 35 of the Summer 1986 issue of *The California Surveyor* John Hoffman, L.S. of Taft presents a neat proposition in 10th grade geometry frequently overlooked by fellow Land Surveyors.

The method of locating the center of a section by simply bisecting one of the connecting lines between opposite quarter section corners is done all too frequently by land butchers — this is correct only in the rare instance of where the accepted quarter corners of the section are *exactly* midway between the section corners; I have yet to see such a section.

However, the location of the center of a quarter section can be done by Hoffman's Lemma in many cases because the surveyor establishing the center is also establishing the opposite one sixteenth corners to be on the mid points of the bounding courses of the quarter section. This, of course, is not applicable to certain quarter sections, in sections 1-6 inclusive, 7, 18, 19, 30, and 31, in a normal township.

For an interesting discussion of another technique to locate the center of a quarter section as posed in a question to the General Land Office and that organization's official response, page 604 et seq. of Clark "On Surveying and Boundaries", Second Edition.

Very truly yours,
Ira H. Alexander
Vice President of
Metrex Systems Corp. □

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The U.S. Public Land Survey:

A Fundamental Multipurpose Cadastral Referencing System

Last fall the Los Angeles/Ventura Chapter presented a Scholarship program for the benefit of survey students. The purpose of the program was to recognize and encourage students pursuing an undergraduate or graduate degree in surveying or related program who research and write on topics of interest to the surveying profession in California. The following article by Steve Henkle, the recipient of the first scholarship, is presented in this issue. The second and third winners will be presented in subsequent issues.

by Steve Henkle
SE 191T – "The Multipurpose Cadastre" – Spring 1986
Department of Civil and Surveying Engineering,
School of Engineering, California State University, Fresno

Biographical Sketch

After completing a bachelor's degree in geography at California State University, Sacramento (1978), and serving in the U.S. Air Force (1978 to 1983), Steve is currently pursuing a second baccalaureate in Surveying Engineering at California State University, Fresno.

Abstract

The U.S. Public Land Survey System (USPLSS) was originally created as a parcel – based, spatial referencing system. The advent of coordinate assigned and computer–based storage has eclipsed this basic intent to such an extent that the USPLSS is becoming, rather, a hindrance to the advancement of digitally stored spatial information processing. Regionally based, interim solutions to the problems associated with multi-user land data bases (as stand alone systems) will not endure unless they utilize the imbedded structure of the USPLSS. Utilization will require assignment of coordinate values to all USPLSS corners within the data base. The long term solutions will require a consortium of user needs and opinions in order to design and legislate a national, multipurpose cadastral data base which optimizes productivity and minimizes data redundancy and cost.

Introduction

The intent of this paper is not to discuss the technical merits (if any) of the USPLSS, but to encourage its inclusion as a fundamental element in the referencing system to be used in developing a national, multipurpose cadastral data base. Such a project must be pursued (expeditiously) by the systematic assignment of corner coordinate values derived by ties to the National Geodetic Survey control networks which govern the State Plane Coordinate Systems. Such an ambitious goal can be accomplished if given the same legal status originally accorded to the USPLSS.

This recommendation is based on three related concepts:

(1) land tenure data represents a fundamental and critical data element in a multipurpose cadastral overlay system used primarily for supplying information affecting land use decisions and land ownership,

(2) The USPLSS is the fundamental reference for the majority of land tenure records. As such, to consider dislodging it in favor of a more sophisticated referencing system would be counter productive and cost prohibitive in the development of a national multipurpose cadastre,

(3) State plane coordinate values assigned to USPLSS corners (or the equivalent monument in non-USPLSS states) is the most generally accepted method of providing accurate positional information for common usage.

Historical Precedence

The USPLSS was instituted early in the history of the United States in order to provide for the orderly dispensing of Federal lands into private ownership. To this end, it represented a significant improvement in the evolution of land tenure systems, and succeeded in solving many of the difficulties created by the antiquated system of metes and bounds description instituted during the American colonial period.

The USPLSS is the fundamental land tenure recordation system for approximately 80 per cent of the area of the United States. Whether a more efficient recordation system exists is trivial. Adjustments to a new recordation system would violate principles of title lineage, and would likely generate more error and confusion than additional benefit. None of the literature surveyed considered replacement of the USPLSS as either reasonable or workable. In fact, the weight of opinion in the literature calls for inclusion of the USPLSS corner into a coordinate reference system, tied to a geodetic control network, as the most logical and natural improvement in the evolution of the USPLSS.

Current Systematic Data Redundancy/Incompatibility/Error

If systematic, national guidelines for the restoration, coordinate assignment, and use of the USPLSS corners are not developed and followed for inclusion into a multipurpose cadastral data base, positional data and mapping product redundancies (and errors) will continue for the foreseeable future do to current parochialism in any one agency (public or private).

Positional data for various resource, engineering, demographic, and cartographic projects are, in general, based on locally assigned control networks likely to be incompatible with other data bases. For those projects which are now tied to the USPLSS, inconsistency of current survey data standards coupled with low USPLSS field accuracies makes data compatibility superfluous when compared to the inherent, systematic errors.

Implementation

The cost of systematic restoration and coordinate assignment for USPLSS corners is a primary stumbling block to progress of a national multipurpose cadastre. This is understandable, since there are approximately 2.8 million USPLSS corners. On the other hand, it should be obvious that a system which has existed for 200 years, and which references 80 per cent of the land area, should take several decades of effort in completing the corner coordinate assignments, if done properly.

The problem at hand is in choosing the form of implementation and allocation of cost. Economic forces will, at some point in the future, motivate enough citizens, private business, and local, state, and federal agencies to cooperatively converge on the solutions to the systematic inclusion of this necessary element in the multipurpose cadastral data base.

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Additional Considerations

Added hindrance in upgrading the USPLSS to multipurpose cadastral standards is the user's present lack of perceptible need. Two current data input/output classes have been identified for the majority of users:

(1) Accuracy requirements met by digitizing USGS 7½ minute topographic quadrangle maps (± 40 ft. horizontal error), and

(2) Positional accuracies met by point to point ground surveying (± 0.01 to 1.0 ft. error)

Users who fall into one of these two groups have little basis for sharing data, and have a tendency to rely on special, unrelated sources for their input/output requirements. Those users in between the accuracy extremes provide a third band of data compatibility problems.

Organizational Walls

The parochialism, cost constraints, and accuracy requirements concerning data acquisition and use have developed into bureaucratic systems. Such bureaucracies must be re-educated (or redefined) if efficient, dedicated, and accurate data bases, capable of serving all levels of positional accuracy, are to be developed.

The positional data base should be structurally analogous to a broadband frequency source, within which a user may sample at the required level (wavelength) of accuracy. This would imply that data is to be segregated by ties to an accuracy level reference system, as well as to the geodetic reference.

Primordial Digital Data Bases

Currently, several private concerns and government agencies at various levels are generating data bases dedicated to geographically defined information (natural resources, land uses, demographic boundaries, and property parcel data). Each particular system represents a unique solution to the particular user's needs. This may be a logical and natural development in the evolution of the multipurpose cadastre, but it cannot proceed much farther without becoming counter-productive.

These users are spending a considerable amount of time and money in developing systems which, inevitably, will be replaced by a data base of broader scope. Short-sighted administration will be responsible for wasting limited resources in developing a data base which cannot be integrated into the future national cadastre. The most efficient way to avoid the problem is to design a current (interim) data base which uses the USPLSS corner as a fundamental reference.

Conclusions

Current sporadic and regionally based digital storage of land related information, though necessary in the interim, represents a short-sighted, stop-gap approach, which will becoming increasingly counter-productive at all levels of use.

It is imperative, in order to minimize data redundancy, and to maximize data base compatibility and efficiency, to assess and define the broadest solutions to the spectrum of land-related data user requirements, and to legislate and implement an acceptable format for the long term development of a national, multipurpose cadastral data base.

The USPLSS has served its intended purpose well. Due to its entrenchment in the spectrum of land related data, replacement with more sophisticated analytical tools would be at best counter-productive and worst would create more legal ambiguity than currently exists.

Widely accepted methods (state plane coordinates/geodetic ties) exist for consistent assignment of numeric values to the USPLSS corners.

In the interest of creating a generic, broadly applicable land data reference system, indexed USPLSS corners represent the lowest cost extant monumentation available.

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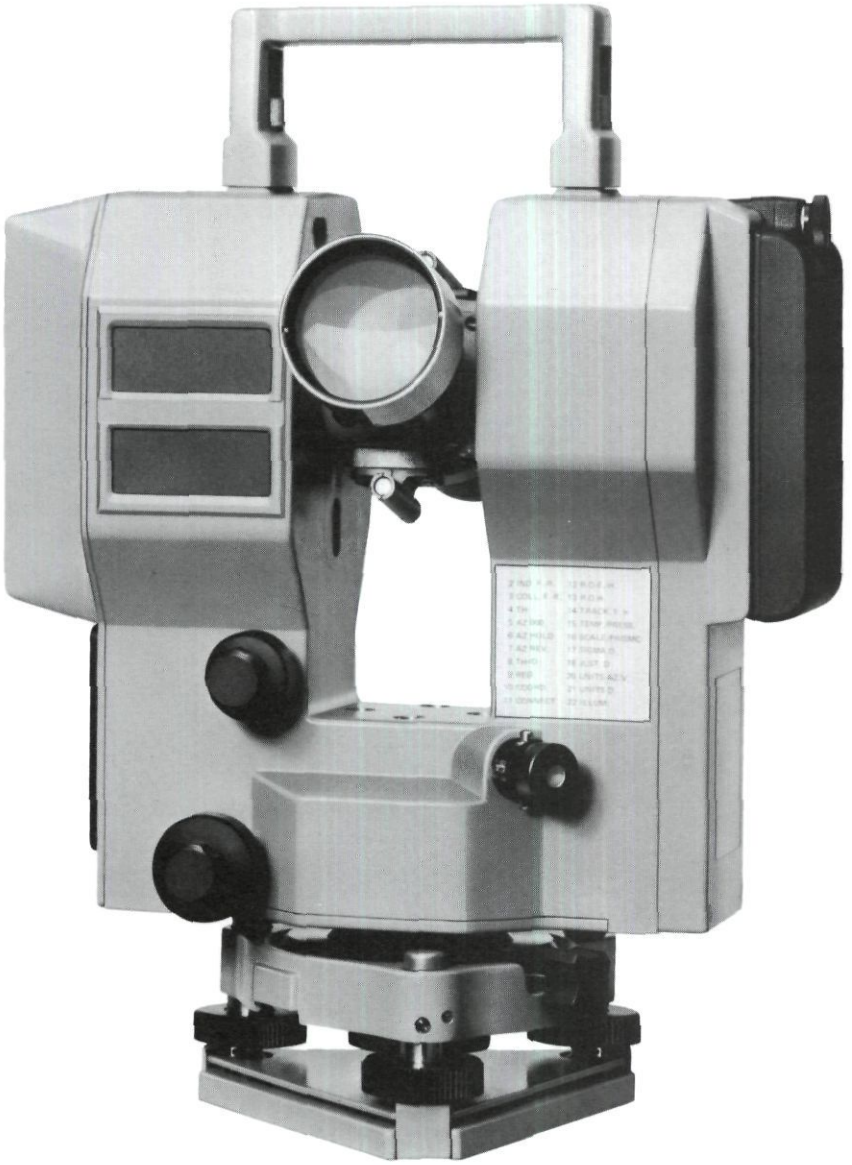

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Board of Directors Meeting Minutes

by Susan Anne Jensen, Secretary, L.S.

The third quarter meeting of the Board of Directors of the California Land Surveyors Association was held on July 26, 1986 at the Airport Marriot Hotel, Los Angeles, California.

The meeting was called to order by President Siegmund at 9:40 a.m.

The minutes of the April 26, 1986 Board of Directors meeting were approved as mailed.

Unfinished Business: The officers gave their respective reports to the Board. Included in the President's report was the unhappy announcement that Jim Adams, Past President and Executive Director of the Association, had passed away earlier in the month.

Paul Cuomo, Treasurer, reported that the BLM workshops in Concord and Santa Ana were a great success.

Administrative Division: The board members discussed the association goals and the chapter representatives were directed to poll their chapter members for input on additional and revised goals.

By-Law Committee: Proposed By-Law amendments were presented for Board approval. Additional minor changes were suggested in the wording of Section 2:01(e) and 3:05 and will be brought back to the Board for approval at the next meeting. In addition, a question was raised about a possible change in the deadline for nominations as specified in Section 4:02. The issue was tabled until after lunch. Discussion of the proposed amendments, as written, followed. It was decided to vote on item 4 which addressed Proxy Voting, as a separate item.

Gene Ehe moved to accept item 4, the proposed change to Section 4:03 (Voting) as written, second by Claude Tomlinson. Lee Hennes requested that East Bay Chapter go on record as opposing this amendment. A hand vote was taken and the motion was passed, 16 aye, 9 no, with 2 abstentions.

Susan Jensen moved to replace the word cumulative with the word continuous in item 1 which amends Aritcle 2, Section 2:01(f), seconded by Don Watson. The motion was passed with 1 no vote.

Gene Ehe moved to approve items 1 through 8 except 4 (Proxy Vote) as amended, second by Lee Hennes. The motion passed unanimously.

Conference Committee: Dorothy Calegari gave a progress report on the upcoming Joint CLSA/NALS conference scheduled for March 5-7, 1987 in Las Vegas. The site selection committee is pursuing a site in the South Lake Tahoe area for the 1988 Conference. President Siegmund requested input from the representatives on suggested sites for 1989. Some suggested sites included Monterey, Palm Springs and Santa Barbara.

Education Division: Education Committee Chairman, Paul Cuomo reported that a one day seminar on ALTA, High-rise and Vertical surveys will be held Sept. 13th in Concord. In addition, 2 seminars on Boundary Determination, utilizing State Lands Commission speakers, are being planned for early next year.

Legislative Division: Legislative Committee report was attached to the agenda. Also, it was reported that the pending lawsuit brought against the association by our former lobbyist was settled out of court.

Professional Matters Division: Gene Ehe, State Board of Registration Liaison, gave a verbal report in addition to that placed on the agenda. He related that the full-time L.S. staff member at the Board was retiring and that there was some question as to whether he would be replaced or the position dropped.

Gene Ehe moved that CLSA send a letter to the State Board of Registration regarding the necessity for a full-time L.S. staff member, second by Joe Bell. The motion was passed unanimously.

By-Law Committee recommendations were continued after the lunch break. Fred Kett moved that the By-Law Committee prepare an amendment to Section 4:02 changing and clarifying the deadline for Nomination Committee recommendations from the third board meeting to the fourth board meeting or October 31 whichever comes first, and to bring the drafted form to the next board meeting for action, second by Neal Campbell. The motion was passed unanimously.

Chapter Reports: The Marin Chapter letter regarding Record of Survey was referred to the Legislative Comittee for their review and recommendations.

New Business: The date and place for the next Board of directors meeting was set for October 25, in the San Francisco Airport area.

Resolutions: Gene Rutledge moved approval of Resolution 86-08 recognizing our debt to James E. Adams and authorizing the creation of an annual memorial scholarship, second by Paul Cuomo. The resolution was passed unanimously.

Chris White moved approval of Resolution 86-09 granting life membership to Edison Ayer, L.S. 2803, second by Fred Kett. The resolution was passed unanimously.

Tom Mastin moved approval of Resolution 86-10 which is a policy statement concerning the appropriateness of county general funding of Record of Survey checking fees, second by Michael Moore. The resolution passed unanimously.

Paul Lamoreaux moved approval of Resolution 86-11 directing the formation of a joint conference committee including all surveying and mapping organizations to organize and promote a single California conference. Lee

CLSA/NALS Joint Conference '87

A committee of members from the California Land Surveyor Association and Nevada Association of Land Surveyors has met three times to date, laying the groundwork for the 1987 CLSA/NALS Conference.

The conference will be held at Bally's Grand Hotel in fabulous Las Vegas on March 5-7, 1987.

Las Vegas is one of the best convention cities in the U.S. It uniquely combines first-class exhibit and meeting areas with equally impressive hotel facilities and entertainment attractions.

An informative technical program has been centered around this year's theme of *"Educate, Legislate, Communicate."* Over 40 exhibit booths will be set up in the hotel's penthouse for vendors to display their latest wares. Many fun and exciting social events are being planned with free time available for gambling, golf, and gourmet restaurants.

Every effort is being made to insure this conference will be one to remember.

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Hennes moved to amend the resolution to direct CLSA to coordinate with other interested organizations to investigate the possibility of a joint California conference, second by Bruce Hall. The amendment was passed. Amended Resolution 86-11 was then passed unanimously.

Bruce Hall moved approval of Resolution 86-12 authorizing the opening of a checking account for the 1987 Joint CLSA/NALS conference, second by Lee Hennes. The resolution was passed unanimously.

Lee Hennes moved to authorize the officers of the association to investigate various procedures to raise funds in support of the National Society of Professional Surveyors Film and to implement any such procedures that do not involve the expenditure of state association funds, second by Paul Lamoreaux. The motion was passed unanimously.

Meeting adjourned. □

The Standard Meter

The French originated the meter in the 1790s as one/ten-millionth of the distance from the equator to the north pole along a meridian through Paris. It is realistically represented by the distance between two marks on an iron bar kept in Paris. The International Bureau of Weights and Measures, created in 1875, upgraded the bar to one made of 90 percent platinum/10 percent iridium alloy.

In 1960 the meter was redefined as 1,650,763.73 wavelengths of orange-red light, in a vacuum, produced by burning the element krypton (Kr-86). More recently (1984) the Geneva Conference on Weights and Measures has defined the meter as the distance light travels, in a vacuum, in 1/299,792,458 seconds with time measured by a cesium-133 atomic clock which emits pulses of radiation at very rapid, regular intervals.

None of the definitions changed the length of the meter, but merely allowed this length to be duplicated more precisely.

Our English foot has not been so constant. The U.S. Congress legalized the use of the metric system in 1866 on the basis that one meter is exactly equal to 39.37 inches. In 1959 a number of English speaking countries agreed that one inch is exactly equal to 2.54 centimeters so that the International foot is exactly equal to 0.3048 meters. The United States retained the old 1866 equivalency and called it the U.S. Survey foot so that 1 U.S. Survey foot = 1.000002 International feet.

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An Idea to Copy

Some companies have discovered a way to charge employees and visitors for making personal photocopies without seeming insensitive to their needs. They're charging 10 cents for each copy but placing a container near the machine with a sign stating that they'll donate the collected money to the United Way in the name of their employees.

Communication Briefings - August 1986 □

Stolen Equipment
Fair Oaks, CA
July 24, 1986

1 – Ziess NI–1 First order level S/N 107287,DWR 64819
1 – Wild T2 S/N 55510, DWR G1233, and
1 – Handie Talkie Radio S/N 551342, DWR 43561

All items had '81000' etched on the surface and, at the time of the theft, had D.W.R. equipment inventory numbers attached as indicated above.

If located, please notify:
California Dept. of
Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001
ATTN: Surveys and
Photogrammetry
or call: (916) 445-9257 collect □

Training for Land Surveyor Registration Exam

On September 17, 1985, Senate Bill No. 670 was passed, requiring that all persons in responsible charge of land surveying work be licensed Land Surveyors. Language in the bill allows State and local agencies to continue using unlicensed employees in responsible charge *until that person is replaced.*

While Caltrans currently has approximately 100 survey party chief positions which require Land Surveyor registration under the new law, only 30 of those currently in responsible charge are licensed Land Surveyors. As party chief positions become vacant, we will no longer be able to appoint non–licensed replacements. It is, therefore, incumbent upon Caltrans managers to encourage and support all efforts to increase the number of licensed Land Surveyors in our Surveys function.

In response to this critical need, we have added to our "Special Programs" training category a pre–test preparation seminar for the Land Surveyor in Training (L.S.I.T.) and the Land Surveyor Professional (L.S.P.) registration examinations. □

Exam Schedule

Exam	Filing Deadline	Exam Date
EIT, LSIT	January 16, 1987	April 11, 1987
	August 14, 1987	October 31, 1987
Land Surveyor	July 10, 1987	October 31, 1987
Structural	May 6, 1987	August 7 & 8, 1987

The Board reserves the right to amend this schedule without advance notice. □

The Second Mile

by William E. Wickenden
President, Case School of Applied Science, Cleveland, Ohio

Revision of an Address Delivered Before The Engineering Institute of Canada, Hamilton, Ontario, February 7, 1941.

President Wickenden is a yeasty individual, and his addresses are worth careful reading, re-reading, and study. The present one is no exception; it is even multilateral.

Would you know better the essence of a profession? Would you know what engineering stands for in the present world? Would you envision the coming action programs of engineers who are now youths? Would you discern the philosophy of the engineer? Would you catch a glimpse of the breadth of conscious professional engineering responsibility? Even — would you read a well-conceived, delightfully phrased essay? Whichever view your inquiring mind takes, you will find some compulsion to thoughtfulness in Wickenden's paper.

I commend it to teachers of English who desire to illustrate the technique of well-built, purposeful speech or expression. I commend it to the engineering educator who feels confused by the multiple aspects which his duties involve. I commend it to the student of modern society in its dependency upon professional groups. I commend it to the man who sees only darkness and danger ahead.

You cannot read it without clarifying your ideas relating to social relations and responsibilities. You cannot read it without absorbing something of its quiet spirit of assurance and confidence in the fundamentals of modern society.

O.J. Ferguson
Dean of Engineering,
University of Nebraska

The Second Mile

"Whosoever shall compel thee to go one mile — go with him twain." You will recognize this text from the Sermon on the Mount as a counsel of perfection, good advice in paradoxical form which emphasizes a profound truth by an apparent denial of common sense. A preacher who was once reproached for straying rather far from his text replied: "A text is like a gate; it has two uses — you can either swing on it, or open it and pass through." Let us swing a moment, then pass on through. Every calling has its mile of compulsion, its daily round of tasks and duties, its standard of honest craftsmanship, its code of man-to-man relations, which one must cover if he is to survive. Beyond that lies the mile of voluntary effort, where men strive for excellence, give unrequited service to the common good, and seek to invest their work with a wide and enduring significance. It is only in this second mile that a calling may attain to the dignity and the distinction of a profession.

There is a school of thought which seems to hold that all the problems of the engineering profession lie in the mile of compulsion. They hope to solve most of them by giving a profession a legal status. You may hear them saying "If only we compel all who would bear the name engineer to go the mile which ends in a professional examination and a public license, we shall have protection, prestige, and profit to our heart's desires." They forget, perhaps, that there are many useful callings which have traversed this mile without finding the higher professional dignities at its end. We license embalmers, chiropodists, barbers, and cosmetologists, but we do it for the protection of the public, and not to erect them into castes of special dignity and privilege.

Is Not Every Occupation a Profession?

There seems to be an illusion abroad that any calling may claim recognition as a profession by merely willing it so and by serving notice to that effect on the rest of the world. It is supposed to help a lot, too if you can invent for your occupation some mysterious-sounding name derived from the Greek. One reads, for example, of a group of barbers who elect to be known hereafter as "chirotonsors," in order to raise the prestige of their "profession." Why not, when you have cosmetologists right in the same shop? The truth seems to be that as soon as any work acquires a halo of distinction, everyone wants to claim it, and the unique value of the word is quickly destroyed by indiscriminate usage. When one scientist observed what the advertising fraternity has done to the word "research," he remarked dryly that we now use that word to mean so many things we shall soon have to invent another word to mean research. The ambition to dignify honorable work is laudable, but there is much seizing after the form and letting the substance escape, which would be ludicrous if it were not pathetic.

A prominent English churchman once remarked jokingly that there were three sorts of Anglicans: the low and lazy, the broad and hazy, and the high and crazy. It seems to be much the same among engineers in our thinking about our profession. We have a low church party, indifferent to forms and organizations, which holds that status and titles are of little consequence; so long as the public allows us to claim them not much else matters if the engineer does an honest day's work. The brad church party is all for inclusiveness; if business men and industrialists wish to call themselves engineers, let us take them in and do them good, not for getting the more expensive grades of membership. The high church party is all out for exclusive definitions and a strictly regulated legal status; in their eyes, what marks a man as a "professional" engineer is not his learning, his skill, his ideals, his public leadership — it is his license certificate.

What Professions Have In Common

In view of these divided counsels, it may not be amiss to consider briefly what a profession is, how it came to be, why it exists, how its status and privileges are maintained and what obligations it entails; and finally to discuss a few of our current issues in the light of these backgrounds.

Of professions there are many kinds: open professions like music, to which any man may aspire within the bounds of his talents, and closed professions like medicine which may be entered only through a legally prescribed process; individual professions like painting and group professions like law, whose members constitute "the bar," a special class in society; private professions like authorship and public professions like journalism; artistic professions like sculpture and technical professions like surgery; ameliorative professions like the ministry and social work and professions which achieve their ends by systematic destruction like the army and navy. Despite all these differences of pattern, there are characteristic threads which run like a common warp beneath the varying woof of every type of professional life and endeavor.

If one seeks definitions from various authorities, he finds four characteristic viewpoints. One authority will hold that it is all an *attitude of mind,* that any man in any honorable calling can make his

(continued on page 18)

Second Mile *(continued from page 17)*

work professional through an altruistic motive. A second may hold that what matters is a certain *kind of work,* the individual practice of some science or art on an elevated intellectual plane which has come to be regarded conventionally as professional. A third may say that it is a special *order in society,* a group of persons set apart and specially charged with a distinctive social function, as the bar, the bench and the clergy. Still others would insist that no work can properly be called professional unless it involves a *confidential relationship* between an agent and a client, like that of a physician to his patient, an attorney to the party he represents, a minister to a penitent making confession, or a social worker to a person or family seeking rehabilitation.

To sum up the sources of confusion, some define a profession solely in terms of ideals professed, others solely in terms of practices observed, and still others in terms of legal powers exercised. None the less, there is a considerable area of agreement. All authorities recognize that some of the distinguishing attributes of a profession pertain to individuals, while others pertain to groups, but there is considerable variation in the emphasis given. Let us glance briefly at these two sorts of distinguishing attributes.

Marks of the Professional Man and Group

What marks off the life of an individual as professional? First, I think we may say that it is a *type of activitiy* which is marked by high individual responsibility and which deals with problems on a distinctly intellectual plane. Second, we may say that it is a *motive of service,* as distinct from profit. Third, is the *motive of self expression,* which implies a joy and pride in one's work and a self–imposed standard of workmanship — one's best. And fourth, is a *conscious recognition of social duty* to be accomplished, among other means, by guarding the standards and ideals of one's profession and advancing it in public understanding and esteem, by sharing advances in professional knowledge, and by rendering gratuitous public service, in addition to that for ordinary compensation, as a return to society for special advantages of education and status.

Next, what are the attributes of a group of persons which mark off their corporate life as professional in character? I think we may place first a *body of knowledge* (science) *and of art* (skill), held as a common possession and to be extended by united effort. Next we may place *an educational process* of distinctive aims and standards, in ordering which the professional group has a recognized responsibility. Third in order is a *standard of qualifications,* based on character, training, and competency, for admission to the professional group. Next follows a *standard of conduct* based on courtesy, honor, and ethics, to guide the practitioner in his relations with clients, colleagues, and the public. Fifth, I should place a more or less formal *recognition of status* by one's colleagues or by the state, as a basis of good standing. And finally *an organization* of the professional group devoted to its common advancement and social duty rather than the maintenance of an economic monopoly.

How Professions Came To Be

The traditional professions of law, medicine, and divinity had a common fountain head in the priestcraft of antiquity. What is professional in engineering and in certain other modern callings can be traced back only so far as the medieval merchant and craft guilds. The guilds arose in the period when feudal society was breaking down, but before strong central and local governments had been created. There was a gap

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Second Mile *(continued from page 18)*

which only voluntary organizations could fill. In this disorganized period men who wished to engage in far-flung commerce, with no strong state to protect them by its army or navy, had to band together for their own protection, as did the merchants of the Hanseatic League along the shores of the Baltic Sea.

The various crafts likewise found it necessary to organize guilds for mutual protection and regulation, and this in turn leg to monopolistic control. In the various crafts it was the guilds which regulated by ordinance the hours of labor, the observance of holidays, the length and character of apprenticeship, and the quality of workmanship; and it was the guild which tested the progress of novices, apprentices, and journeymen and finally admitted them to the ranks of the master.

When the cities and the states waxed powerful, they usually confirmed the monopolies which the guilds had gathered to themselves and even incorporated them into the structure of the municipality, as in the City and Guilds of London. The church too lent its blessing, since the religious philosophy of the middle ages regarded society as a commonwealth divided into divinely ordained functions, and not as a mere aggregation of individuals — an idea which recent Papal encyclicals have sought to reanimate under the name of a corporative society. In the spirit of the times, the guilds required members to contribute periodically to a common fund for the relief of distress, to participate in certain religious observances, and to honor certain festivities and pageants.

Professional Life a Form of Citizenship

Guild life was a highly developed form of citizenship, centered around occupations rather than politics. If you have an opportunity to see a performance of Richard Wagner's opera "Die Meistersinger," you will not only hear much magnificent music, but see an unforgettable picture of guild life in its medieval home. Many of the features of this unique form of citizenship are perpetuated in our modern professional bodies. The public grants to a profession more or less tangible monopolies and self governing privileges, in consideration of which it engages to admit to its ranks only men who have proved their competency, to scrutinize the quality the quality of their work, to insist on the observance of ethical relations, and to protect the public against extortion and bungling.

The occasion which calls for professional service is often a human emergency in which the legal doctrine of *caveat emptor* — let the buyer beware — breaks down. When a baby is about to be born or an appendix must be removed, you do not want to drive a smart bargain at your own risk, but you do want some credentials to assure you that the job is in competent hands. When a layman comes face to face with the complex and often terrifying specialization of professional knowledge and skill, he is likely to be baffled or even misled. If you have a problem of mental hygiene in your family, how can you be sure you are dealing with a qualified psychiatrist and not with a plausible but unscrupulous quack? To protect you in these emergencies, the public wisely puts the burden of guaranteeing at least minimum standards of competence and ethics on the profession itself. The physician you can trust is the one who is recognized to be well qualified and reputable by other physicians of good standing; the same with lawyers, dentists, architects, and engineers.

The public may implement this obligation which it places on the profession by appointing a board from its members to conduct professional examinations and to issue licenses to those who pass them successfully, or it may leave the profession free to issue its own credentials, as the actuaries do; but in the end it comes down to the same thing — a profession must guarantee to the public the competency of its practitioners. In return, the public protects the profession from the incompetent judgment of the layman by a privileged status before the law.

Professional Duty to Society

Professional status is therefore an implied contract to serve society, over and beyond all duty to client or employer, in consideration of the privileges and protection society extends to the profession. The possession and practice of a high order of skill do not in themselves make an individual a professional man. Technical training pure and simple, I think we can agree, is vocational rather than professional in its character. The difference between technical training and professional education is not merely a matter of length — of two years, or four, or six; nor is it a difference of intellectual levels. It is rather a matter of spirit and ideals, and even more a matter of what may be called an overplus beyond the knowledge a man needs to master his daily job. A surgeon, for example, may have to be extremely skillful in tying knots, which he learns by technical training and prolonged practice, but the overplus of his education which makes him a professional man consists largely of studies in biology and psychology which give him a deeper insight into the human organism and its hidden forces than he may ever require for the mastery of the most complex technique of his art. Professional education for the lawyer means more than training him to draw contracts or deeds, or wills, to make briefs or to try cases. It means also the study of history, philosophy, and social institutions out of which the law has grown as a deposit from man's age-long experience. Likewise for the engineer, professional education means not only skill in applying mathematics and the physical sciences, but also philosophic insights into these sciences as modes of human experience.

This overplus, again, involves a knowledge of social forces and institutions which will enable a professional man to view his work and its consequences not only as a service to a client, but also in terms of its implications for society. An engineer, for example, recommends the introduction of a labor-saving process; does he see in this only a saving in the immediate cost of production, merely assuming that this is a desirable end in itself, or can he perceive the sequence of effects which will be felt in the lives of individuals, the organization which employs them, the community in which it functions, and the wider sector of society which it serves? In the answer to this question there is wrapped up much of the difference between a high-grade technician and a man of true professional stature.

Professional Management in Industry

Through all professional relations there runs a three-fold thread of accountability — to clients, to colleagues, and to the public. Is business a profession or can it be made so? We sometimes hear it referred to as the oldest of trades and the newest of professions. It seems clear that business is moving away from the dog-eat-dog area to one nearer the fringe of professional like. This occurs whenever the direct administration of an enterprise passes out of the hands of owners who merely divide its profits, into the hands of managers who receive salaries for their services and who are expected to serve not their own interests, but the interests of others. Business may still be far from a true profession, but management is well within the pale. Business has lived traditionally from balance-

(continued on page 22)

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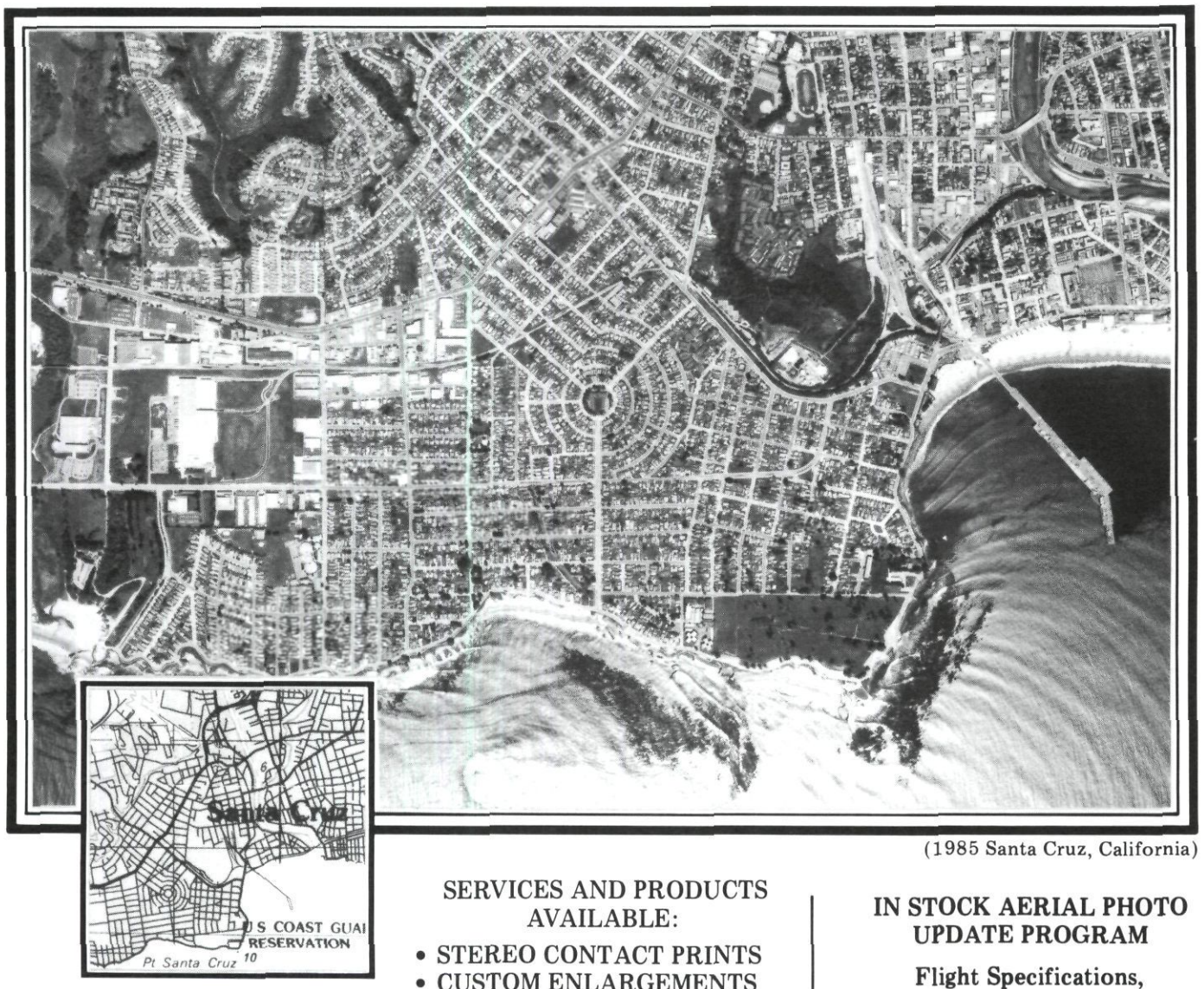

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Second Mile *(continued from page 20)*
sheet to balance-sheet; the time span of its thinking has often been about three months; the profit-and-loss statement has been its only yardstick. Professional managers, if assured of reasonable security of tenure, are better able to think and plan in terms of long-range prosperity and to act as responsible middlemen between investors, workers, customers, and the public. At one time I worked for the Bell Telephone System, of which no individual owns as much as one percent. It is the best example of manager-operated, as distinct from owner-operated, business that I know of and the one that comes nearest to fulfilling professional standards.

All of us can take pride in this example, because it is so largely an engineer-managed enterprise. If we engineers were to narrow our professional fellowship so as to include only men who render technical service on an individual agent-and-client basis and exclude all whose work is primarily administrative, I feel that we should do an irreparable injury both to ourselves and to society. The engineer has been the pioneer in the professionalizing of industry, and his task is only begun. Organized labor, it seems, is intent upon gaining a larger voice in the councils of industry; it wants to sit in when policies are made and to share in planning the schedules of production.

Many labor organizations not only exercise a direct voice in management, but are also in a position to accumulate immense surplus funds from fees and dues. These funds may become one of the major sources of capital for investment in industry, making labor an important stockholder as well. If any such day is ahead, the middle-man of management who can reconcile the stake of the investor, the worker, the customer, and the public is going to be the key man on the team. For that responsibility, the finger of destiny points to the engineer. This makes it all the more urgent that the young engineer, while using every opportunity to gain a discriminating and even a sympathetic knowledge of the labor movement, should avoid being sucked into it by the lure of a quick gain in income and in bargaining power.

Ethical Obligations

The ethical obligations of a profession are usually embodied in codes and enforced by police powers. The physician and lawyer are bound by explicit obligations, and woe betide the man who oversteps them. If the courts do not deal with him, the organized profession will. He must not only keep inviolate information confided to him by his client, serve his client's interest exclusively, and stay within strict bounds of procedure, but he must also observe definite rules in his relations with other members of his profession. As engineers, our codes are more intangible, as our duties are less definable, but our ethical obligations are no less severe.

Professional Life a Form of Citizenship

Guild life was a highly developed form of citizenship, centered around occupations rather than politics. If you have an opportunity to see a performance of Richard Wagner's opera "Die Meistersinger," you will not only hear much magnificent music, but see an unforgettable picture of guild life in its medieval home. Many of the features of this unique form of citizenship are perpetuated in our modern professional bodies. The public grants to a profession more or less tangible monopolies and self governing privileges, in consideration of which it engages to admit to its ranks only men who or service. His knowledge, however, is to be regarded as part of a common fund built up over the generations, an inheritance which he freely shares and to which he is obligated to add; hence the duty to publish the fruits of research and to share the advances in professional practice. If the individual lacks the ability to make such contributions personally, the least he can do to pay his debt is to join with others in creating common agencies to increase, disseminate, and preserve professional knowledge and to contribute regularly to teir support. That is the purpose to which a large share of the membership dues of our professional societies is devoted.

There are too many engineers with a narrow and petty attitude on these matter; mature men who complain that the immediate, bread-and-butter value of the researches and publications of a professional society is not worth the membership fee, and young men who complain because it does not serve them as an agency of collective bargaining. Shame on us! Do we look with envy on the high prestige of medicine and of surgery? Then let us not forget that this prestige has been won not merely through personal skill and service, but through magnificent contributions to human knowledge without profit to the seekers and with incalculable benefits for all mankind. Do we covet public leadership on a par with the legal profession? Then we do well to remember that the overplus which differentiates a profession from a technical vocation calls for personal development and for powers of expression sufficient to fit a man for a place of influence in his community.

Measured by the standards I have been seeking to outline, many men who call themselves engineers and who are competent in accepted technical practices can scarcely be said to have attained a real professional stature. These are the men who have let their scientific training slip away after college days, who do not see beyond the immediate results of their work, who look on their jobs as an ordinary business relationship, who contribute nothing to advancement by individual or group effort, and who have little or no influence in society. They have been unable to surmount routine in the early stages of experience and have gradually grown content with mediocrity. There is much in the daily work of a physician, a lawyer, and a minister of religion which compels him to be a life-long student. In peacetimes the army officer is likely to spend one year in six going to school. The student habit is less often a mark of the engineer, which is natural perhaps in a man of action rather than one of reflection, but far too many seem to leave all growth after their college days to the assimilation of ordinary experience without deliberate intellectual discipline of any kind.

Why Not Require a Longer Training?

There is a certain school of thought which has two quick and ready remedies for all ills and shortcomings of the profession. One is to keep the boys longer in college and to compel them to cover both the arts and the engineering courses; the second is to compel every engineer to take out a public license. One need not quarrel with either the aims or the means; so far as they go both are good, but they cover only the first mile. Registration, I believe, will always be a qualifying standard rather than a par standard for the engineering profession. It will go far toward keeping the wrong men out, but will serve only indirectly to get the right men in. Beyond it lies a second mile of growth and advancement for which effective stimuli, incentives, and rewards can be provided only within the profession itself.

The riper experience of the medical profession seems a safe guide. For the protection of the public, the law determines who may practice general medicine; but if a registered physician wishes to qualify as an orthopedic surgeon, he submits to a training prescribed by a

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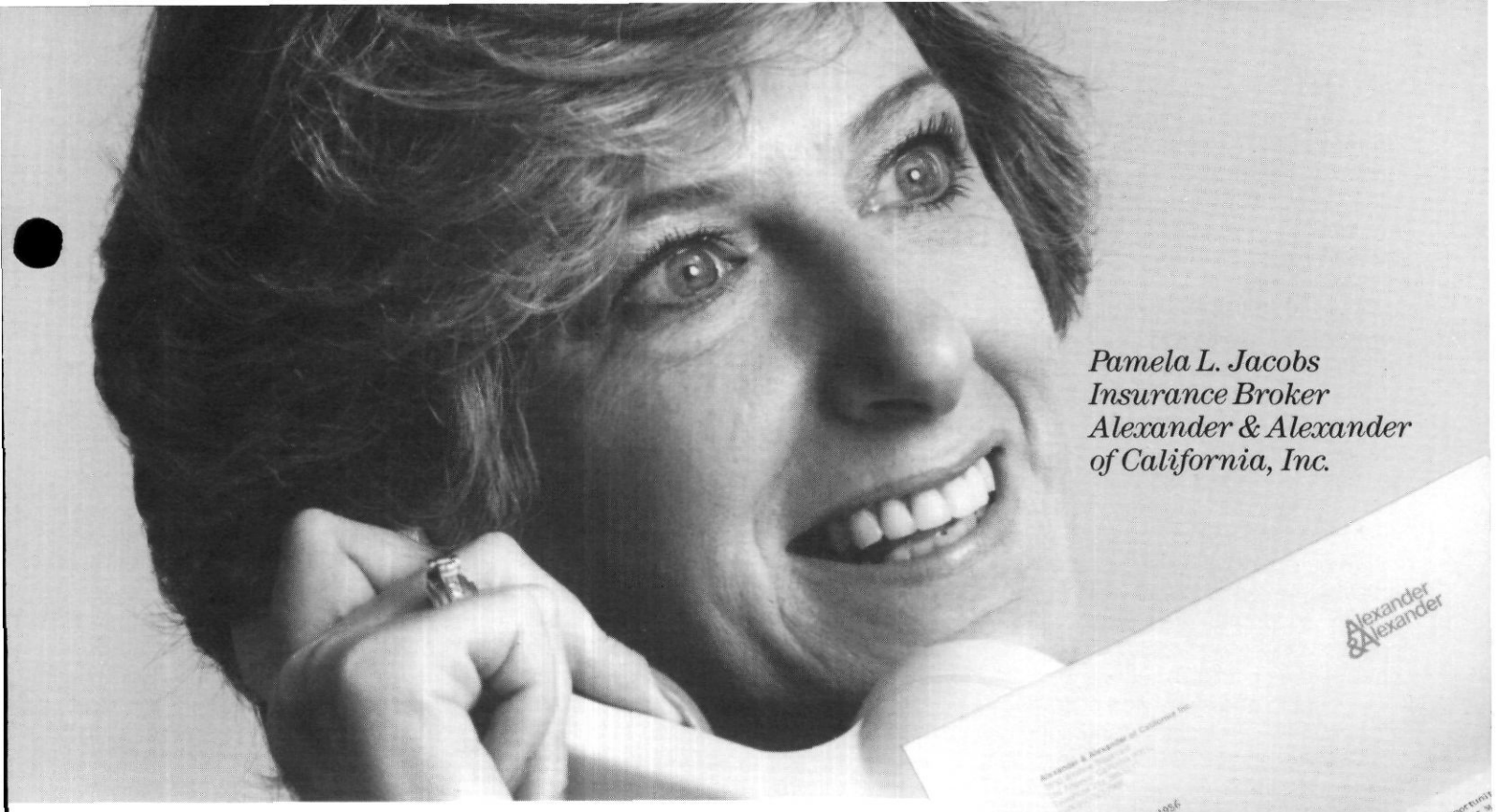

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Second Mile *(continued from page 22)*

voluntary group of specialists and undergoes an examination at their hands rather than those of a public licensing board. Evidences of distinction are likewise a gift within the sphere of the profession's inner life, rather than the domain of law.

The proposal to compel all engineering students to remain six years or more in college in order to take degrees both in liberal arts and in engineering is attractive in theory but unworkable in practice. Some young men should do so, but the majority will not. No such plan can be made compulsory so long as engineering work covers so wide a range of responsibility and is available on attractive terms to four-year graduates, or so long as the typical student engineer shows unmistakable signs of growing fed up for the moment with formal teaching and study and of craving for action as graduation approaches.

All our experience suggests that the further possibilities in the mile of voluntary advancement are much more hopeful than those in a lengthened mile of compulsory discipline. Growth in voluntary postgraduate enrollments has been going forward at a truly surprising pace. The ratio of master's degrees to bachelor's degrees granted in our engineering schools has passed one to ten and that of doctorates in close to one in a hundred. Especially important is the fact that so many of these advanced students have discovered needs and tastes for further study in their early professional experience and are now going forward with a strong individual purpose and not merely as passengers on an academic conveyor.

Equally encouraging are the gains in liberalizing the engineering curriculum by more adequate inclusion of studies in language and literature, in history and economics, and in psychology and social institutions — gains which are being made possible by the progressive transfer of specialized technical studies to the graduate plane. My enthusiasm is stirred by the rapid gain in cultural interest and activity among engineering students, gains in the reading of books, in attendance at the theater, in hearing and producing music, and in artistic forms of expression.

One cannot urge too strongly on a group of student, engineers the necessity of extending and broadening their education in the second mile of voluntary effort beyond graduation. The graduate may feel assured of his ability t secure employment, to do useful wor and to earn his keep. This may seem like quite an advantage over the arts graduate, but is it enough? The mere fact of graduation will not guarantee much more. It is not a badge of distinction; about one young man in every six in our entire population now goes to college, and one in every fifteen in likely to hold a degree. It is not a guarantee of preferment; why engineering graduates without further training so often complain of supposed economic neglect in so competitive a field is a mystery to me. It does not entitle a man to professional consideration; the graduate is a novice with his professional spurs yet to win.

It is true enough that not a few engineering graduates are building useful and sometimes successful careers by simply doing each day's work, assimilating its experience, and seizing its

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Second Mile
(continued from page 24)
opportunities, without benefit of sustained study. Well and good, but these are not rightly classed as professional careers. They are business or industrial careers, and usually narrow ones at that. No one can quarrel with them, but we are concerned now with the future of the engineering profession, with men who cannot only produce technical results and business profits, but who can be looked to for the advancement of knowledge, for the development of improved methods and products; men who can be trusted with confidential problems, with conflicting interests, and with the general welfare; men who can contribute to our common culture as well as our material comfort and convenience; and men who can shape the policies which are to guide society as well as the tools to defend and equip it. Leadership in engineering, as in law, medicine, architecture, and religion is for men who can combine boldness in action with lifelong habits of study.

A Look Ahead

Let us risk a look into the next 50 years, which our present student engineers are to share in shaping. The climax of man's effort to subdue nature, to shift labor from muscles to machines, to make material abundance available to all, and to extend a high civilization into the backward areas of the world may well fall within their lifetime. After that, perhaps human interest may shift from work to leisure, from production to enjoyment, from economic progress to culture and from industry to art. Who knows? In the meantime, however, it seems inevitable that industry will be extended on world-wide lines, production will grow more scientific, research will expand, and engineers will multiply accordingly.

Engineers will find their way into every field where science needs to be practically applied, cost counted, returns predicted, and work organized systematically. They will be called upon to share the control of disease with physicians, the control of finance with bankers, the bearing of risks with underwriters, the organizing of distribution with merchants and purchasing agents, the supplying of food with packers and purveyors, the raising of food with farmers, and the operation of the home with housewives. In few of these new fields, if any, will engineers be self-sufficient; to be useful they must be team workers; and they must be prepared to deal with "men and their ways," no less than "things and their forces."

The engineering profession, it seems equally evident, will bear much heavier responsibilities in civic and economic affairs. It cannot afford to become either a narrow caste of highly skilled technicians or a free-for-all alumni association of engineering graduates. It will probably never be able to define its boundaries precisely, nor become exclusively a legal caste, nor fix a uniform code of educational qualifications. It leaders will receive higher rewards and wider acclaim. The rank and file will probably multiply more rapidly than the elite, and rise in the economic scale to only a moderate degree.

What if Technological Education Becomes Dominant?

Technological education, now being pushed into greater prominence by the defense crisis, may find itself taking on a permanently dominant role. To fulfill any such function, it must break away from its present conventional uniformity. At one extreme, a part of it must become more profoundly scientific; at the other extreme, a vast development of practical technical education for directing production will be in demand. Engineering schools ought to be less alike, less standardized by imitation. The men who are to lead the profession will need a longer training, and one that is both more broadly humanistic and more profoundly scientific. Great numbers of workers in technology could do well with a more intensive type of training. For every *one* who should receive post-graduate training, possible *four* would find the present course sufficient, and *ten* would find an intensive two-year course more suitable. The science of economy needs to be more strongly emphasized at all levels. A science of human work needs to be created and systematically taught.

The engineers' job will be so varied, and will change so fast, and his tools will so increase in variety and refinement with the advance of science, that no engineer can hope to get a once-and-for-all education in advance. We must expect to re-educate engineers at intervals throughout their careers. The most important development of all may come in after-college education. In the future we shall see large numbers of young engineers coming back to college, some for full time, some for half time, some in the evening, some in correspondence divisions; some to pursue higher work in science, some for new engineering technique, some for training in economics and business, and not a few for broader cultural opportunities. This is as it should be. We should cease to think of education as a juvenile episode. Once these means of adult education are provided in ample degree, the engineering colleges could broaden the scientific and humanistic bases of their bases of their curricula, cut down on early specialization, relieve overcrowding, inspire independent work, and show the world the best balanced and best integrated of all modern disciplines.

Competence and Culture

There are undoubtedly some who feel that the cultural and spiritual interests of society are menaced by a greater dominance of technological education. I am unable to share these fears. We of the engineering schools have no quarrel with liberal education. We recognize that there are great numbers of young people whose career purposes come to a focus late rather than early in adolescence and who do well to lay first their foundations of culture and social understanding before attempting to build up some special competence. We believe, however, that there are a great many more young people than are now provided for whose career aims can be brought to a focus late in the secondary period and who will do best to lay first the foundations of competence, then to erect on them a superstructure of social understanding and personal participation in cultural activity. If we were to criticize the traditional emphasis of the liberal arts, we should do so on the ground that the preservation and advancement of culture and social ideals, except for certain highly trained specialists, are not the obligation of a special elite in today's society, but one which rests equally on men and women in all occupations and social groups.

We are not indifferent to culture, save that of the dilettante type. Culture is to us not a form of professional interest, nor the fruit of any form of pose or academic exposure, but the fruit of spontaneous activity which all may share on an amateur basis in that second mile which lies beyond the compulsions of one' economic occupation. Expressional activities — sport, music, writing, speaking, dramatics, and the arts of design — also the reading of books, are flourishing on many an engineering campus today quite as vigorously as in many a so-called liberal college. If destiny is to make our technological institutions responsible in the future for a major stem of higher education, and not merely for some of its specialized phases, I have faith that we shall give a good account of our stewardship. □

Programming a Cure for Computer Phobia

by Larry Stessin

How does a business owner spell fear?
C-O-M-P-U-T-E-R

Go through the history of mechanization in office and plant and you will find that nothing has infected the executive with more goose bumps and icy fingers than those gadgets made up mostly of silicone-chip compounds. In fact, these high-speed calculators (purists will disagree with such a simplistic description) have brought a new phrase into the vocabulary of management -computer phobia. This in part accounts for the current shakeout of companies that have plunged into software and hardware only to find that, because of managerial timidity, their products do not sell like hot cakes. Yet a computer-dominated society is in the entrepreneurial cards, and businessmen will have to overcome their quivers - most of which are more fanciful than real.

Businessmen whose firms have installed computers or are going to install them soon also are looking at something called 'option shock.'

Instead of ooh-ing and ah-ing over a computer that can draw color pictures, people are flustered by the overwhelming variety of alternatives available to them. But words such as 'cellular radio,' 'advanced telemarketing,' 'protocol conversation,' 'voice/data/image integration,' 'digital,' and 'voice mail' are too confusing for most executives to understand, said Edward Bleckner, chairman of Sunrise, Fla., -based Racal-Milgo, at a recent high-tech conference. And it's nearly impossible for them to choose among the hundreds of products that do essentially the same thing.

The upshot: Businesses have stopped buying until they can figure out what's going on. Companies such as Racal-Milgo are falling upon hard times. What to do about option shock? 'Keep your eye on the big picture,' Bleckner advised. 'Be aware of your company's information need. Think of your company's data as a resource to be shared.'

A soothsayer who has been a phobia watcher for several years is Dr. Stanley Kaden, a consulting psychologist who has distilled the causes of managerial skittishness to five basic fears - all of which can be overcome by common business sense.

The fear of making a mistake - With more than 400 brand names, how can a manager decide which one is the best investment? For fear of making a wrong purchasing decision, many delay taking advantage of the new technology.

Kaden's answer: 'You are no more likely to make a mistake in acquiring a computer than you are for any other investment. It is important to realize that your expectations must be realistic. You should be as skeptical of advertising claims for computers as for any other product. Do not believe that you can solve all of your business data problems by just pressing a button. Remember that some training is required, as with any advanced product, and any reputable computer sales organization will provide it when you purchase the system.'

The fear of looking dumb - The jargon and buzz words that are part of computer technology have intimidated many business owners. The media, trade journals, and manufacturers themselves have exploited high-tech language to give the products the mystery and glamour of sci-fi drama.

Kaden suggested that if a business owner looks upon the computer as just another machine designed to do a specific job, he will overcome the feeling that he is dealing with some planetary unknown.

The fear of losing control - One of the threatening aspects of computers is how invisibly they work. Kaden explained: 'When your bookkeeper posts figures, you can look over his or her shoulder and see the numbers that have been entered. And you can thumb through the pages of a ledger or a batch of account cards and see what's there. But when you see a computer swallow these figures into its innards, you get the feeling that you are losing control. So you decide to do without one.' Truth is, said Kaden, 'the computer enables you to gain more control over more things. Although the computer's work is invisible it does only what you tell it to do.'

The fear of exposure - The movies and startling stories in the press that competitors or just playful vandals have been able to tune in on outside computers have been overblown, often inaccurately reported or dramatized from fact to fiction. Computer information can be locked up and stored just as any private documents, assured Dr. Kaden.

The fear of confrontation - This, said Kaden, is the least recognized fear of all. It is the fear that computerizing one's business functions will reveal serious weaknesses in the company's operation. For example, people who like to think they are managing their business affairs on tried and true instincts may be afraid to discover the fallibility of their hunches. One might find that a favorite employee is less productive than simple observation would indicate. The firm's pet product might be recorded as the least profitable.

No one likes bad news, and a properly run computer could reveal some embarrassing data.

But the function of a good manager, Kaden continued, is to shoulder the bad news and take steps to correct the broadening seams of unprofitability.

Kaden told of a contractor who prided himself on his ability to take measurements by eye and very quickly come up with job-cost estimates. Only when he began using one of the electronic spreadsheets did he discover that his tendency to underestimate an area by as little as 1 percent made a difference in one year of $110,000 less profit than if he made more concise measurements.

Kaden said an additional area of resistance to the computer by business owners is the rationalization that the state of the art is changing so quickly that it is foolish to purchase current computer equipment when another system soon will become the thing to buy.

Obsolescence of equipment is a constant in all businesses, and the time will never come when this or that technique will be the final word.

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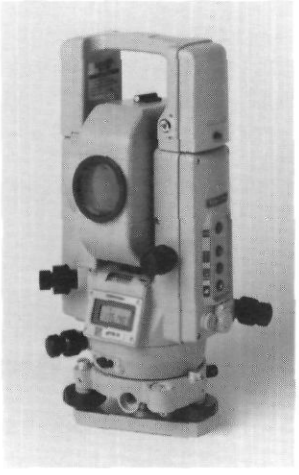

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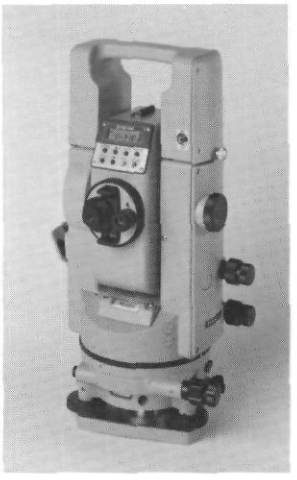

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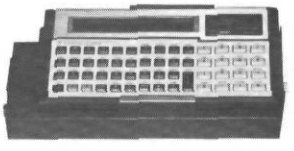

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Alternatives to the Courthouse

by K. Patrick Neill,
Litigation Department

The local, state or federal courthouse is what most people think of when they consider where one goes to have a legal dispute resolved. However, we are seeing more and more attention being given to alternatives to the traditional courthouse trial for the resolution of disputes. There are many reasons for this trend, including the ever-increasing cost of litigation, delays in traditional litigation in many jurisdictions, and, in some cases, dissatisfaction with the results of the traditional process. Arbitration, mediation, neutral expert fact finding, and mini-trials are among the methods of alternative dispute resolution gaining attention.

ARBITRATION. The first of these alternatives, arbitration, has been available for a long time, but is receiving increasing use in recent years. It is generally available where the parties have agreed to arbitrate disputes by contract, or where they mutually agree to arbitration after a dispute arises.

In many respects arbitration is like the traditional trial. However, instead of a judge or a jury being the decision maker, the parties select one or more arbitrators to decide the dispute. In addition, an arbitration proceeding is generally less formal than a court trial, and the rules of evidence are less strictly applied. Pretrial proceedings are generally expedited, and discovery is limited in an arbitration proceeding.

The advantages of arbitration over a traditional trial include the possibility of a quicker resolution, often at less expense in light of its speed, and the opportunity to have persons experienced in the subject matter of the dispute make the decision rather than a judge or a jury who may have limited familiarity with the subject matter of the dispute. Where these factors are of importance, arbitration is an alternative that should be considered.

However, the disadvantages of arbitration also need to be considered. Perhaps the greatest potential disadvantage is the limited review available to the losing party. Arbitration awards are subject to review only in very limited circumstances. For all practical purposes, one must assume that no appeal will be available even if errors are made by the arbitrators during the course of the arbitration or in making their ultimate decision.

The use of arbitration may also be disadvantageous in certain types of cases. For example, arbitration may not be desirable where there is a concern that untrustworthy evidence might be considered, thereby prejudicing one's case. The formal rules of evidence applied in a traditional trial might exclude such evidence from consideration. Similarly, where substantial discovery is desirable in order to develop facts not easily available prior to the hearing, arbitration may not be a good choice. Arbitration may also not be suitable in cases involving complicated or subtle legal principles. Those cases might be better tried before a judge who has legal training.

MEDIATION. Mediation is a private process in which parties resolve their differences with the assistance of a neutral third party. As a legal dispute resolution

technique, mediation has been used most often in domestic relations matter.

The parties are typically not represented by lawyers in the mediation process. They represent themselves and present their case to a single mediator whose role is to listen to both sides and use his or her experience to suggest solutions that the parties may not have considered on their own. Generally, the rulings of the mediator are not binding upon the parties. However, mediation is frequently an effective method of assisting parties to resolve their own disputes where the relationship between the parties is such that they are able to work out a settlement satisfactory and fair to both sides.

The primary advantage of mediation is the savings of time and expense which it offers. On the other hand, a party who engages in mediation without legal counsel runs the risk of agreeing to a disadvantageous or unfair settlement. However, in many smaller disputes, mediation is finding increasing popularity.

FACT FINDING. Neutral expert fact finding is a fairly recent approach for resolving complex disputes. The process involves submitting the dispute to experienced trial lawyers for a decision. This procedure is generally used only by agreement of the parties after a dispute arises.

The procedures for neutral expert fact finding can be tailored to fit the particular dispute. For example, the fact finder may act as a mediator, attempting to bring out facts on both sides and assist the parties in arriving at a mutually acceptable resolution. Alternatively, the parties may elect to actually adjudicate all or part of their dispute before the fact finder who sits as a decision maker, with considerable flexibility to streamline the procedure and become actively involved in investigation of the facts. The decision of the fact finder may or may not be binding upon the parties, depending upon their agreement.

The advantages of neutral expert fact finding are speed and cost. Because the neutral expert may be involved in both fact finding and decision making, this process can be completed more quickly than even an arbitration proceeding. Since the parties may not be represented by their own attorneys in the proceeding, substantial cost savings can result. However, a key factor in the success of neutral expert fact finding in the selection of a fact finder that both sides trust.

MINI-TRIALS. The mini-trial process is also being used in resolving complex business disputes. Once again, the process is typically used only by agreement of the parties after a dispute has arisen.

In this process, each party represents its case as it would in a regular trial. However, the case is not presented to a judge or jury rather to a top executive from each side. The mini-trial is not intended to yield a binding decision resolving the dispute. Rather, its purpose is to facilitate a negotiated settlement by fully informing both sides of the strengths and weaknesses of their respective cases.

There have been several instances where the mini-trial process has been extremely successful in resolving very complex cases which could have taken years to resolve had they been tried in court. With the use of the mini-trial, those cases were resolved in only a few days.

THE FUTURE. We expect to see increasing use of these and other alternative dispute resolution processes in the coming years. Some of these processes are quite new and are just beginning to receive attention locally. Moreover, the increasing numbers of disputes which are being handled by the courts may tend to aggravate the present problems with traditional dispute resolution processes.

Most cases will undoubtedly continue to find their way to the courthouse since alternative dispute resolution processes will not be appropriate in all cases. However, the alternative process should be given careful consideration since the potential for saving time and money may be substantial.

Reprinted from The Oregon Surveyor □

Pomona Municipal Court,
Small Claims Division

Every now and then, the small cases raise the interesting legal issues. The following case is shared by Neill J. Cummins, Jr.

Neil J. Cummins, Jr., Plaintiff,
vs. _____, Defendant
Case No.: 89571
Trial Brief
Date: August 27, 1986
Time: 10:00 a.m.
Dept.: Small Claims

I. PREFATORY STATEMENT

On June 10, 1985 plaintiff and defendant entered into a written contract under the terms of which plaintiff was to survey and monument the property of defendant. The field work for the survey was promptly performed and monuments were placed. At that time, by mutual agreement, filing of the required Record of Survey pursuant to *Business and Professions Code,* Section 8762 was deferred while defendant's neighbor, whose property had been concurrently surveyed by plaintiff, attempted to negotiate a boundary agreement with Pomona College, the owner of surrounding property. Fees for the field work are not in dispute.

In October of 1985 an inquiry was made of the neighbor as to the progress of negotiations. When no response was received to that inquiry, plaintiff proceeded to prepare and file a Record of Survey map with the County Surveyor, who has thereafter recorded the same.

It is believed that the above facts are not in dispute. The genesis of the controversy now before this court is the contention of the defendant that had plaintiff given defendant notice of the intention to proceed with the filing of the Record of Survey, defendant could have ordered plaintiff to discontinue work, and thereby incurred no further charges for the processing of the Record of Survey. The issue before the court will therefore be: Once a licensed Land Surveyor makes a survey in conformity with the practice of land surveying, and sets monuments on the ground, must the Land Surveyor thereafter proceed to file a record of survey:

II.

PLAINTIFF'S DUTY TO FILE A RECORD OF SURVEY BECAME ABSOLUTE UPON THE SETTING OF BOUNDARY MONUMENTS.

Business and Professions Code, Section 8762.

Business and Professions Code, Section 8762 provides in pertinent part:

"After making a survey in conformity with the practice of land surveying, the licensed Land Surveyor or registered Civil Engineer *shall* file with the county surveyor in the county in which the survey was made a record of survey relating to land boundaries or property lines, if the survey discloses any of the following:

(a) material evidence or physical change, which in whole or in part does not appear on any subdivision map, official map, or record of survey previously recorded or filed in the office of the county recorder or county surveying department, or map or survey record maintained by the Bureau of Land Management of the United States.

• • •

(e) the points or lines set during the survey of any parcel described in any deed or other instrument of title recorded in the County Recorder's office are not shown on any subdivision map, official map, or record of survey.

The record of survey required to be filed pursuant to this section *shall* be filed within ninety days after the setting of boundary monuments during the performance of survey or within ninety days after completion of the survey, whichever occurs first." [Emphasis added.]

Plaintiff was required to file a record of survey of the survey he performed for defendant for two reasons. First, the survey was of deed lines, and thus fell within the ambient of Section 8762(e) since the deed lines of defendant's parcel had never been shown on any map of record.

Second, plaintiff was required to file a Record of Survey because during the course of the survey it was discovered that there were substantial encroachments both of defendant's improvements onto the property of defendant's neighbors and of defendant's neighbors onto the property of defendant. These encroachments were themselves material evidence which plaintiff was required to disclose on his record of survey in accordance with the provisions of Section 8762(a).

This analysis is consistent with the Attorney General's analysis of a prior version of *Business and Professions Code,* Section 8762, 64 Op.Cal.Atty. Gen. 224, 228 (1981). Implicit in the analysis of the Attorney General's Opinion is the proposition that if a monument is set, some record, either a corner record or a record of survey, must be prepared and filed by the surveyor setting the monument. And the survey here in question falls within none of the exceptions to the filing of a record of survey set forth in *Business and Professions Code,* Section 8762. Thus, plaintiff was obligated, having monumented defendant's property, to proceed with the filing of the record of survey.

Once it became apparent that the justification for delay beyond the ninety day limitation of *Business and Professions Code,* Section 8762 had expired, plaintiff's excuse for not filing the map terminated. Whether or not plaintiff gave notice to defendant that work was resuming was irrelevant. Plaintiff was legally obligated to file the map.

III

PLAINTIFF'S DUTY TO FILE A RECORD OF SURVEY WOULD HAVE SURVIVED REMOVAL OF THE BOUNDARY MONUMENTS

Business and Professions Code, Section 8762.

It is, of course, possible to argue that if the event that triggers the obligation to file a record of survey is the setting of boundary monuments, it should be possible to un-ring the bell by removing those monuments. Under *Business and Professions Code,* Section 8762 as it existed prior to 1984, it was possible to make this argument although the argument was in conflict with a letter opinion of the Board of Registration for Professional Engineers which had been widely disseminated .

Subsequent to 1984, however, the statute was amended to foreclose such argument in that the triggering requirement was stated in the alternative to be either the setting of the monuments of the completion of the survey. Thus, if the monuments were removed and the survey deemed completed, the obligation to file a record of survey would nevertheless be triggered by the requirements of subsections (a) and (e) and, under the provisions of the first paragraph of *Business and Professions Code,* Section 8771, plaintiff would have been required to reset sufficient durable monuments to enable the survey to be readily retraced, i.e. the very monuments that had just been removed.

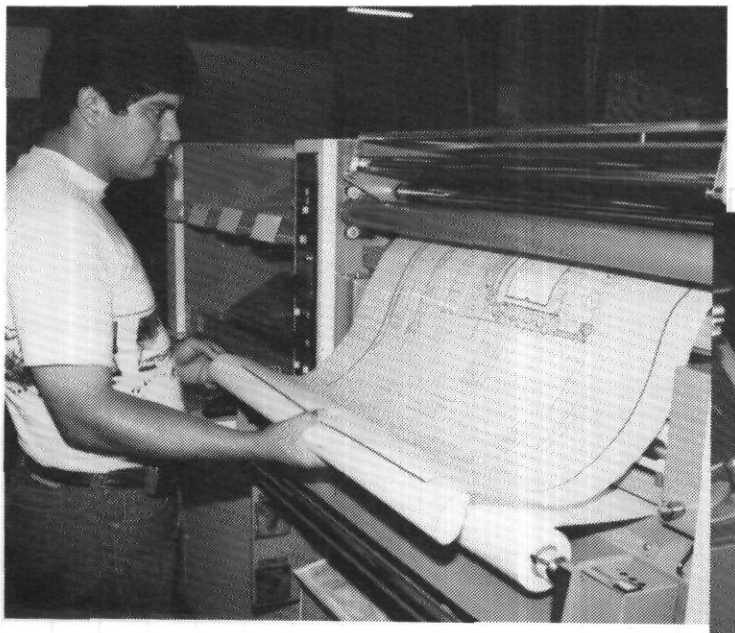
IV.

CONCLUSION

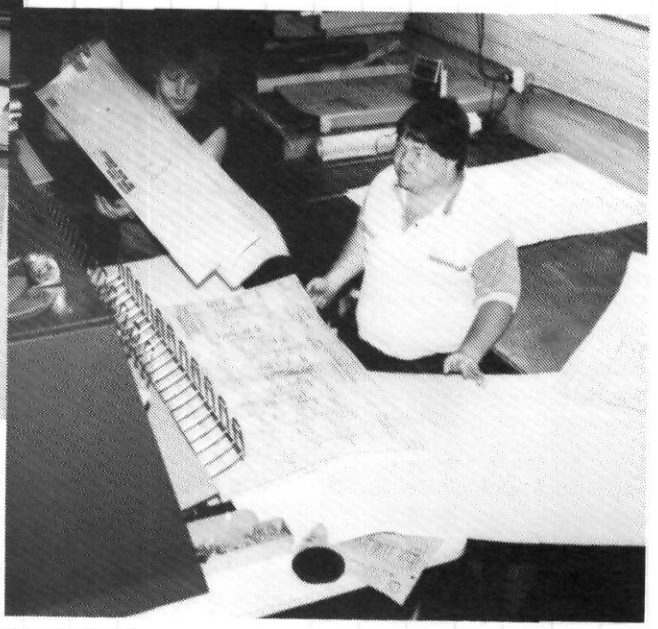
Plaintiff was obligated to file the record of survey and defendant, by the terms of the contract, was obligated to pay for it as a necessary part of the survey.

Respectfully submitted,
Neil J. Cummins, Jr.,
Plaintiff in pro per □

RODNEY STOKES CO., INC.



SHACOH 920 REPRODUCTION



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Black Widow Spiders
Valued Employees At Surveying Firm

by Rose DeWolf Knight
Ridder News Service

The last black widow spider working on the production at North American Survey Supply Co. in northeast Philadelphia died the other day.

'R.I.P. A short life but a productive one,' her tombstone might say, if spiders had tombstones.

The company plans to recruit new spiders, a spokesman said, although not right away.

It is not every company that employs spiders. North American Survey Supply does because it both sells and repairs surveying equipment, as well as other optical instruments used by builders and engineers. And spider's web is the preferred material for making cross hairs in the eyepieces of such instruments.

Nylon thread won't do. When magnified (and the cross hair in a surveying instrument is magnified 25 to 35 times), you can see the fibres in it. That's distracting.

Human hair is out. 'Too thick,' said Charles M. Dilger, North America's service Manager. 'Human hair is 80 times the thickness of a spider web. In a surveying instrument, it would look like rope.'

You can etch a fine line on glass or reproduce one with a photographic process, but that means adding an extra piece of glass to the eyepiece – which cuts down on the light coming into the eye.

And so, ever since the days of the nations's best known surveyor, George Washington, experts have agreed that nothing could be finer than the line a spider winds up in the morning.

And this has meant industrial careers for generations of black widow spiders.

'Black widows are best,' said Dilger. 'Their web provides the best combination of strength and thinness. If a black widow can't be found, we will turn to a brown barn or a golden garden spider.'

How strong? Stronger than steel for its size. You can hold a black widow spider's web under a gushing faucet and it won't break.

How thin? You can barely see the thread that emerges from the spider, yet the thread is actually a cable of three strands thick.

'We separate the strands and use only one for a cross hair,' said Dilger. He demonstrates by nudging the cable with a piece of horsehair until it loosens, and then he gently pulls the threads apart. (If you think threading a needle is tough, forget this job.)

When installing this gossamer thread on an eyepiece, says Dilger, you first place the strand, then put weights at both ends, then blow on it. The moisture from your breath will moisten the thread, the weights will stretch it tight. If you don't do this, any moisture getting into the instrument later could make the cross hairs sag.

There are other companies that also repair surveying instruments, but most don't bother to obtain their webbing directly from a spider. They prefer to buy what they need from North American.

The fact is that the black widow is the most poisonous spider around. Not everybody wants to work with him or her. (Despite the name, the black widow can be male as well as female. Both spin webs. The name comes from the fact that the female kills the male after they mate if she can catch him.)

In addition, the black widow is native to the Northeast region. Dilger says it isn't hard to find them, once the weather

Official Surveys Accepted by BLM

This letter is to inform you of official surveys in California which have been accepted in the 4th quarter of FY 86 (July 1–September 30, 1986).

These surveys 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.

The accepted surveys are listed by township, range, meridian, and acceptance date.

Township & Range	Meridian	Date
T. 3 S., R. 6 E.	San Bernardino	7-09-86
T. 3 S., R. 7 E	San Bernardino	7-11-86
T. 25 S., R. 44 E.	Mount Diablo	7-22-86
T. 26 S., R. 44 E.	Mount Diablo	7-22-86
T. 27 S., R. 43 E.	Mount Diablo	7-22-86
T. 27 S., R. 44 E.	Mount Diablo	7-22-86
T. 28 S., R. 43 E.	Mount Diablo	7-22-86
T. 14 N., R. 10 E.	Mount Diablo	7-25-86
T. 2 S., R. 5 E.	San Bernardino	8-19-86
Tps. 4 S., Rs. 5&6 W.	Mount Diablo	8-19-86
T. 14 S., R. 1 E.	San Bernardino	8-26-86
T. 6 N., R. 14 E.	Mount Diablo	9-04-86
T. 7 N., R. 11 E.	Mount Diablo	9-10-86
T. 4 N., R. 10 W.	Mount Diablo	9-16-86
T. 13 N., R. 3 E.	Humboldt	9-26-86
T. 14 N., R. 2 E.	Humboldt	9-26-86
T. 15 N., R. 2 E.	Humboldt	9-26-86
T. 5 N., R. 5 E.	Humboldt	9-30-86
T. 16 N., R. 7 E.	Humboldt	9-30-86
T. 32 N., R. 11 E.	Mount Diablo	9-30-86
T. 40 N., R. 11 W.	Mount Diablo	9-30-86
T. 16 N., R. 8 E.	Mount Diablo	7-21-86
T. 27 N., R. 9 E.	Mount Diablo	8-01-86
T. 12 N., R. 8 W.	San Bernardino	8-26-86
T. 3 S., R. 5 E.	San Bernardino	9-03-86
T. 5 N., R. 14 E.	Mount Diablo	9-10-86
T. 7 N., R. 25 E.	Mount Diablo	9-12-86
T. 6 S., R. 22 E.	San Bernardino	9-30-86

Clifford A. Robinson
Chief, Branch of Cadastral Survey □

gets warm. You just go into the woods, look for a rotting tree stump or lift up a log, and there they are. He does not pick them up, of course. He uses a stick to knock them into a container.

Back at the plant, the spiders live in a big bell jar that contains sticks and grass and such that spiders like. (The jar has a lid that is open just enough to allow air in, but not spiders out.)

Every so often, a spider will be taken on the end of the stick from the big jar and popped into a smaller jar. This is done 'very carefully,' say Dilger, who has never been bitten and doesn't bother to keep any antivenim serum around.

Once isolated, the spider is tickled on the tummy until it starts secreting filament, pushing it backward with its rear legs. A human attaches the filament to a fork – a two-pronged rectangle and by slowly turning the fork, winds the spider's production for later use. An energetic spider can produce as much as two feet of webbing before calling it a day.

Is the spider upset at never managing to get an actual web out of all this effort? Dilger doubts it. After all, the spider doesn't actually need a web to live. The purpose of the web is to catch food, and North American Survey Supply spiders don't have to catch food, since they are supplied their favorite dishes of flies and other spiders in generous measure.

Spiders have short lives, which means that the North American work force has a relatively high turnover.

John Miloszar, public relations director for Warren Industries, Inc., North American's parent firm, said that although there are no spiders working right now, there are two reasons why new ones will not be recruited immediately.

First, any spiders out in the woods now would be hibernating and second, the company has a good supply of spider web on hand. Spider web, he said, can be stored on the shelf for seven or eight years with no deterioration.

Come spring, if the supply seems to be running low, or if Dilger comes across a couple of big spiders, spinning production will begin again.

Possibly, you wonder why North America goes out and finds adult spiders instead of raising its own. ('You know how much trouble adolescents are,' quipped Miloszar.) 'We wait until they grow to a productive size in the woods before bringing them in,' said Dilger. 'In this field, as in everything else, you want experience.'

Reprinted from Sideshots □

Title Insurance Explained

How the least appreciated real estate transaction makes sure no legal impediments exist to kill a deal.

by Andrew Reinbach

Title insurance isn't sexy — but no real estate transaction can be closed without a certificate of clear title. Many real estate professionals nevertheless consider it a mere detail. And because the concept is rooted in the finer points of real property law, mentioning the subject can elicit resounding yawns. "The stereotypical image of a title insurer sits at a roll-top desk and wears green eye shades," says Bernard M. Rivkin, Executive Vice President of Title Guarantee-New York, a division of Title Insurance and Trust Co. (Ticor), a leading firm in the field.

Perhaps there is some justification for the stereotype, since the field is so specialized. The concept of title insurance dates to 1876 (although some companies are older), when a Philadelphia court held that a conveyancer of property was liable only for negligence or outright fraud in certifying his claim to the property in question. This stemmed from the doctrine of constructive notice, which meant that all persons are presumed to know the facts about a particular piece of real property interest, even if no public notice is published.

So it was up to the receiver of the transaction — be this a lease, mortgage, parcel of land or a building — to find out if the grantor of title actually had the right to claim he was passing on complete and rightful ownership to the property. The question was, how many people knew the particulars of the matter well enough to discover claims on the title that didn't show up on the official record?

Capitalism responded to this market place need with title companies. These organizations would investigate the matter for a fee and certify that the receiver, or grantee, had a clear right to use the property as he intended, subject to visible claims like mortgages, easements, restrictive covenants on the deed, or such other "clouds" as mechanic's, tax, bankruptcy court or other liens, or competing claims to ownership; these constitute legal barriers to the grantee's full use of the property. (One consequence of this is that property cannot be re-sold without second mortgages being satisfied, though this may not invalidate a transaction.) The matter is equally important in lease negotiations, where a non-disturbance clause in the lease can protect a tenant from such situations as a mechanic's lien foreclosure proceeding that could strip him of the right to use his premises.

This service is now a national industry that grossed over $1.6 billion in the first three quarters of 1984. It is dominated by such companies as Lawyer's Title Insurance Co., Chicago Title & Trust Co., and Ticor. These and some 23 other firms operate across the country (except in Iowa, which requires resident title insurers), guaranteeing clear title for deeds, leases, mortgages, and increasingly the more arcane aspects of real estate practice, such as air rights transfers, sale/leasebacks, and convertible mortgages.

A curious wrinkle

Among the more esoteric doctrines abroad in today's title insurance universe is the matter of clogged equity. Basically, this is the assertion that "once a mortgage, always a mortgage." Obvious as this seems, there's much more to the matter.

In some of today's development project deals, the construction lender may issue a loan that converts to a short-term permanent first mortgage that includes options to convert the debt held by the bank to equity at regular intervals. Typically, this would be expressed as a construction loan rolling into a mini-perm with convertible options.

This arrangement "clogs" the equity, since the owner of the building cannot redeem his equity in the building at the end of the mortgage term — and gives the bank a "collateral advantage" in which it receives more than interest and principal on its loan. This argument is generally answered by contending that it should be perfectly all right as long as the situation is freely entered into; the matter can be cleared up, in any case, by allowing the owner to buy out the options as they come due, unclogging the equity.

In this situation, case law has very little to go on. Such policies are thus very carefully written. Similar problems for the title insurer arise in other newly beaten paths of modern real estate practice, such as air rights transfers.

"The question is, are air rights an interest in real property that can be insured?" wonders William A Colavito, New York regional counsel for Chicago Title.

On faulty surveys and unmarked graves

Whether the grantor is passing title to a million sq. ft. office building or a house, the basic service is the same. For a one-time fee paid at closing, usually costing $2 per $1,000 of coverage for a big policy (although the price can dip to $.60 per $1,000 in Atlanta's competitive market), the title insurer will examine all the relevant documents and issue a certificate of insurance guaranteeing clear title or a settlement, if the title turns out to be clouded, after all. The coverage lasts for the term of the instrument involved until sold, for a deed, or satisfied, for a mortgage.

The matter of clouded title can take several forms, according to Janet A. Alpert, senior vice president of Lawyer's Title. "Clouds can appear that are more than 40 to 60 years old, which is about as far back as title companies search," she says. "In fact, a lot of claims arise from this."

Alpert cites as one instance Indian tribal claims to former tribal lands. Other problems can be a faulty original land survey, unmarked graves discovered during construction, fraud, and, in today's computer age, computerizing a county's records.

Even the rarified world of title insurance has its amusing side, though. The New York, real estate business is notoriously litigious, with almost every real estate figure being either a defendant or a plaintiff at any particular time. The problem is how can these people do business when their every transaction is subject to liens by their antagonists?

One ingenious solution was to hire the late John Javacile, a man whose job it was to be judgment proof. Owning neither a house nor a car and no securities, without relatives or heirs, he played a small but vital role at the closing: to accept title from one major real estate figure and pass it to another, avoiding lawsuits for his clients and collecting a fee for his trouble.

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	SET 3 1 mile/5 sec.	75	50	38
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	SDR2 collector	20	13	10
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	B2C level 32X	11	7	5
ZEISS	Ni-2 level 32X	11	8	6
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Choosing A

by Keith Houseman

Computer technology is having a dramatic effect on the surveying company. Field surveyors have programmable hand held calculators and semi-total stations and office surveyors have microcomputers and computer-aided graphic stations at their disposal.

For the purposes of discussion, we will evaluate the most popular data collection systems. These are composed of three parts: 1.) data collector, 2.) semi-total station, and 3.) microcomputer. According to our figures, these are the HP41C/CV/CX, the Topcon GTS-2 semi-total station, and the IBM PC.

When evaluating a data collector, there are several features to study: 1.) Size, 2.) Programmability, 3.) Ease of use, 4.) Interfacing, 5.) Power supply, 6.) Computation power, 7.) Storage capacity, and 8.) Cost.

The size of the data collector is important. The unit should be hand held and lightweight. The data collector should withstand an unintentional or accidental drop to the concrete or ground. The unit should also be pocket-size for protection from bad weather or hazardous conditions. Several computers have been lap-size and not suitable for data collection as a result. Another consideration is the qwerty-style keyboard. This will require two hands to efficiently type. You will then need a place to rest the unit while you type - your knee, the tripod, or a structure. This resting place will be a luxury when you are standing in snow, mud, or a swamp. The need for qwerty style keyboards has been replaced by numeric coding of descriptions.

A programmable data collector is an absolute necessity. Although the survey company's policy may be that the field crew should only data collect and not compute, surveyors collect angles and distances in a variety of ways. Some double angles, measure inverted angles, turn sets of angles, or use direction instruments. This has been a downfall of many survey manufacturers' data collectors - only single angle right or azimuths could be measured. If the data collector is programmable, how easy is it to program? Several surveyors have delved into programming an HP41CV, but have been unsure where to start on a programmable data collector that has no sine or cosine key.

How easy is the data collector to use? Training field crews is very expensive considering the cost of labor. If the data collector is too difficult to use, the lost time due to the lack of collected data or erroneous data collected will result in abandoning the data collection system. Some data collectors allow the party chief or recorder to select the pen, the character size, or even the line type for drafting the plat. This type of system has proved too complex and time-consuming for the average party chief. Also the cost of field crews varies from twice to three times the cost of a draftsman. The data collector should prompt the user for all entries. One reason the total stations have not proved as popular as semi-total stations such as the Topcon GTS-2 and an HP41CV has primarily been ease of use and cost. Some total stations have no manual entry mode for cross-section or stadia surveys. An EDM could not measure all trees in a forest or through buildings. It was too time-consuming to make another instrument setup when only one tree or one additional building measurement needed to be made. An HP41CV could perform all types of surveys.

Interfacing the data collector to the survey instrument and to the computer are two important electronic links. The interface to the instrument and to the computer will eliminate manual entry errors. Two manufacturers with electronic entry to the HP41CV are AGA and Kern. AGA's interface is well-manufactured and cables connect to the total station at the base of the instrument and through a rugged RS232-IL interface to the HP41CV. Removing the HP41CV from the interface is simple and communication to the HP41CV is easy. Interfacing has been a downfall of survey equipment manufacturers. Some have supported only one computer and their total station while others have left software interfacing to third party coordinate geometry software vendors. Some claim ability to interface to any computer, but data transfers were only data dumps that were not properly formatted for the reduction to coordinates.

The power supply should be lightweight. Using flashlight batteries is most convenient because new batteries are easy to add. Some data collectors are limited because of their power electric outlet. The power supply should be near the data collector and not have to be placed on the ground.

The data collector should be able to

Data Collection System

compute. Although the field crews are directed to collect data only, they should be able to check for closure before returning to the office. Field crews allowed to compute in the field with the HP41CV will find tremendous timesavings. After a radial survey is made to locate existing corners, the following can be computed and laid out: 1.) lost property corners, 2.) positions to search for lost corners, 3.) building corners, and 4.) manholes and streets. A data collection system that computers 3-D coordinates has its advantage. Manhole invert elevations can be displayed immediately to verify proper direction of flow. Distances between property corners can be checked and additional measurements made to search for double corners if distances do not check.

The storage capacity should be enough for a day's work. Fifty measurements per day will be typical for a survey crew. The data collector should have the capacity for three to five hundred measurements when large topographic or radial surveys are made.

Cost is always a consideration and data collectors are not exempt. The HP41CV with sufficient memory modules cost $475 whereas survey manufacturer's data collectors cost from $2500 to $6000. The HP41CV does not need a total station to perform cross-section and topographic surveys that are made with tape and level. As a result, all survey crews can data collect, not just the crew with a total station.

The following is a program listing for transferring data from the HP41CV to the IBM PC or Macintosh. A similar program will allow data to be transferred to the IBM PC from the HP71B. The following equipment is required: HP82183A Extended I/O Module, HP82160A IL Module, HP82164A IL-RS232C Interface, Female to female gender reverser, and HP17255B Cable.

```
10 REM IBM PC Program
20 CLS:REM Clear the SCREEN
30 PRINT 'PRESS ANY KEY TO CONTINUE.':REM COMPUTER WAITING
40 A$=INKEY$:IF A$="THEN 40
50 OPEN'COM1:9600,N,8,,CS1000,DS,CD' AS -:REM 9600 BAUD, NO PARITY
60 PRINT'PRESS RESET ON IL-RS232C INTERFACE'
70 PRINT 'MAKE ALL ENTRIES ON THE HP41C'
80 PRINT
90 PRINT'PRESS SHIFT, RETURN, R/S'
100 PRINT
110 INPUT-,B$
120 INPUT-,B$
130 INPUT -,B$
140 INPUT-,B$:REM CLEARS THE IL-RS232C INTERFACE
150 PRINT'ENTER THE NORTHING'
160 INPUT-, N$:REM waiting for input of NORTHING ON THE HP41
170 PRINT'N = ';N$
180 PRINT
190 INPUT-,E$:REM WAITING FOR INPUT OF EASTING ON THE HP41
200 PRINT'E = ';E$
210 PRINT
220 GOTO 30
```

```
01 LBL'HP41'
02 LBL 00
03 AUTOIO **** FINDING THE LOCATION OF THE HP82164A INTERFACE ****
04 'HP82164'
05 FINDID
06 Select
07 'C2'
08 OUTA **** WAKE UP HP82164A interface ****
09 'SLO'
10 OUTA **** USE ALL LINES TO COMMUNICATE ****
11 'ENTER N'
12 PROMPT
13 CLA
14 ARCL X
15 OUTA **** SENDING NORTHING ****
16 'ENTER E'
17 PROMPT
18 CLA
19 ARCL X
20 OUTA **** SENDING EASTING ****
21 GOTO 00
```

Reprinted from The Cornerpost
Vermont Society of Land Surveyors, May 1985□

Surveys and Surveyors of the Public Domain: 1785-1975

By Lola Cazier

About 500 years before the birth of Christ, a Greek philosopher and mathematician Pythagoras suggested that the earth was spherical rather than flat. Erathosthenes of Cyrene, who lived from 276 to 196 B.C., believed Pythagoras was correct. Erathosthenes was a learned man who became the head of the Alexandrian Library. His intellectual curiosity was aroused when he discovered that, at the peak of the summer solstice, the sun illuminated a deep well in Syene. At noon, on the longest day of the year, Erathosthenes measured the angle of the shadow cast by a vertical wall in Alexandria 500 miles away. It was equal to one-fiftieth of a circle. He thought that Alexandria and Cyene were on a north-south line, and he knew the accepted distance between the two cities.

Based upon his observations, his theory was that the distance between the cities was equal to one-fiftieth of the circumference of the Earth.

Erathosthenes came very close. Because of compensating errors, he arrived at a distance of 24,662 miles. Since the Earth is not a perfect sphere, and since Syene and Alexandria are not exactly the distance apart that he used, nor are they on a perfect north-south line he was a little off in his estimation. The precise figure is 24,899 miles. A one in one-hundred and five error.

This was the first attempt to find the circumference of the Earth by measuring the arc of a meridian. It was quite a feat in the advancement of surveying. The only thing wrong was that people could not believe that the Earth was that large. Instead, they used the calculations of Poseidonius (130 to 51 B.C.) and came up with a circumference of 18,000 miles. During the Middles Ages, the Church used the 18,000 mile figure to help convince people that Jerusalem was the center of the world.

When William the Conqueror invaded England in 1066, he changed the existing manorial land tenure system to the feudalism of France. Under this new system, the lords of the manors paid a fixed sum to the king. About 20 years later, William ordered a survey of the lands of England so that there might be a more accurate assessment of the sum he was to receive. The survey was completed and its results were published as the 'Domesday Book.' It was, in fact, a cadastral survey – a description of the land, with the names of the owners and the extent, nature, and value of their holdings.

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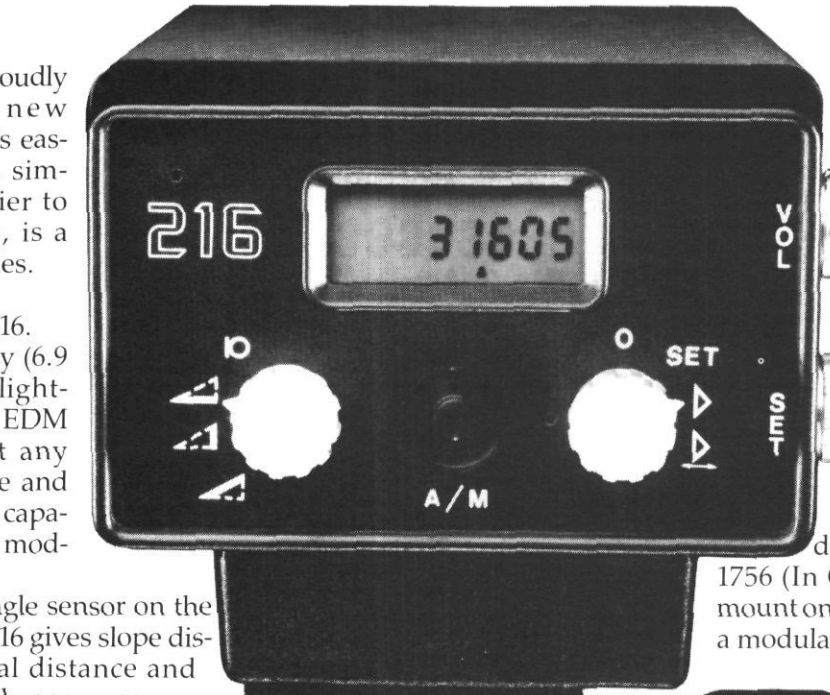

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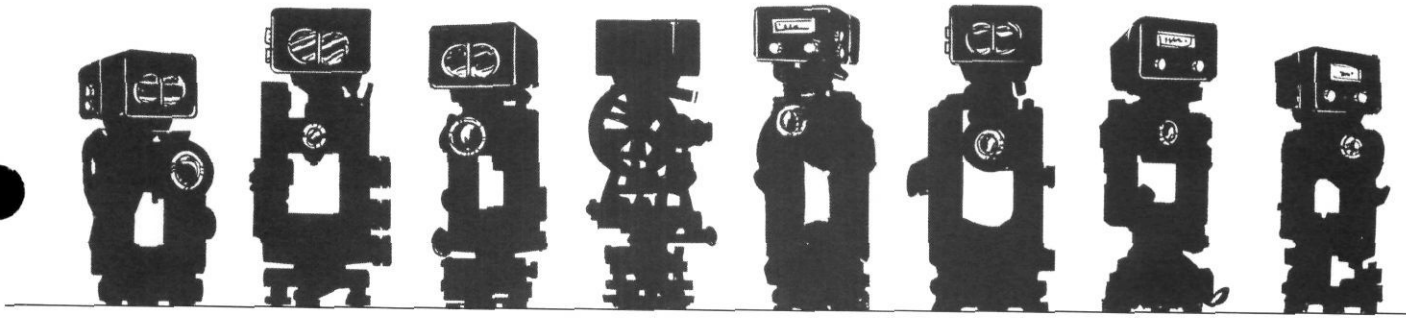

Chapter Reports

Marin County Chapter

Condensed from a chapter report submitted by Steven H. Jacobs, acting secretary.

The September Dinner Meeting was held at T. J. Corcoran's, in Novato, on September 10th. The meeting started at 7:07 p.m. and the August minutes were approved with minor additions by Steven Jacobs.

Under new business was a report by Dale Waag regarding the "Adopt A Student Volunteer Program." This is a program in which you take a student into your home and business in order to introduce him to the real world of the surveyor. D. White, and possibly Larry Doyle, volunteered their hospitality.

Association goals were discussed and it was noted that the chapter had overwhelmingly turned down the idea of a Professional Practices Committee. . . requirement of Record of Survey, or equivalent, prior to a subdivision map. (Also, support for removal of B.S. degree for licensure from goals.)

Only the Surveyor can guide the profession in the direction of their best interest.

Bakersfield Chapter

Condensed from the September 24th minutes by Gene Martin

President Ron Walker was not present. Impromptu presiding by Gene Martin. The new officer election was discussed. Mike Berry and Tom O'Connor "volunteered" for the nominating committee and met in the hall. The following slate was returned and voted in unanimously.

Riley Smith – President
Don Britton – Vice President
Gene Martin – Secretary/Treasurer
John Hoffman – Chapter Representative

Larry Hubbard is currently the instructor of the Engineering 1A Class at Bakersfield College. The apprenticeship class was cancelled with 21 students.

Gene Hershberger gave an update on County activities. A discussion followed. Leonard Lenger (guest speaker) offered that funds were available from State monumentation monies. It was discussed that funding was not as paramount to the monumentation program as support from the local surveyors. Please notify the Director of Public Works by letter of your feelings on the monumentation perpetuation program. We all know how valuable the perpetuation program and maps have been.

Susan Jensen of the Central Coast (San Luis Obispo Chapter) was our guest speaker. Susan is active at the State level of C.L.S.A. and gave an update on that. She also had several suggestions for revitalizing local groups such as:

1 C.L.S.A. Yellow Page Ad
2 Professional Practice Committee
3 Education Goals

NOTE: You should repay your debt and support the profession that you enjoy today, for it may change for the worst tomorrow.

Sonoma Chapter

Condensed from a report by Richard O. Wasson

The Sonoma County Chapter held its monthly dinner/business meeting at Michele's Restaurant in Santa Rosa on September 17, 1986. Thirteen members were present.

President Bruce Jarvis called the meeting to order at 8:45 p.m. The minutes from the August meeting were approved as mailed.

The scholarship for Jim Adams and a plaque for the S.R.J.C. were discussed. It was decided that the chapter would make a contribution of $400.00 to the state scholarship fund in Jim's name. This was voted on and passed.

Howard asked for a vote on the idea of changing the name of the chapter scholarship each year to honor a local person. This was voted on and passed.

The question of who should handle the acquisition of and placement of the plaque at the S.R.J.C. was discussed and it was decided that the Santa Rosa Junior College Liaison Committee should take care of it. This committee consists of Doane Heryford, Howard Brunner and Bruce Jarvis.

John Fitzgerald noted that in 1983 the C.L.S.A. sent out a questionnaire asking members what they felt were important goals for the organization. After SB-2 was passed, the direction of the C.L.S.A. was not clear to many members. This most recent questionnaire, which most of us have received, is important and should be filled out and returned as soon as possible.

A nominating committee for next year's officers was appointed. Howard nominated Paul Brown and Doane Heryford. This was seconded and passed.

Martin Paquette said that he was having a problem with the county requiring a dedication of land for a Lot Line Adjustment. Bruce Quinn also has been having this problem.

Meeting was adjourned at 9:32 p.m.

This 84th issue of *The California Surveyor* is brought to you with the support of dues-paying and participating members of C.L.S.A. Please join and support your profession.

Humboldt Chapter

Printed as submitted by Michael J. Hollins, Secretary

The September 17, 1986 meeting was called to order by Mike O'Hern.

The minutes of the August 20, 1986 meeting were accepted without being read.

After a brief discussion of map checking fees a motion was passed to write to the Board of Supervisors explaining the public benefit from recording surveys and making a request to abolish or at least limit map checking fees.

During the past few meetings there has been discussion of holding a seminar or workshop for the purposes of education and fund raising. A committee was formed to look into the practicality of holding such a seminar. The committee members, Mike Moore, Ron Hunt, and Mike O'Hern, are to report back at the October meeting.

The status of the microfilming of recorded and unrecorded maps was briefly discussed and then it was decided to contact John Olson for further information on the subject.

The Recorder's index of maps, parcel maps, and surveys has been found to contain errors and omissions. It was decided to make a new index. Formats and the parting out of the work will be done at the October meeting.

John Fowler of Mendocino Micro Computers gave a demonstration of AUTO C.A.D.–a Computer Aided Drafting computer program. □

Got a second
or even a minute or so?

By David P. Moore, RPS 2040

Many optical instrument maladjustments, *e.g., plate level or optical plummet, are readi*ly detectable by the operator and easily corrected. One of the more concealed maladjustments and also one that requires a special test in optical transits and theodolites is that of 'scale length' or 'run' of the micrometer.

In instruments which are ready by causing a coincidence or indexing to occur, as with a micrometer, the same micrometer is generally used for both the horizontal and vertical angle measurements.

Actually, the angle exists as some portion of an interval on the circle, and the micrometer is used to determine a portion of a full interval. If a circle is graduated at 1 degree arc intervals, only full intervals of 1 degree arc can be directly measured.

That portion of a fractional degree that *cannot be directly measured is determined* by measurement with a micrometer which is graduated in units of less than a degree but will measure no more than 1 degree arc.

The question is, will the full measurement on the micrometer (usually 1 degree arc on most optical transits but generally 10′ arc or *2′ arc on theodolites) equal exactly 1 full unit* of that circle?

The test is performed by setting the micrometer exactly at the 0′00″ point. A slow-motion screw is then used to set the circle 'exactly' at the full degree coincidence or index. The micrometer is then advanced *toward the other end of the scale, i.e., 59′60″,* while concentrating on making an 'exact' coincidence or indexing of the next full circle mark.

After the exact coincidence or indexing is made, the micrometer is then read. Ideally, it should read 59′60″, but it may be a few seconds above or below.

As making the 'exact' coincidence or indexing of the circle of each end of the scale includes some observer error, this test should be performed a number of times at various *locations on the circle and should be done* not only in the 'forward' direction, but also in the 'backward' direction.

Generally, if the average of the 'run' is less than the least reading of the micrometer, the adjustment can be considered satisfactory.

This test must be conducted on both the *horizontal and the vertical circles.* Although the adjustment must be performed in an instrument repair shop and is usually quite stable, I have encountered instruments so badly maladjusted that a coincidence could not be made at the opposite end of the micrometer or the coincidence would occur *before the micrometer was more than 9/10* through its scale.

I also have found that small errors of run tend to occur more often with the vertical circle than with the horizontal circle. Small errors in run tend to show more readily in precision theodolites than in optical transits but are deleterious to observations in any instrument.

There are formulas that may be used to correct observations made with a known quantity of micrometer run, but the application is really not worth the effort and can itself *cause further inaccuracy if applied incorrect*ly. If you have an instrument with excess micrometer run in either circle, send it to the shop for repair.

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