



Institutional Affiliate of American
Congress on Surveying and
Mapping

The California Surveyor

THE VOICE OF THE LAND SURVEYORS OF CALIFORNIA

NO. 45

SPRING EDITION

1977

Surveyor vs. Engineer—No Contest

By GUNTHER GREULICH, P.E., R.L.S.

President, Boston Survey Consultants, Inc.

Boston, Massachusetts

reprinted from SURVEYING AND MAPPING, March 1976

FIRST OF THREE INSTALLMENTS.

"A surveyor's good name may live forever on recorded plats and plans. His work will be referred to by many generations to come. Pride and respect for his profession, taught at a university [or college], will enable him to do the thoroughly professional job the public has a right to expect."

History—How It All Began

Man's history in surveying from the Babylonians and Egyptians to the Greeks and the Romans is fairly well-known and needs no repeating here. It is the American surveyor who requires our attention. Who was he and what did he do? Was he Mason or Dixon? Was he Lewis or Clark? Thomas Jefferson? Abraham Lincoln? Henry Thoreau? George Washington?

What was he called? A surveyor? An engineer? Or both? Or did it matter? Did one title automatically exclude the other? Or did one infer the other?

Let us consider for a moment that America's development took place in three basic phases: survival, exploration, expansion. The Pilgrims' first order of business was survival. To meet that goal, farming skills and crafts were in demand; surveying was not. Having survived the first winter and many thereafter, exploration of the vast unknown land became the second objective. After that, expansion and growth followed.

Here is where American surveying began. The explorers were followed by the mappers, surveyors, geographers, and astronomers, who, in turn, were followed by the fort builders, and town planners, the road builders, the bridge builders, the topographic engineers, the military engineers, and, last but not least, the civil engineers. Often, some of the above skills were merely successive functions during the professional career of one and the same individual.

Most of those men were self-taught, imaginative, ambitious, and courageous, with a minimum of formal education. In-

genuity was their greatest asset.

Land boundaries in the original Colonial States developed as arbitrary lines. Chiefly the result of use and claim, they are the basis for today's irregular metes and bounds surveys in those states.

Starting with the Northwest Territory, now the State of Ohio, the rectangular system was established in 1785. A most gigantic effort has been made ever since. "Cadastral engineers" began to survey huge land areas, covering 29 states, in a predetermined, mathematical arrangement.

Canals, dams, and railroads were selected in the field, surveyed, plotted, designed, and built by surveyors who were also called civil engineers. William H. Wisely, ASCE (American Society of Civil Engineers), explained¹⁹ that "a large segment of engineers in the mid-1800's had little or no formal education, acquiring their technical knowledge through self-study and apprenticeship, often as axemen or rodmen in surveying parties. The roads, canals and railroads on which they worked served as their 'universities.'"

Surveying formed the basis for both military engineering and civil engineering. As the term "civil engineer" became more and more associated with those in construction and allied fields, there developed a growing community of men engaged in other new and less popular branches of engineering. That

Continued on page 18

1977 C.L.S.A. OFFICERS

PRESIDENT JAMES E. ADAMS
VICE-PRESIDENT MICHAEL K. WELCH
SECRETARY PAUL W. LAMOREAUX, JR.
TREASURER MERLE W. ELI
DIRECTORS AT LARGE:

KENNETH BURTON
EUGENE P. EHE
GARY K. SHELTON
RAYMOND B. THINGGAARD
JAMES N. DOWDEN

NEWS BRIEFS

... WILL LAND SURVEYORS BE NEXT?

Assemblyman L. Greene has introduced legislation which would repeal all the regulatory provisions relating to the practice of landscape architecture. Assembly Bill No. 63 could be the portent for the Land Surveying Profession.

... The Southern California Section of A.C.S.M. will be presenting their annual seminars from March to June 1977. For further information contact: Claude Tomlinson, Chairman, at P.O. Box 3213, San Bernidino, CA. 92413, phone: 714-383-1536 (office), 714-882-8678 (home).

... Four public members, three women and one man, have been appointed by Gov. Brown to the Board of Registration for Professional Engineers. Thus for the first time, California engineers and land surveyors will have a majority of public members ruling on the qualifications of persons who are allowed to practice in their professions.

Named to the Board are:

Dona Hoard, 34, from Oakland, She is an associate with a SF business firm. She replaces John Holoman.

Sofia L. Nietes, 43, is an attorney with LA Superior Court. She replaces Dr. Charles Nelson.

Cynthia Sage, 28, from Santa Barbara, is a consultant for the Santa Barbara County office of Environmental Quality. She replaces William J. Jurkovich.

Tracy A. Westen, 35, professor of law, communication program at U.C.L.A., replaces R. Bruce McCallum.

Director of Consumer Affairs Richard B. Spohn remarked "this is a system of citizen licensing. We license through citizens . . . and this is a much more sensitive system. The philosophy behind the thing is to institute public accountability." ▲

The California Surveyor

is the quarterly publication of The California Land Surveyors Association 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. The California Surveyor is an open forum for all surveyors, with an editorial policy predicated on the preamble to the constitution of the California Land Surveyors Association 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."

Advertising

Commercial advertising is accepted by "The California Surveyor" and advertising rates and information can be obtained by contacting the Editor, P.O. Box 3707, Hayward, CA 94540.

Classified advertising is published at the rate of \$2 per line for members of C.L.S.A. and \$4 per line for non-members and should also be directed to the Editor of "The California Surveyor."

Sustaining Membership

Membership in the California Land Surveyors Association as a sustaining member is open to any individual, company or corporation who, by their interest in the Land Surveying profession, is desirous of supporting the purposes and objectives of this association. For information regarding sustaining membership, contact the Editor of "The California Surveyor."

Editorial Material

All articles, reports, letters and contributions are accepted and will be considered for publication regardless of the author's affiliation with the California Land Surveyors Association. Material should be sent to "The California Surveyor," P.O. Box 3707, Hayward, California 94540.

EDITOR: Michael S. McKissick, L.S.

P.O. Box 3707

Hayward, CA 94540

Phone 415-581-1070



*Greetings and
Best Wishes
for a
Successful
1977
Convention*



SURVEYORS SERVICE CO.
P.O. BOX 1500
COSTA MESA, CALIF. 92626
(714) 546-0606
EXCLUSIVE WESTERN DISTRIBUTORS

WILD
HEERBRUGG

DEADLINE DATES FOR THE CALIFORNIA SURVEYOR

SPRINGMAY 13, 1977

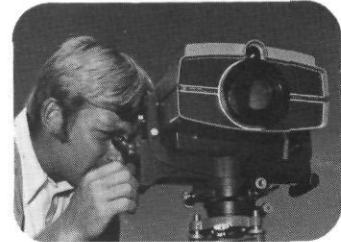
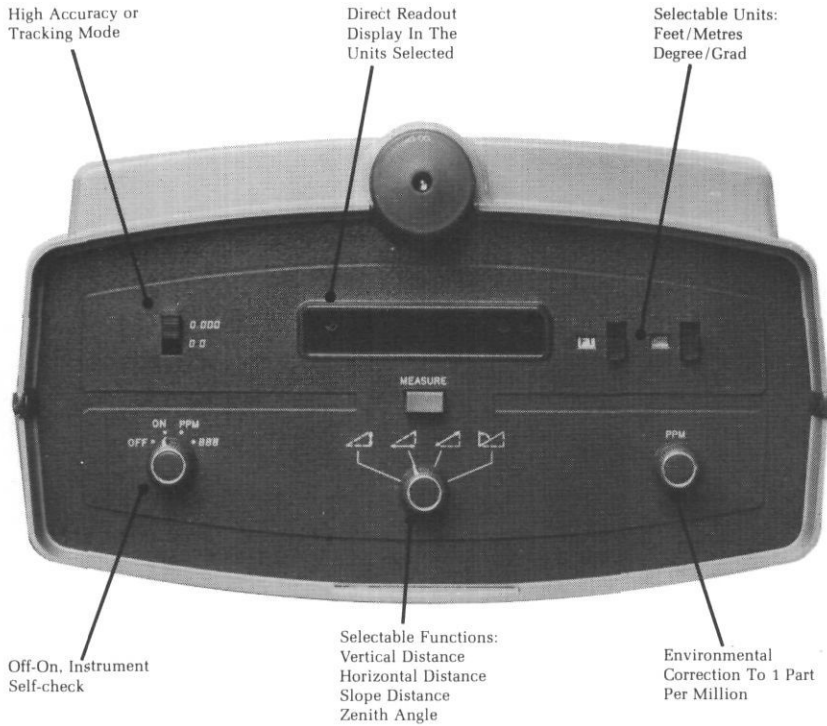
SUMMERAUGUST 12, 1977

Articles, Reports, Letters, etc., received after the above mentioned date will be placed in the next edition.

Editor

New-Total Station.

Angle and automatic horizontal distance measurements from one instrument.



Angle and distance measurements couldn't be easier. Or faster. The new HP3810A Total Station lets you read and lay out horizontal distances automatically. It also gives you combined angle and distance measurements. The secret? A built-in vertical angle sensing device, a microcomputer, and a horizontal angle base.

Point the HP Total Station, press one button, and it quickly measures your slope distance, zenith angle, corrects for curvature and refraction and automatically computes and displays your horizontal distance. This time and money saver also has a tracking mode that drastically shortens layout time—making readings every three seconds to speed you from point to point.

With the 20-second least count horizontal angle base, you can estimate horizontal angles to 5 seconds. Imagine, complete angle and distance measuring capability in one compact package—with no need for cables, clamp on's, transit or theodolite. An ideal solution for layout and location work.

You'll also like the other features that make field work easier. For example, the flashing indicator that tells you when the beam is obstructed. The one mile (1.6 km) range that means you don't have to break down those long shots, the feet/metres switch that allows you to select the units, and the built-in handle for out of the case carrying convenience.

These are just the highlights of this remarkable instrument. You can get full details by simply mailing in the coupon. One good look at the new HP Total Station and you'll know you've seen the measuring instrument of the future—today.



Sales and service from 172 offices in 65 countries.
P.O. Box 301 Loveland Colorado 80537

095/72

HP Civil Engineering Division
P.O. Box 301, Loveland, Colorado 80537 Ca

I would like to order the HP3810A Total Station.

I would like a demonstration of the HP3810A Total Station.

I would like a demonstration of the other HP Surveying Products.

Distance Meters Programmable Calculators

Please send me more information on HP Surveying Products.

Name _____

Title _____ Phone _____

Company _____

Address _____

City _____ State _____ Zip _____

Signature: _____

State Registration of Surveyors?

Editorial Note:

The following paper was presented by Leo M. Odom, P.E., at the 1975 Spring Meeting of the Southern Zone of the National Council of Engineering Examiners. It was one of several papers presented on April 25, 1975, during a session titled "Land Surveying Registration."

LAND SURVEYING REGISTRATION

I am very happy to be given the opportunity of discussing the subject of the registration of Land Surveyors because it is one that I consider to be of great importance and also because the administration of registration as affected by the drastic changes in the Louisiana Registration Law made by the Legislature in 1970 by which the profession of Land Surveying was separated from that of Professional Engineering has gradually become pretty well established.

The subject will be discussed under two headings, "Trends in Registration Requirements" and "Identifying the Profession."

TRENDS IN REGISTRATION REQUIREMENTS

Although Wyoming, whose registration act for professional engineers was adopted in 1907, is generally given credit for having the first state registration act of its kind, the Louisiana Engineering Society can lay undisputed claim to having begun the movement towards registration much earlier — in 1898, in fact — and having had legislation introduced to accomplish it at that time. Louisiana's act providing for registration of Civil Engineers and Land Surveyors was adopted in 1908 and those became the second of its kind in this country. However, until 1970 our act accorded registered Civil Engineers the right to practice Land Surveying as well.

In recent years it has become necessary to discontinue the gratis award of the title of Land Surveyor to persons registered as Civil Engineers in Louisiana. This is because surveying courses, which formerly were considered an important part of every curriculum in Civil Engineering, were being replaced. And because of the great increase in the value of land, to better protect the public the 1970 Louisiana Legislature passed Act 685. This act, an amendment to Act 73 of 1950, recognized Land Surveying as a separate profession, allied with but not necessarily integrated with Civil Engineering.

In addition, the 1970 amendment requires that an application for registration as Land Surveyor be made entirely separate from an application for registration as Civil Engineer. It also established much more stringent requirements for registration on the basis of experience plus examination than had formerly been required.

Applicants who are registered professional engineers and who earned not less than six semester hours in surveying courses approved by the Board may be registered without examination. However, since four years of engineering experience are required for registration as a Professional Engineer, the Board has ruled that the applicant for Land Surveying registration on this basis must have had not less than two years of land surveying experience in addition to the four years of

engineering experience.

Registration as a Land Surveyor on the basis of comity is provided for in the amended law, but the applicant's record is closely examined to be sure that the requirements for registration in the state in which he is registered satisfy our requirements. In any case applicants on the basis of comity must pass a four-hour written examination in Louisiana law relative to Land Surveying.

One of the provisions of the 1970 amendment, which was necessary in order to get it passed, is that all Civil Engineers and Land Surveyors registered prior to its passage would automatically receive registration as Land Surveyors under the amended law. This provision resulted in our having over 3,000 registered Land Surveyors to start with. New registrants under the amended law have come in very slowly at the rate of 12 to 15 per year.

IDENTIFYING THE PROFESSION

A clear interpretation of the definition of the term "Land Surveying" became of particular importance to the Registration Board after the passage of the 1970 amendment since by virtue of that amendment the Legislature definitely recognized Land Surveying as a profession separate and apart from Professional Engineering. It was no longer to be regarded as a sort of subprofessional activity in a field in which Professional Civil Engineers were the prime professionals. Up to that time the term "Land Surveying" had actually been considered to cover only one relatively small area in the general practice of Civil Engineering.

There are many engineers who are still of the opinion that all engineering surveying is Land Surveying and vice versa. This opinion can no longer be accepted in Louisiana since the passage of the 1970 Amendment to Act 73 of 1950. The difficulty remains largely because the Land Surveyor uses the same instruments and techniques in the work of measurement of lines and areas and drawing of plats that are employed by Professional Engineers in their work.

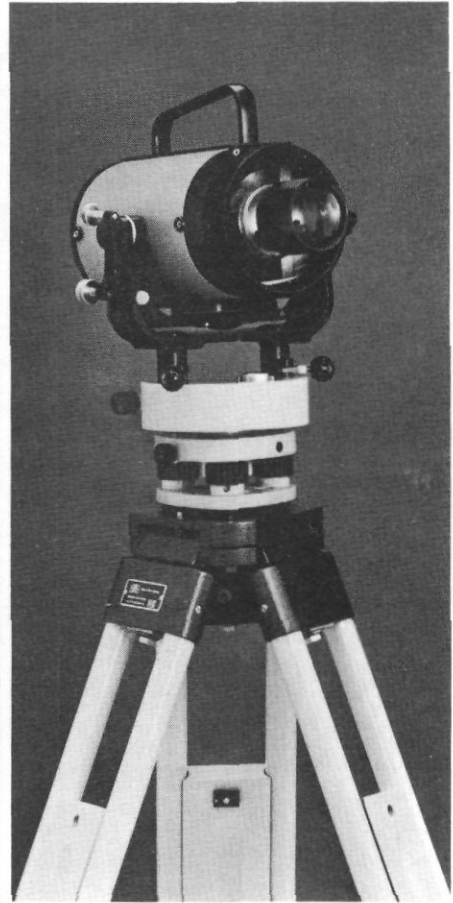
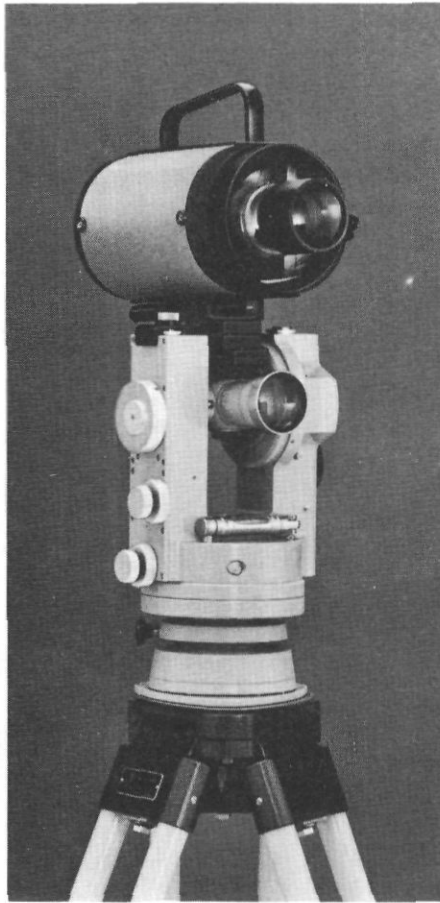
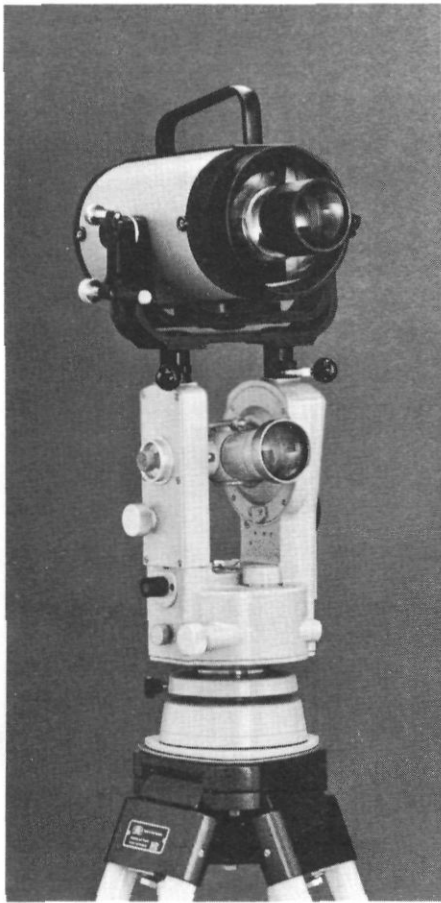
It is therefore necessary to define Land Surveying in terms which specifically indicate what it is that a Land Surveyor does with the data that he collects which sets him apart from other professionals. He is not solely a collector and compiler of data. The Land Surveyor's claim to professionalism lies basically in the fact that independent judgment and responsibility are required in his practice.

The following quotations from an article by Frank Silver, L.L.S., which appeared in the November-December 1973 issue of the "Empire State Surveyor" published by the New York State Association of Professional Land Surveyors, reinforce our position:

"It is probably not the mensuration or measurement part of the task that makes the legal branch of land surveying a learned profession. More likely it is the record and legal part of the task, the weighing the evidence, reconciling the conflicting claims of parties, the relocation of lost corners, the creating of a plat and description that will stand up in court, that makes boundary surveying a learned profession. Five years is hardly long enough to gain a good working knowledge of the record,

Continued on page 23

Today's most versatile EDM system.



MicroRanger EDM system mounts on most theodolite standards, telescopes or tribrachs—saves set-up time, lets you match method to project.

K&E's new yoke allows you to mount the MicroRanger directly on theodolite standards permitting the telescope to be plunged for backsights.

Yoke-mounted on an azimuth base, the MicroRanger provides the more conventional set up for distance measuring only.

And with the MicroRanger telescope-mounted, you're then set up for easy stakeout work, when many shots are to be taken from one point.

Your investment is modest, yet the MicroRanger system operates accurately from 3 feet to over 1 mile—a range where most surveying is done. And the system comes complete—the head unit, control unit, rechargeable 12 volt nicad battery as well as the interconnect

cable, battery charger, and carrying case.

Here are a few of the MicroRanger system's other features:

- Weighs only 12 lbs. with battery
- Audio signal for rapid target acquisition
- Auto-ranging for rapid updating of digital display.
- Dial-in correction factors for environment and offset reduces chance for error.
- Highly accurate $\pm(0.02\text{ft} + 2\text{ppm})$, with readout in meters or feet, or optional meters or chains.

You'll find service locations in the United States as well as Canada, Europe and Japan. For further details, write to Keuffel & Esser Company.



KEUFFEL & ESSER COMPANY

223 Lawrence Ave.
South San Francisco, Calif. 94080
Phone: 415 873-6850

1327 South Olive St.
Los Angeles, Calif. 90015
Phone: 213 747-7601

A THOUGHT

ON CALTRANS ENTRY INTO PRIVATE PRACTICE

by George Dunbar, L.S.

Liability

In the event of a 3rd party damage (or even 2nd party other than another state agency, i.e.: municipality), who is liable? The surveyor who signs the map, Caltrans (State of California), or both? Is Caltrans responsible under the Engineers and Land Surveyor's Acts? For their *own* work they are specifically exempt.

Consumer Protection

Who is responsible when Caltrans personnel and equipment is used and a survey is performed and a map filed that would come under the auspices of the Board of Registration (such as an inept or fraudulent survey)? If the man who signs the map and places his number on the monuments set is responsible, how can the use of State owned equipment and State employees be justified? Is the State liable for real damages such as cutting of vegetation and damage to fences during the conduct of their survey? How does one go about recovery?

Preservation of Field Notes

In the event of litigation—original field notes are invaluable. All responsible private practioners maintain a permanent record of field notes, correspondence, etc. for all work done. Has Caltrans set up a filing system for private work that makes these field notes, calculations, and preliminary maps readily available? If not, they are not acting responsibly.

Ethics

When Caltrans enters into the private sector using State employees and equipment, at what level and by whom is it determined that the survey was properly conducted? The maps I have seen filed are signed by a Land Surveyor, and yet to my knowledge, Caltrans has no positions in its table of organization with the prerequisite of licensing as a land surveyor and from this I deduce that the man signing the map is simply an employee as a technician without responsibility. This in itself would appear highly unethical, and an attempt to dodge or ignore both legal and moral responsibility.

Specifics

To my knowledge, three records of survey have been filed in Santa Cruz County. One (64-M-4) appears to be in violation of paragraph 8764 (f) of the Land Surveyor's Act in that it makes no reference to the fact that it is in conflict with a prior map of record (54-M-8). It does not even acknowledge the existence of the map except an obscure reference in the Basis of Bearings, nor the fact that it is in conflict with recorded deeds. Furthermore, the two deeds that I checked, although being the correct volume and page, show owners of Record different from those shown on Caltrans Map. The map would seem to indicate a *laissez-faire* attitude towards the rights of adjoining by not even calling attention to conflicting data. This map portrays about 2½ miles of boundary based on two pipes, 234

feet apart, and some 1200 feet distant from the boundary in question; and yet bearings are shown to one second which when carried through a hundred courses, averaging 100 to 200 feet in length, is patently ridiculous.

The second Map (62-M-70) and the third (62-M-71) indicate a reliance on technology, rather than a genuine understanding of the nature of land surveys.

Example 62-M-71 shows a deviation from the record of 0°00'04" in 175.55 feet. This would result in a displacement of the monument by 0.003 which is not measurable, nor ascertainable, except by the use of highly sophisticated techniques at an exorbitant cost with instrumentation and personnel not readily available even to an entity as large as the State of California. In the same vein 62-M-70 disagrees with a private engineer's monument by 0.04 feet some 430 feet along a line which is 1685 feet long with none of the points intervisible. This type of thing obfuscates the record, contributes little or nothing and raises doubts as to the competence and ability of the author of the map.

PERSONAL OPINION FROM A PRIVATE PRACTITIONER'S POINT OF VIEW

The use of State equipment and personnel to perform surveys in the private sector is unfair to the public. It is a misuse of State funds provided from taxation. The use of licensed individuals who are *not* responsible to the Board of Registration for their actions as an employee of Caltrans cannot be in the best interests of the public. The ethics of competing with the private practioner while using space and equipment provided by public funds (taxes) is unethical as is the lack of responsibility for their actions. If the State is liable, then this too, laces an unfair burden upon the taxpayer. ▲

C.L.S.A. MEMBERSHIP

C.L.S.A. MEMBERSHIP

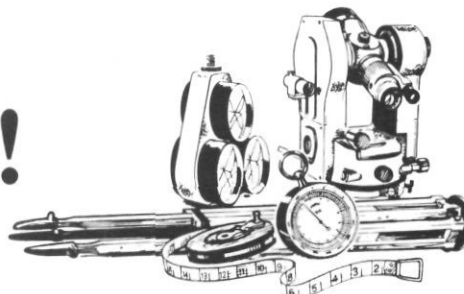
Members as of January 1, 1977	644
Sustaining Members	11
Corporate Members	380
Associate Members	158
Affiliate Members	38
Student Members	49
Life Members	8

**ULTRA-SITE
ADJUSTABLE TRIPOD**
5½ft to 10ft high
FLUORESCENT SURVEY EQUIPMENT
write or phone for details
(714 630-5060)

C&R MANUFACTURING
1189 N. KRAEMER BLVD.
ANAHEIM, CALIF. 92806

OWNED AND OPERATED BY HADCO INSTRUMENTS

Rent from us and save money!



- Overnight delivery anywhere!
- Charges stop on day shipped for return!
- Purchase options available!
- Call toll-free!

Electronic Distance Measuring Equipment:

	1st 10 Days per day	After 10 Days per day (or 30 Day Minimum)	After 90 Days per day
†Hewlett-Packard 3800 A or Cubic DM-60 Cubitape Distance Meter	20.00	12.00	8.00
†Hewlett-Packard 3805 Distance Meter	25.00	15.00	10.00
†Hewlett-Packard 3810 Total Station	60.00	36.00	24.00
*†K & E Microranger Distance Meter	30.00	18.00	12.00
*†K & E Autoranger with Azimuth or mount for Theodolite	30.00	18.00	12.00
*†Geodimeter Model 78	35.00	21.00	14.00
*†Precision International Beetle 500 Distance Meter	20.00	12.00	8.00
Cubic DM-20 Electrotapes—Two Units	40.00	24.00	16.00

Positioning Equipment:

*Motorola Mini-Ranger with two Coded Transponders	200.00	90.00	60.00
Each Additional Mini-Ranger Coded Transponder	36.00	18.00	12.00
Cubic DM-40 Autotape with Two Responders	300.00	150.00	100.00
Autotape or Mini-Ranger Printer	15.00	6.00	4.00
Raytheon DE-719 Recording Fathometer	25.00	15.00	10.00
Raytheon DE-119D Recording Fathometer	20.00	12.00	8.00

Optical Surveying Equipment:

*Lietz TM-1A 1" or Wild T2 Theodolite (Direct reading Horizontal and Vertical to 1", Self Indexing Vertical Circle)	20.00	12.00	8.00
*Lietz TM-10C 10" Theodolite (Horizontal and Vertical Estimation to 1", Self Indexing Vertical Circle)	14.00	8.40	5.60
*Lietz TM-20C 20" or Wild T1 Theodolite (Horizontal & Vertical Estimation to 3", Self Indexing Vertical Circle)	11.00	6.60	4.40
*Lietz T-60D 60" or Wild T-16D Theodolite (Horizontal and Vertical Estimation to 6", Self Indexing Vertical Circle)	10.00	6.00	4.00
*Lietz TS-20 60" Theodolite (Estimation to 20" Horizontal, 1' Vertical)	7.50	4.50	3.00
*Lietz BT-20A 20" Optical Plummet Transit	5.25	3.15	2.20
*Lietz B-1 Engineers Precision Automatic Level	5.50	3.30	2.10
*Lietz B2-A Engineers Automatic Level	3.50	2.10	1.40
*Lietz C3-A Engineers Automatic Level	2.75	1.65	1.10
*Lietz B-4 Contractors Automatic Level	2.00	1.20	.80
*Lietz Builders Transit-Level #200	2.00	1.20	.80

Miscellaneous:

*Survey 31 Desktop Computer with Surveying Software	30.00	18.00	12.00
H.P. 9815A Desktop Computer with Surveying Software	25.00	15.00	10.00
*Lietz #7312-45 Traverse Set	6.00	3.60	2.40
*Magnetic Locator — Schonstedt GS-32	4.00	2.40	1.60
Spectra-Physics LT-3 Laser Transitlite with Fan Beam attachment	20.00	12.00	8.00
*American Paulin Model M-2 Surveying Altimeter — 0 to 10,000 feet, 2 foot graduation ..	4.00	2.40	1.60
*Kern #173 W Tripod with 5/8" x 11 Adaptor	2.00	1.20	.80
*Lietz #7512-52 or Equal Wide Frame 5/8" x 11 Tripod75	.45	.30
*Lietz #7533-10 3 1/2" x 8 or #7533-20 5/8" x 11 Standard Wooden Tripods50	.30	.20
*Lietz #7311-35 or Wild GDF-6 Tribrach with Optical Plummet	1.50	.90	.60
*Lietz #7311-38 Tribrach Prism Adaptor50	.30	.20
*Retro-Ray Single Prism Assembly (round)	1.00	.60	.40
*Retro-Ray Triple Prism Assembly (round)	2.50	1.50	1.00
*Retro-Ray Tilting Single Prism Assembly (round)	1.25	.75	.50
*Retro-Ray Tilting Single Prism Assembly (lateral)	1.50	.90	.60
*Retro-Ray Tilting Triple Prism Assembly (lateral)	3.50	2.10	1.40

NOTE: For 30-day minimum contract rate, disregard "1st 10 days" column above.

*New and used equipment available for purchase. Option to purchase included in rental agreement. Additional equipment available for rent or purchase—information on request. Authorized Lietz dealer.

†All short-range E.D.M. units are supplied with power supply, altimeter, thermometer and one single prism assembly.

We purchase used surveying equipment. Call us for a quote.

Lessee pays all round trip shipping charges on rented equipment.

Rental charges commence on the day the equipment leaves
Lewis & Lewis and terminates on the day the equipment is
returned or shipped for return to same Lewis & Lewis office
from Lessee's location. Rates for longer periods available
on request. Rates subject to change without notice.



Lewis & Lewis

surveying equipment

CALL TOLL-FREE: (800) 235-3377
(except Alaska, California & Hawaii)

1600 Callens Rd., P.O. Box 820, Ventura, Ca 93001 • (805) 644 7405
6580 Washington Blvd., Elkridge, Md. 21227 • (301) 796 1468
8419A Rannie St., Houston, Tex. 77080 • (713) 460 2911

OLD SURVEYING BOOK REPRINTS

In 1976 an association was formed between Carlisle Madson of Hopkins, Minnesota and R. Ben Buckner of Columbus, Ohio for the reprinting of significant surveying books which are out-of-print and of current practical value to the surveyor. These two men are actively involved in the profession of surveying and well qualified to adjudge which books are most valuable. Dr. Buckner, who has developed most of the core program for the Bachelor of Science in Surveying degree at The Ohio State University, teaches what may be the first and only complete college course in surveying history. He has also presented several lectures on history of surveying. Carlisle Madson has long held a keen interest in surveying history, particularly concerning public lands resurvey problems. Mr. Madson is Executive Vice President and principal surveyor of Schoell & Madson, Inc., Consulting Engineers and Land Surveyors. He is well known for his overall leadership in the profession and many will remember his "Compilation of Rules for Land Surveyors" printed and reprinted in several state newsletters. Both men are registered surveyors and are considered leaders in the profession. Both are members of the ACSM Historical Surveying Committee recently formed by President Sam Baker and chaired by Walt Robillard, LSD Chairman.

The books being reprinted by Madson and Buckner are sold by Landmark Enterprises, owned by Roy Minnick, Senior Boundary Officer for the California State Lands Commission.

These three gentlemen have a sincere interest in education of practicing surveyors and hope that making books available will help improve practices. At present, the following reprints by Buckner and Madson are available:

Stewart, Lowell S. *Public Land Surveys: History, Instructions, Methods*. (originally published by Collegiate Press, Inc., Ames, Iowa, 1935) \$8.95, hardbound, 185 pages.

Hodgman, F. *Land Surveying*. (originally published by F. Hodgman, Climax, Michigan, 1913). \$11.50, hardbound, 472 pages.

In early 1977, the following two books will also be available.

Mulford, A. C. *Boundaries and Landmarks*. (originally published by D. Van Nostrand, 1912). paperback, 90 pages.

Hawes, J. H. *Manual of United States Surveying*. (originally published by Government Printing Office, around 1871). hardbound, 240 pages.

The reprints are facsimile reproductions made directly from an original copy, printed and bound using high quality methods as with modern textbooks. Prices are kept as low as possible and are well under the costs for modern texts. Any one would be a low-cost bargain considering their relative value in surveying practice. Facsimile reprints are emphasized here, but it should be mentioned that Landmark's catalog contains over 50 other titles, both current and reprinted material.

For a catalog write to Landmark Enterprises, Ft. Sutter Station 160502, Sacramento, California, 95816. ▲

JACK LEROY DODGE

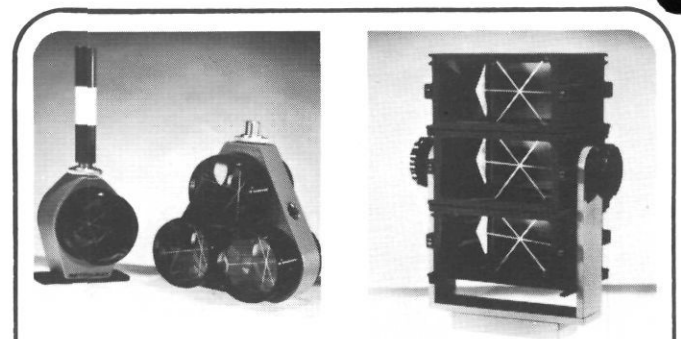
1908 - 1976

JACK LEROY DODGE, 68, (L.S. 2703) passed away December 26, 1976 in Yountville, California. He was County Surveyor of Lake County from 1960 to 1971, when he retired on a disability. Jack was employed by the County of Lake from the late forties until 1959, during which time he also served as Deputy County Surveyor. During 1959 and 1960 he was in private practice. He was a veteran of World War II, serving with the Combat Engineers in Europe.

Jack was born in Lake County of a pioneer family and lived most of his life in the Upper Lake area. He knew and loved the County well. A tremendous compassion for others, he was well liked by all who knew him.

He is survived by his wife Pat of Lakeport, two sons, Jackson, a student at U.S. Davis, and Stuart of Lakeport, and a daughter Stephanie of Lakeport. Two brothers, Edwin of Upper Lake and Clair of Nice also survive. One of his brothers, Kimball, a land surveyor in the Fort Bragg area and a sister Wilda, of Saratoga, preceded him in death. One of his nephews, William K., is a land surveyor currently practicing in the Fort Bragg area.

Graveside services were held at the Upper Lake Cemetery under the auspices of Hartley Masonic Lodge 199, of which Jack was a Past Master. ▲



Save money with our prisms!

All of our Retro-Ray reflectors are precision ground to exacting specifications for optimum field use from solid BK-7 optical glass. Compare them, and if you can find a retro-reflector that outperforms Retro-Ray, we'll give you back every cent you paid!

Retro-Ray reflectors:

No. 110; Round, single prism	\$145.00
No. 109; Round, triple prism	395.00
No. 105; Lateral, triple prism, tilting	695.00

Padded storage bags available for above models. Send for complete price list and details on all our reflectors.

Lewis & Lewis

surveying equipment

1600 Callens Rd., P.O. Box 820
Ventura, Ca. 93001 • (805) 644-7405

6580 Washington Blvd.,
Elkridge, Md. 21227 • (301) 796-1468
8419A Rannie St.,
Houston, Tex. 77080 • (713) 460-2911



CALL TOLL-FREE (except Alaska,

California & Hawaii) (800) 235-3377



SURVEY 31

Twice the computing power at 1/2 the cost!

Compare **SURVEY 31** with some computers selling for over \$10,000 and you will likely find that it's at least twice as powerful. And, because **SURVEY 31** was specifically designed as a surveying computer, it's easier for you to use.

- A surveying computer? Yes, most of the more commonly used surveying solutions (traverse, inverse, curves, area, etc.) are "hard-wired" into the circuitry of **SURVEY 31**. They are immediately available by simply touching one or two appropriately labeled keys.
- What about other uses? Other solutions are achieved by using programs loaded into the programmable memory through a built-in magnetic tape reader.
- How large is the program memory of **SURVEY 31**? 10,000 program steps, including the surveying solutions and the programmable memory. This is approximately equal in computing power, to 32,000 "words" of memory on computers that use Basic language.
- How many coordinate points can **SURVEY 31** store? 300 points (coordinate pairs) may be stored **directly into memory** and instantaneously recalled by point number. Over 16,000 points may be stored on an optional disc memory with access to any point in less than 1 second.
- Why do you emphasize "directly into memory"? To clarify what we consider to be misleading advertising claims by some other companies. One highly respected company claims "2,000 coordinate pairs can be stored for immediate use." The actual fact is that only 50 pairs may be stored directly into memory. The rest are stored on magnetic tape with an access time of up to 18 seconds per coordinate pair!
- How long is the guarantee period? One year. Service is performed either at our factory (we pay the freight both ways as well as providing a loaner) or you may take or ship the equipment to any of 45 service centers in the United States and Canada.
- What peripheral equipment is available? All those shown in the above picture (Typewriter, Plotter, Digitizer, Disc Memory) plus more.
- What is the cost of **SURVEY 31**? \$5,275 for the computer and the program library. Or, it may be leased for \$125 per month on a five year lease-purchase plan. (If you want to save \$400, it's also available with 100 point storage for just \$4,875 which leases for \$115 per month).
- Wouldn't it be foolish to buy something else without at least looking at **SURVEY 31**? Yes, we would think so.

FOR MORE DETAILS, (including the name of your nearest authorized Survey 31 Dealer), call or write:

ENGINEERING SERVICES COMPANY

14604 205th S.E.
 Renton, Washington 98055
 (206) 226-7950
 Bill Watson, President

CLSA SUSTAINING MEMBER

WE WANT TO KNOW MORE ABOUT SURVEY 31

Name _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

EDITORIAL COMMENTS

FIELD NOTES

by Allan Ralls
Secretary, CLSA
CSUF Student Chapter

Is surveying a profession? The answer to that question would depend on who is asked. Ask a Land Surveyor, and you will get an affirmative response. But what about that segment of society who are laymen to the knowledge, experience, and responsibilities that the Land Surveyor must possess? What about those individuals and organizations which affect the social and economic status, directly and indirectly, of most everyone employed in the broad field of surveying, whether you realize it or not? Many federal bureaucracies don't seem to think surveying is a profession. These are the same agencies that publish occupation classifications that are used as guides by groups and committees determining the classification, legal status and salaries of surveyors.

The U.S. Dept. of Labor, Bureau of Labor Statistics, in their "1974 Occupational Manpower and Training Needs" publication, lists surveyors under the classification of "technician." Surveying and Photogrammetry are labeled as "civil technologies" and tabled under the educational heading: "associate degrees below the baccalaureate level," while Civil Engineering is listed under "occupations for which a college degree or graduate degree is required."

Another example is from the U.S. Dept. of Commerce, Bureau of the Census. In their publication, "Classified Index of Industries and Occupations," surveyors are found under the Occupation Code 161, with the heading: "Engineering technicians." The importance of these two documents may be questioned, but how can surveying and surveyors be considered professional when educators and the public have this kind of data available?

If surveying is to be recognized as a true profession, then it must be on a parallel with other professions. One of the integral aspects common to each of the traditional professions (such as law and medicine) is the attainment of at least a bachelor's degree. Which of the recognized professions can you enter into without a mandatory B.S. degree? To become a professional Land Surveyor (i.e. registration) in California, you do not need a B.S. degree. Should the educational requirements of these other established professions be lowered to be on a par with those in Land Surveying? Would you want your physician to be just a high school graduate with a "working knowledge" of how to operate on your lungs or kidneys?

The "professional" is clearly defined by federal authority in Sec. 2, (12) of the National Labor Relations Act, 29 U.S.C. Sec. 152 as: (in part) "any employee engaged in work (iv) requiring knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study in an institution of higher learning . . . as distinguished from a general academic education or from an apprenticeship. . . ."

A good example of the consequences of the surveying profession's failure to adamantly insist on recognized minimum educational qualifications is found in the largest municipal employer of surveyors in California, the City of Los

Angeles.

The City of Los Angeles' classes of Survey Supervisor and Senior Survey Supervisor (7287 and 7288), which require state registration, fail to meet the statutory definition of a "professional employee" as defined in Sec. 4.801 of the Los Angeles City Employee Relations Ordinance.:

"An employee engaged in work requiring specialized knowledge and skills attained through completion of a recognized course of instruction, including, but not limited to, attorneys, physicians, registered nurses, *engineers*, architects, teachers, and various physical, chemical and biological scientists" (emphasis added).

This ordinance is based on Section 3507.3 of the Meyers-Milius-Brown Act, (Government Code) which defines the term in the same way.

The general interpretation of the statutory definition is that it requires attainment of at least a bachelor's degree in the specific field practiced for an occupation to be considered as "professional." This is the very basic common thread that links the example professions. While the specialized knowledge and skills vary greatly among those professions, in each case the knowledge and skills were attained through a recognized course of instruction culminating in a bachelor's degree or a higher degree. While some of the examples also require registration by the state in order to practice, others do not. Therefore, the *manner* in which the knowledge and skill are obtained is the only reasonable interpretation that can be applied in the determination of professional status for such classes as surveyors.

While the above-named classes do require a valid license as a Land Surveyor (which in itself does not require graduation from an approved land surveying curriculum), the educational requirements are not on a par with the examples in the definition.

Without the class specifications being changed, the positions cannot be considered as professional. The Personnel Department, which has the sole legal authority to change those classifications, has rejected the appeal to require graduation from an approved land surveying curriculum because it justifiably feels that since it requires a license as a Land Surveyor, it would be redundant to require the B.S. degree also.

The implication seems obvious: if its own profession doesn't require the degree, why should anyone else? The consensus of legal definitions is equally obvious: that the "professional" has, at the very least, a bachelor's degree, ergo, the old maxim seems appropriate: "It's not how professional we think we are, it's how professional the professionals think we are that determines our acceptance."

I think it is important to mention to anyone who is as yet uninformed, the following information: On March 19, 1976, Assemblyman Chappie introduced AB 4074, to the California Legislature. This was an act to amend Sec. 3507.3 of the Government Code (See earlier reference) to include "Land Surveyors" under the title of "Professional Employees." On June 3rd, it was passed by the Assembly by a vote of 69 to 0; on Aug. 24th, it was passed by the Senate by a vote of 21 to 11;

Continued on page 14

AGA

GEODIMETER® EDM



MODEL 12

Infrared EDM with 1.5 mile range, mounts on most theodolites. Continuous tracking made for stake-out. Will track moving reflector up to 15 feet per second.

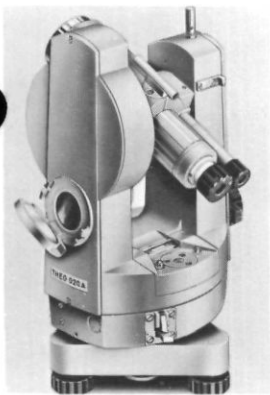


MODEL 78

Medium range EDM using low power visible laser for distances up to 6 miles. The Model 78 is an improved version of the well-known Model 76.

JENA THEODOLITES & LEVELS

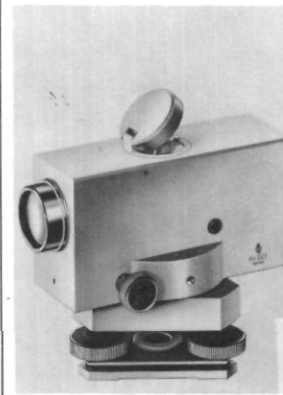
JENA THEODOLITES



The Model 010A Theodolite is a one second directional instrument for triangulations through the second order, precision traversing and engineering construction projects. Available with repetition clamp.

The Model 020A – One minute reading (optical transit), repeating type for medium accuracy triangulation, land surveying, road and highway layout, city and mining engineering. Available with 1 minute left and right graduation.

JENA LEVELS



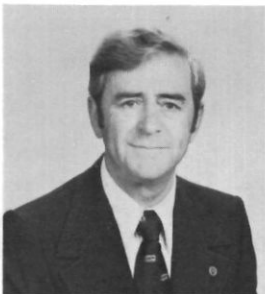
Model Ni025 – A self-leveling instrument suitable for all 2nd, 3rd, and 4th order work. Ideal for engineering – contractors and surveyors. Also available with graduated horizontal circle, direct reading to 10', estimation to 1'.

Model Ni050 – for builders.

Model Ni007 for precision levelling.

Model Ni002 – for geodetic work.

SALES & SERVICE



MEET OUR NEW SALES REPRESENTATIVE . . .

We are pleased to announce that John Weir has joined the Geodimeter Division. John is well-known to many of you, having been in this field of business for many years.

John will be pleased to call on you and discuss any of your requirements.

MAIL TO: AGA Corporation, Geodimeter Division
80 Mark Drive, San Rafael, California 94903
(415) 479-3816

- Please send me more information about the products checked below.
 Please call. My number is _____

I am interested in:

- Model 12 Model 78 Theodolites
 Levels Reflector System Other, please specify: _____

Name _____

Firm _____

Address _____

City _____ State _____ Zip _____

AGA Corporation
Geodimeter Division
80 Mark Drive San Rafael, CA 94903 (415) 479-3816

C.L.S.A. ORANGE COUNTY CHAPTER

by Brad Brier, L.S.

Just over one year ago, the Orange County Chapter, California Land Surveyors Association was formed. During that year, our membership has grown from 0 to 54 paid members.

We have had an active year for a new organization. We have toured V.T.N.'s Photogrammetric Facility; Title Insurance and Trust's title plant; and Surveyor's Service Company's headquarters and repair facility. We've had demonstrations of the latest in scientific calculators and electronic distance measuring devices by Hewlett-Packard. We have had talks by representatives of Cal OSHA; Orange County Planning Department; California State Board of Registration of Professional Engineers; California Division of Highways; International Union of Operating Engineers, Local 12; Associated Builders and Contractors, Inc.; and the Orange County Surveyor's Office. We have had discussions concerning new laws, pending legislation, local codes and policies and many other subjects which affect the profession.

Since our group consists of both public and private surveyors, it serves as a forum for discussion of an formation of possible solutions to some of the problems which can and have become real points of friction between the two groups.

We will be continuing along these same lines in the future as

well as other directions as may be dictated by the membership and the profession.

We would like to have you as a member of our group and take this opportunity to invite you to join both the local chapter and the state organization. These groups are both working toward the advancement of your profession and need the help of all who are interested.

The Orange County Chapter of the California Land Surveyors Association meets on the second Thursday of the month at various locations throughout Orange County. If there are any questions concerning any of the above, please feel free to contact the Immediate Past President, Ruel del Castillo - (714) 834-3102; President, Chuck Krepp - (714) 962-7228; Secretary/Chapter Representative, Brad Brier - (714) 533-5321; Treasurer, Bill Large - (714) 774-5740; or Chapter Representative, Tallas Margrave - (714) 556-7781 at any time.

ORANGE COUNTY CHAPTER

P.O. Box 4012
Santa Ana, CA 92702

A workshop on water and water related boundaries

A PRESENTATION BY
CALIFORNIA LAND SURVEYORS ASSOCIATION, INC.

May 20-21, 1977

Irvine

Airport Inn Hotel

MAY 20 - FRIDAY	0830	1000	1030	1200	1330	1500	1530	1700
	Registration desk opens at 0700 hrs. Sessions begins promptly at 0830 hrs.	the morphology of water boundary - DOWDEN -	tides, time and shoreline processes - THOMPSON -	tides, time and shoreline processes (cont'd) - THOMPSON -	Lunch	federal juris. aspects - DISTRICT ENGINEER - LOS ANGELES DISTRICT Fact, Fantasy and fiction - the law looks at water boundary	the ordinary high water mark - how it's determined! (cont'd) - GRABER - - WASHBURN -	

(SESSIONS BEGINS PROMPTLY AT TIMES INDICATED)

MAY 21 - SATURDAY	0800	1000	1030	1200	1330	1500	1530	1700
	Sessions begins promptly at 0800 hrs.	to insure or not to insure the title company looks at the water boundary - DORSEY -	state juris. aspects the B.C.D.C. and the C.C.Z.C.C. - THINGGAARD -	omitted lands, forgotten lands and conflicts - GRIFFIN -	the restless tide and marine boundary program of N.O.S. - THURLOW/BOONAR -	Lunch	will the real high water mark please stand up! - GUTH -	change and changeability - a look at the evidence " PANEL discussion - BILL WRIGHT -

CHAIRMAN: JIM DOWDEN L.S.
PHOTO: GEORGE GARY L.S.
REGISTRATION: GARY SHELTON L.S.
MIKE MOTHERHEAD L.S.
AUDIO/VISUAL: ED ZIMMERMAN L.S.

Final program

FACILITIES: BRAD BRIER L.S.
ADMINIS.: TALLAS MARGRAVE L.S.
COORD.: CHUCK WOOLDRIDGE L.S.
ELL ANGELONI L.S.
MOODRATOR: LEROY WOOD L.S.

The Kern DM 500 Survey System

COMPACT • PRECISE • TOUGH

... and EXPENSIVE?

Not at all!

It's versatility, speed and reliability will make it your most valuable employee.



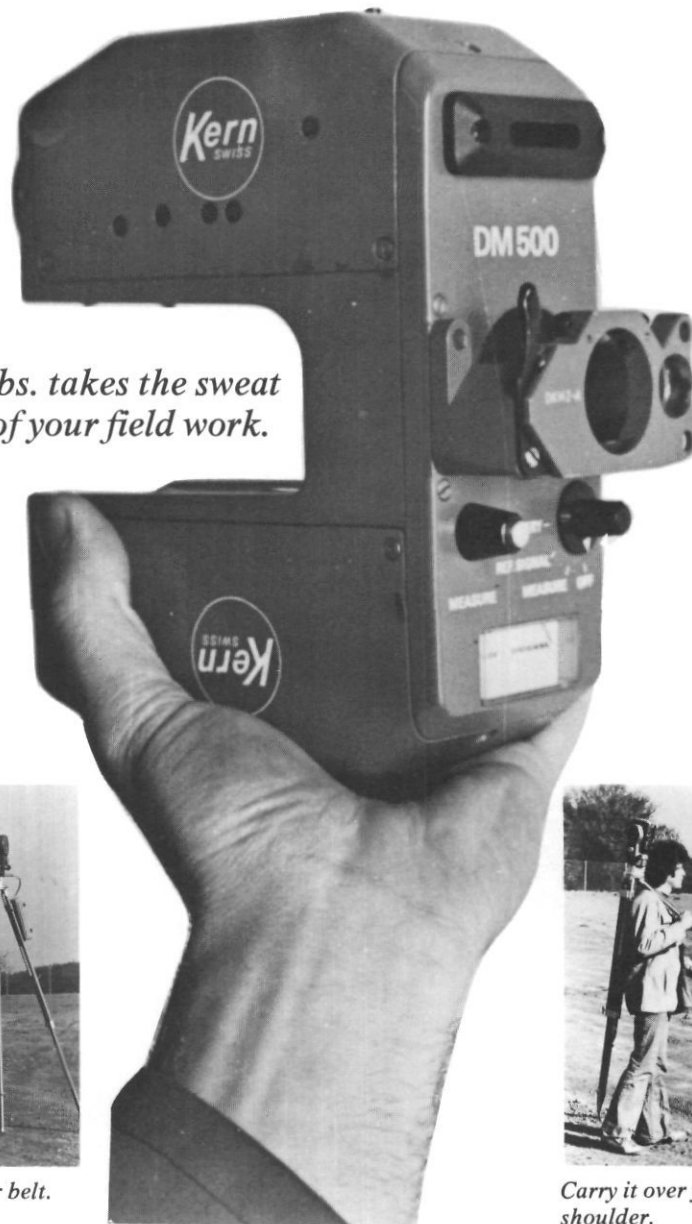
Capability to work to one second.



Carry it in the special case.



Carry it on your belt.



3.5 lbs. takes the sweat out of your field work.



Carry it over your shoulder.



KERN INSTRUMENTS, Incorporated

25-L COMMERCIAL BLVD. / NOVATO, CA 94947 / 415-883-0616
111 BOWMAN AVE. / PORTCHESTER, N.Y. 10573 / 914-939-0200

- I would like to order the DM 500 Survey System.
- I would like a field demonstration.
- I would like a DM 500 brochure.
- I would like a DKM2-AE, K1-SE Theodolite brochure.

NAME _____

COMPANY _____ PHONE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

(SIGNATURE)

FIELD NOTES

Continued from page 10

and finally passing on Aug. 26th. The bill was sent to the Governor on Sept. 2nd and on Sept. 29th, Governor Brown vetoed the bill. Informed sources indicate that it is unlikely that the bill will be reintroduced next session.

Ostensibly then, in our present societal structure, the doctrine of belief that the baccalaureate degree is the gateway to the Professional Fraternity must be considered as viable. Though there are those who may oppose this position, let them not do so in the false belief that the proponents view the baccalaureate requisite as a panacea for the profession. Rather, it is in the conviction that has been so eloquently affirmed by the elder statesman and Past President of the California Land Surveyors Association, Eugene Lockton, "It, (the baccalaureate) represents not so much an acquisition of knowledge as an experience during a formative period in early life—jointly shared by a peer group and therefore constructive of a lasting esprit de corps. The common ground is not the training for increased earnings but the other fraction of the curriculum, the humanities and those disciplines calculated to generate a broader interest in life and to point the way to ethical behavior."

Conformity may not always seem desirable, and for those individuals in the Land Surveying profession who oppose the degree requisite, their persuasion is not without merit. If we are, however, to promote the common good and welfare of Land Surveying and Land Surveyors, maintain a desirable level of professional ethics and practices, and instill public faith and dependence in Land Surveyors and their work, we will have to play the proverbial game by the "professional's" rules. ▲

Examination Tips

by John Pedri

After reviewing several years of Land Surveyors examinations, I would like to offer the following advice to future examinees. This is not a magical formula for passing, but rather some tips to help you prepare for it and to help prevent you from falling into some of the pitfalls that have consumed some past examinees.

I. Preparation

1. Review for the exam for a period of from two to three months prior to the exam. Past exams offer insight into types of questions and areas of study.
2. Don't attempt to cram the night before the exam; that is one of the surest ways to guarantee you will do poorly. Don't even think about the material the night before—relax and get plenty of rest so you are fresh and alert the next morning.
3. Think positively; think of the exam as an opportunity to demonstrate your skills and knowledge rather than a device to trip you up.
4. Self-confidence is one of the most important assets you can take with you into the exam.
5. Keep calm; there is no need to panic; remember, everyone is taking the same exam and there will always be some who pass. If you have properly prepared for it, it will probably be you.

II. Examination Strategy

1. Read the directions carefully.

Continued on page 16

Hewlett-Packard's newest programmable surveying calculator system.

A calculator almost as portable as HP pocket calculators, but with the problem solving power of a minicomputer to handle your surveying computations.



646 W. North Market Boulevard
Sacramento, California 95834
916/929-7295

1430 East Orangethorpe
Fullerton, California 92631
714/870-1000

HEWLETT  PACKARD

Sales and service from 172 offices in 65 countries.
P.O. Box 301, Loveland, Colorado 80537

In surveying, expect HP to set the standards.

HP9815A Surveying Software

Complete integrated software for virtually all your surveying computations.

Volume 1

Programs for general computations including
Triangle Solutions
Curve Solutions
Intersections
Curve Layout
Spiral Curve Layout
Vertical Curves
Line Layout
EDM Slope Reduction
Taping Reduction
Resection
Stadia Reductions
Three Wire Leveling
Solar Observation
Field Angle Check
Coordinate Transformations
State Plane Coordinates
Average End Area
Borrow Pit
Map Check

Volume 2

Interlinked programs for field reduction and design including
Field Data Traverse
Field Bearing Traverse
Radial Surveying
Transformation
Coordinate Geometry with:
Traverse
inverse
Bearing-Bearing Intersect
Bearing-Distance Intersect
Distance-Distance Intersect
Sideshots
Area
Enter & Assign
Curve Computations
Coordinate List
Point to Point Area
Radial Stake-out
Lot Summary
Predetermined Area
Point to Point Angles
Auto Traverse
Street Corner
Street Intersection
Cul-de-sac
Right of Way
Offset from a Line
Circle Thru 3 Points
Tangent to a Circle
Tangent to Two Circles
Re-number



SURVEYING STAKES

SAVE UPWARDS OF 50% ON THE FINEST STEEL PIPE BOUNDARY STAKES



PRICES FOR
MOST
POPULAR
SIZES

3/4" I.D. x 12"	.28	each
1" I.D. x 12"	.39	each
1 1/2" I.D. x 12"	.56	each
2" I.D. x 12"	.68	each
3/4" I.D. x 18"	.35	each
1" I.D. x 18"	.49	each
1 1/2" I.D. x 18"	.72	each
2" I.D. x 18"	.87	each
3/4" I.D. x 24"	.41	each
1" I.D. x 24"	.58	each
1 1/2" I.D. x 24"	.87	each
2" I.D. x 24"	1.06	each

IMMEDIATE DELIVERY

PLEASE FEEL FREE TO CALL FOR PRICES ON ANY SIZE
NOT LISTED ABOVE. WE CUT ANY SIZE AND LENGTH

(Ask for TOM)



INDUSTRIAL PIPE & STEEL CO.
9936 RUSH ST. • SOUTH EL MONTE, CALIF. 91733

PHONE (213)

443-9467

TAKING A PROFESSIONAL EXAMINATION

Continued from page 14

2. Look over the entire exam to get an overview of the scope, nature and difficulty of the exam. This also gives you an opportunity to relax before beginning.
3. Complete the easy questions (those you know) first. Read and temporarily postpone the tough ones (those you anticipate trouble with).
4. Budget your time. Then alter your schedule so that you can spend more time on those with higher point value. Stick to your budget intelligently.
5. Give yourself short rest periods; rest your eyes, stretch your legs, shift your body and take a couple of deep breaths. You will break mental and physical tension and be able to get back to the exam refreshed.

III. The Examination

1. Read the problem very carefully being careful to recognize exactly what is being asked.
2. Think your solution through prior to beginning work on the problem. This could avoid wasting a great deal of time going up a blind alley.
3. The Examination's purpose is to test your knowledge, not to trick you, therefore, if you do not use most of the information given in your solution or if you must make more than the most basic assumptions, you have probably misinterpreted the problem. Go back and read it again—with an open mind.
4. If you find the answer to a particular question in reference material do not copy it verbatim, but explain it in your own words. The examiners are looking for the fact that you understand the concepts not that you have good reference material.
5. If possible, estimate the answer to a calculation prior to calculating the result. If the two do not check fairly well, determine the reason why.
6. After completing the necessary questions don't leave early. Proofread your answers and solutions to make certain you have said what you meant to say or haven't made a minor mistake which can be easily changed. Don't attempt major or wholesale changes of answers at this time. Don't make changes unless you are quite certain that you were wrong in the first place.
7. Show your work! The importance of this cannot be stressed too strongly. Granted, with the advent of the calculator it is not necessary to show every calculation, but you should show the formulas used and give a step by step accounting of your solution. Without this, you are betting 100% that you have not made even the slightest error. By showing step by step procedures, even if your answer is wrong, you will receive partial credit provided your technique is correct.

Good luck on future exams! Remember, however, that your destiny is in your hands; there is no substitute for good preparation.

The Liaison Committee of the Northern Counties—Feather River Chapter has as one of its functions the arbitration or review on maps of surveys which are dissident.

The Committee has established a format to help arbitrate specific un-yielding differences of opinion on common lines and points in surveys on which they occur:

1. Disagreements between public agencies, other Engineer or Surveying Firms as to the resolution of *Surveys* such as but not limited to:
 - a) insufficient map data
 - b) incomplete record data and research
 - c) failure to locate or relocate and use or utilize recognized monuments
 - d) failure to set monuments
2. Failure to record a map of individual survey pursuant to the Land Surveyors' Act.
3. Lack of Professionalism.

Action on matters presented to the Liaison Committee will require legible blue line prints or photo-copy of disputed surveys and also accompanying G.L.O. field notes, if applicable. Conflicts involving personalities will not be heard. Comments will be constructive criticism, without censure, and shall be revocable and non-advertised. The Liaison Committee will *not attempt to represent a Civil Court and no inference to such is implied and shall be denied.*

Arbitration shall not be restricted to only C.L.S.A. membership.

In any situation involving a committee members' firm or association by employment, an alternate member shall replace that committee member in arbitration.

Chairman of the Liaison Committee shall upon the receipt a request for assistance, call a meeting of the committee within 5 days to act upon the request and shall within 30 days notify by U.S. Mail the suggested solution.

Chairman or Alternate Chairman shall keep all records, suitable to the situation, and file same with the Secretary of the combined Northern Counties and Feather River Chapter, said files shall be presented upon request for inspection to any member in good standing within the combined chapters, but only after approval of request by the Liaison Committee. Liaison Committee members acting in arbitration or review shall consist of C.L.S.A. members or shall hold a valid Land Surveyors License.

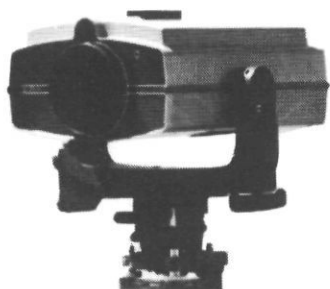
The arbitration committee shall consist of a chairman and four (4) C.L.S.A. regular members, members to be appointed by said Chairman from the said combined membership. ▲



FOR SALE

Clary De 600 computer
Complete with tape unit . . . \$1,500.00
Contact Bob Rondeau
JENNINGS-McDERMOTT-HEISS, INC.
925 Regent St., San Jose, California 95110, (408) 286-4555

When you
need to rent:
We have
what you
need!



Specializing in rental of precision measuring and location systems, utilizing the most advanced in state of the art and dependable distance measuring and marine seismic and sonar equipment. Our large inventory of complete systems is available for long or short term contract and can be delivered in hours—anywhere in the world.

	DAY	MONTH
Lietz Transits (1' & 20'')	\$ 3.00	\$ 60.00
K&E Transits (1' & 20'')	4.00	80.00
Askania A-2e 1" Directional Theodolite	10.00	200.00
Wild T2 Theodolite	15.00	200.00
Wild T3 Theodolite	35.00	350.00
Lietz B-1 Level	3.50	70.00
Wild Automatic Level	15.00	150.00
Zeiss Level	15.00	150.00
American-Paulin Altimeter	4.00	70.00
American-Paulin Barograph	15.00	150.00
Wild DI-10 Distomat	20.00	300.00
Tellurometer CA-1000	35.00	350.00
Triple Prism reflector assembly	3.75	65.00
Hewlett Packard 3810A Total Station	120.00	1200.00
Cubitape (DM-60)	20.00	400.00
Cubic-Electrotape (DM-20)*	30.00	400.00
Cubic-Autotape (DM-40)*	200.00	2500.00
Cubic-Autotape (modified DM-40)*	250.00	4000.00
Autotape Printer (2 range)	10.00	100.00
Autotape Printer (3 range)	50.00	500.00
Motorola Mini Ranger (c-band) w/two Coded Transponders*†	250.00	2500.00
Decca Hi-Fix (range-range)*.**	250.00	2500.00
(hyperbolic chain)*.**	350.00	3500.00
EG&G Mark 1-B Side Scan Sonar*.**	500.00	4000.00
EG&G Uniboom Seismic Profiler*.**	400.00	3000.00
EG&G Sparker (1000 joule)*.**	400.00	3000.00
Raytheon DE-119 Recording Fathometer*	15.00	200.00
Raytheon DE-719 Recording Fathometer*	25.00	350.00
Raytheon 723 Precision Survey Fathometer Accuracy 1 to 100 feet ± 0.25 feet, 100 feet to 250 fathoms ± 0.25 percent of indicated depth	50.00	300.00
Braincon-Histogram Recording Current Meter. . .	50.00	500.00
Teledyne-Gurley Current Meter	25.00	250.00
Honeywell Sea Scanar	50.00	500.00
Shipek Sediment Sampler	50.00	300.00
Super Cobra (portable drill)	20.00	300.00
GE Radios (Porta-mobil & Mastr)	10.00	100.00
Power Plants (110 & 12V)	15.00	150.00

*Power source not included

**Plus technicians (if required)

†Antennas supplied are omnidirectional. Rates for additional transponders, printers, etc. available upon request.

New and used equipment available for lease-purchase. Option included in agreement.

Prices commence on departure and end upon return or shipped for return to leasing office and do not include transportation, rates on long term leases, operator/technicians, and aircraft, available on request. Rates subject to change without notice. Authorized Lietz Dealer. Tripods included with equipment.

ESR ELECTRONIC
SURVEY
RENTALS, INC.

Land, Aerial, & Hydrographic Systems

ESR, Inc. Highland Business Park 3353 S. Highland Dr. Suite 504 Las Vegas, Nevada 89109 Phone (702) 732-8131 Telex 684464

Surveyor vs. Engineer—No Contest

Continued from page 1

trend is highlighted by the chronology of the formation of national professional engineering associations—a trend which began in 1818 with the Boston Society of Civil Engineers (BSCE) and which continues to this day. Following the founding of BSCE were:

- 1852—American Society of Civil Engineers,
- 1871—American Institute of Mining & Metallurgical Engineers,
- 1880—American Society of Mechanical Engineers,
- 1884—American Institute of Electrical Engineers, and
- 1941—American Congress on Surveying and Mapping.

What Took So Long?

Surveying and mapping, the earliest, the most common, and the most necessary form of American engineering, without which phases two and three of America's development would not have been possible—it seems strange that surveyors and mappers should have waited 89 years to form their own professional association. Surveyors and mappers had to be present and active long before technical designers were. Was it because they were too busy "doing their own thing"? Was it because there were no unusual problems in their field which required discussion on a professional level? Was it because surveyors were loners, hermits, pioneers, who didn't believe in technical association?

Or is it possible that until 1941 surveyors felt adequately represented by the American Society of Civil Engineers and saw no need for a special national society? Is it merely a coincidence that Benjamin Wright, 1770—1842, famed builder of the Erie Canal, but first and foremost an accomplished surveyor,⁸ was designated the Father of the American Civil Engineering by ASCE?

One of the major purposes of ASCE, as expressed by its founders in 1852, was "the collection of maps, drawings and models" in order to advance engineering in its several branches.

Professor Arthur J. McNair has pointed out that ASCE's membership pin bore the outline of a wye level during the first 50 years of its existence. Actually, the wye level badge was used from 1884 through 1894. It was ASCE's first official membership pin. The design was then changed in order to avoid the impression that Civil engineering was limited to surveying (!).

Not until 1926 did the leaders in surveying find the need for a separate Surveying and Mapping Division within ASCE. Yes, surveyors felt quite at home in and had, in fact, dominated civil engineering for over 70 years.

Professional Registration

It took 50 years before all states in the United States required professional engineers to be registered. Wyoming was the first state. Its 1907 laws provided for the registration of civil engineers in five categories. Two of the five civil engineering categories were entirely in the field of surveying and mapping, and a third involved surveying and mapping.¹⁸ The five branches of engineering registration were:

Land Surveyor,

Topographic Engineer,
Hydraulic and Topographic Engineer,
Construction and Designing Engineer, and
Administrative Irrigation Engineer.

Registration of land surveyors took even longer. New Hampshire has the dubious distinction of being the last state in the Union to adopt surveyor registration laws—as late as 1969.

Other professions were licensed much earlier:

Medicine	1760
Dentistry	1841
Law	1890
Engineering	1907

Most states have established joint registration boards for professional engineers and land surveyors. Is that another coincidence? Or could it be that surveying is so closely related to engineering that most Americans consider it its logical place?

The Georgia Code Annotated Law Governing the Practice of Professional Engineering and Surveying states "that the said Act, approved March 31, 1937, entitled 'An Act, to Regulate the Practice of All Branches of Professional Engineering, Including that Branch of Engineering Commonly known as Surveying.'"¹⁰

The Connecticut General Statutes pertaining to Professional Engineering and Land Surveying, Sec. 20-299, Definitions, describe a "land surveyor" as "a person who engages in the practice of that branch of engineering commonly known as land surveying and includes surveying and measuring. . . ."⁴

Not all joint registration boards seem to have been motivated by logic and history, however. Here is how John D. Constance, P.E., engineering registration consultant,⁵ describes the situation in one state:

"Indiana has had experience for many years, with one law which provides for registration of both engineers and land surveyors. Land surveying is not a technician's job; it is a business of going out and properly relocating obliterated corners. It is neither work that one turns over to a technician nor is it on the level of professional engineering. So long as land surveyors are under the jurisdiction of the engineering board, they can be prevented from practicing professional engineering and kept under control. Indiana feels that when two boards are involved, because of natural overlapping of activities, there would be no way to control the situation. The more boards there are, the more trouble there will be. It does not degrade professional engineering to have surveyors associated on the same board and under the same law."

Originally, only property or cadastral surveying was considered land surveying. Today, many state registration laws include engineering surveys (for design and construction). Most, but not all, states prohibit professional engineers from performing boundary surveys. All states authorize registered civil engineers to perform engineering surveys. Some restrict this to the individual engineer's design.

Although engineering registration is confined to one *professional engineer*, most states list registrants by branches. Curiously enough, civil engineering is one of the branches listed on an equal footing with structural engineering and sanitary engineering. As everybody knows, the latter are subspecialties of the former. The term civil engineering has

always included structural and sanitary work among others. Yet, for some reason, professional registration has now developed civil engineering into at least three separate fields of endeavor. This is a very significant trend as will be discussed later.

Did registration of land surveyors automatically improve the status of the profession? Not so, said Walter S. Dix. He detected a general "board blindness" to the real, evaluated qualifications for professional surveying. He even found that "in those early days before adequate examination for surveyors, the surveyor license was handed out all to frequently as a consolation or second-rate license to an applicant that could not make the grade of engineer."⁷

Curtis M. Brown warned in 1961 that "The major deterrent to our becoming a learned profession is our low requirements for the right to practice. So long as we have low admission requirements, we will have low standards of practice and low public opinion."³

*TO BE CONTINUED IN THE SUMMER
EDITION OF THE CALIFORNIA SURVEYOR*

FOR SALE: WANG 720C calculator/plotter

Terms 21 payments \$684 month. Includes printer, alpha keyboard, extended core and disc drive; also CoGo, annotation and engineering software. Will deliver. Call (602) 779-0388 Flagstaff, AZ.

"THIRD WORLD" SURVEYORS

... . Accrediting para-engineering curricula. ECPD, the curriculum-accreditation group, is considering a bold new step beyond its present accreditation of engineering and technology curricula. Proposal is to begin accrediting curricula in the "third world"—that is, the para-engineering curricula in such fields as surveying and construction. Accreditation is intended to provide a floor under curriculum quality, thus improving quality of graduates. ASCE is leading this push.

September 1976 Civil Engineering-ASCE

HADCO INSTRUMENTS

**SURVEY INSTRUMENTS
SALES & SERVICE**

**LIETZ DAVID WHITE
K&E ZEISS/EDM EQUIPMENT**

**FINEST REPAIRS AVAILABLE
RENTALS - FIELD SUPPLIES**

714 630-5050

**1189 N. KRAEMER BLVD.
ANAHEIM, CALIFORNIA 92806**

ENGINEERING COMPUTER SERVICES WILL PROVIDE YOU WITH:

- SUBDIVISION CALCULATING & PLOTTING
- FIELD STAKING CALCULATIONS
- AERIAL CONTROL PLOTTING
- EARTHWORK QUANTITIES
- SURVEYING CALCULATIONS
- GRADING PLAN BASE MAPS
- CONDOMINIUM PLOTTING
- SPECIAL MAP PLOTTING
- PLOT PLAN BASE MAPS
- UTILITY MAPPING
- SALES MAPS

**I ENGINEERING
I I I COMPUTER
I I I I I SERVICES**

**CONTACT JIM BUTLER AT:
2200 "F" STREET
BAKERSFIELD, CALIFORNIA 93301
(805) 325-7012**

FRESNO STUDENTS

Five student members of C.L.S.A. will be graduating from California State University at Fresno this spring and will be seeking employment. In the interest of the profession and the continued acceptance of the fine program at Fresno, "The California Surveyor" is publishing a short resume of these graduates:

D. Allan Ralls

Allan will be graduating in May from California State University, Fresno, with a Bachelor of Science in Surveying & Photogrammetry. He received his A.A. degree from Los Angeles Valley College in Van Nuys, in Jan. 1975.

He has worked for the California Division of Highways from August 1968 to August 1969, employed as a Engineering Aid I and before leaving, was promoted to Aid II. From 1969 up to the present, he has been employed by the Los Angeles Dept. of Water & Power-Power System, Field Surveys, as a Field Engr. Aid; Working for Power Survey, he has gained experience in boundary, right-of-way, geodetic, cartographic, and construction surveys. The extreme variety of types of surveys that the Power System is involved in has allowed him to have an exposure to an extensive array of different fields of surveying.

During the 1976 City of Los Angeles' Promotional exam for Land Surveying Assistant (instrumentman), Allan finished 6th out of 72 applicants. He is also co-editor for the CSUF Surveying and Photogrammetry newsletter, the *Fore Sight*, Fall 1976, and has contributed an editorial column, *Field Notes*, in both the first issue and the current issue. He is a student member of both the ACSM, and the So. Cal. Section of the ACSM. He was Vice President of the student chapter of CLSA in 1975-76, and Secretary for that group in 1976-77 (currently.)

His senior project involves comparison cadastral and planimetric mapping by establishing photogrammetric control by photo-image point identification and map compilation on Kern PG-2; Resume on request: 1613 N. Avon St., Burbank, Calif. 91505.

Leroy K. Latta, Jr.

I will be graduating from CSU, Fresno in May, 1977, with a degree in Surveying and Photogrammetry. I received my California L.S.I.T., #538, August, 10, 1975. I also have a Photogrammetric Technology Certificate from Pasadena City College.

I am 27 years old and not married. I would prefer a field position in land surveying in order to obtain experience toward my L.S. license. I have four years full-time experience in the surveying and photogrammetric fields. My first job was with the Union Pacific Railroad as a chainman, then later a draftsman. Next I worked for Wilsey & Ham as a civil engineering draftsman. I also worked for Metrex Aerial Surveys as a digitizer in their interactive graphics section. The past summer I worked for the U.S.G.S. Topographic Division in their orthophoto section, and currently I am working for CSUF in their survey equipment room part-time.

I am a student member of C.L.S.A. as well as A.S.P. and

A.C.S.M. I have served as A.S.P. student chapter President during the 1975-1976 school year and during the 1976-1977 school year as President of the CSUF Surveying and Photogrammetry Club. Please address responses to:

Leroy K. Latta, Jr.,
43A W.
Santa Ana Ave. Clovis, CA 93612
Phone: (209) 291-5875

Mark J. Bardakjian

Receiving B.S. In Surveying and Photogrammetry from California State University, Fresno, in June 1977.

I am 28 years old, married with one child, seeking position as Party Chief and/or Survey Personnel; Willing to work in the office as well as the field.

Seven years of experience from chainman to Party Chief, with the last three years as Party Chief for a Registered Civil Engineer. Duties included hiring and organizing survey crew, bid estimations, mathematical adjustments and map drawing.

Also, self-employed, while attending school, performing land leveling surveys for agricultural purposes.

Member ASP, ACSM, and CLSA Student Chapter President. Dean's List last 6 semesters.

Land-Surveyor-in-Training Certificate Number 890, Dec. 1976. References and additional information furnished upon request.

671 W. Sample
Fresno, CA. 93704
(209) 431-7596

Wayne Strong

Wayne is originally from the Los Angeles area and has worked during the summers for the L.A. County Engineer as a Survey Aid and for Grimes Surveying and Mapping as a survey technician. He now desires a full-time surveying or photogrammetric position in the field and/or office.

Wayne holds a California L.S.I.T. Certificate #468 and received a Certificate of Completion in Civil Engineering Technology from Pasadena City College. He is a student member of CLSA, ACSM, and ASP, and is Vice President and Treasurer of the campus Surveying and Photogrammetry Club. His current senior project involves analytical photogrammetric determination of subdivision lot corners.

Wayne is a member of the National Engineering Honor Society, Tau Beta Pi, Rho Chapter of California. After receiving a B.S. degree in May, he desires to work in Southern California. Resume on request.

4571 E. Sierra Madre Avenue
Fresno, CA 93726

Allen F. Dibelka

Bachelor of Science in Surveying and Photogrammetry California State University, Fresno (CSUF) Graduation date May 20, 1977.

I will be taking the Land Surveyor in Training test on April 23, 1977. Type of position sought: Assistant Surveyor.

4762 East Herndon
Clovis, CA 93612

CALIFORNIA BOARD OF REGISTRATION
FOR PROFESSIONAL ENGINEERS

Written Examination Schedule
1977

Examination Dates *Final Filing Dates

Land Surveyor-in-Training—LSIT
April 16, 1977 January 31, 1977

Land Surveyor—LS
November 5, 1977 July 11, 1977

*Applications filed after the final filing date specified will be considered for the following examination.

NOTE: This schedule is subject to change at any time without prior notice. ▲

T.I. DISPLAY PROMPTING SR-60
WITH PROGRAMMING FEATURES (NEW)

FIELD TRAVERSE	BEARING TRAVERSE
ASSIGN POINT NUMBERS	AREA BY CURVE RADIALS
ADJUST & STORE 29 TO 130 PTS.	BRG./BRG. BRG./DIST.
IMMEDIATE ACCESS TO PTS.	DIST./DIST.
AREA BY FORCED CLOSURE	FIXED AREA BY:
BRG/BRG, BRG/DIST, DIST/DIST	BRG/BRG, BRG/DIST.
GRID REDUCTION - OFFSET - PAYROLL + PROGRAMS CUSTOM MADE	

SR - 60

\$ 2395 FOR 29 POINTS
LEASE \$70 MO. PLUS

DAN B.
RT. 1 BOX 818
JAMESTOWN, CA. 95327
209-984-5984 (HOME)

ELECTRONIC DISTANCE MEASURING
EQUIPMENT RENTALS

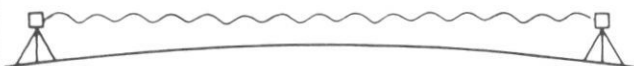
HEWLETT  PACKARD

DISTANCE METERS



THEODOLITES

ALSO AVAILABLE — QUALIFIED TECHNICAL ASSISTANCE AND OVERNIGHT DELIVERY TO MOST AREAS. CALL OR WRITE TODAY.



ELECTRO-DIST. & ASSOC.

5383 EAST FIG
MANTECA, CA. 95336
(209) 239-3121

Wear the marvelous
FILSON VEST



The Filson Vest is your "pocket" vest. It has pockets inside, pockets outside, pockets in front and a pocket in back.

You can carry things without bulging.

Choose:

- Blaze-orange acrylic fiber \$19.50
- Tan all-cotton duck 17.00
- Red cotton-polyester blend 18.50

Sizes 36 to 50. Specify yours.

In Stock. Prompt Shipment.

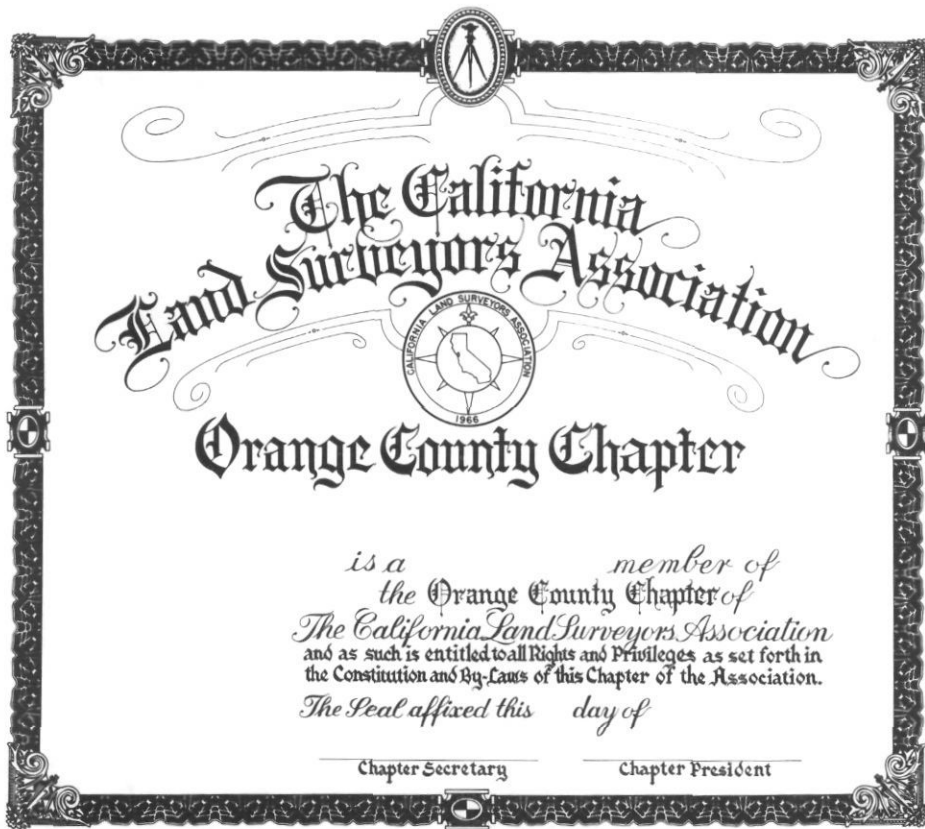
Order from:



**Forestry
Suppliers,
Inc.**

BOX 8397 - 205 W. RANKIN ST.
JACKSON, MS 39204

Quality Forestry, Engineering and
Environmental Equipment.
Shipped World Wide.



The Orange County Chapter will supply chapters with membership certificates identical to the one shown with appropriate name and date changes as required.

The price for a blank certificate, i.e. no name, no date, is \$2.50; The price for a completed certificate, i.e. chapter name, individuals name, membership status & date, is \$5.00. This certificate has been designed by Bill McGee Orange County Chapter to aid in membership promotion. ▲

Letters to the Editor

Dear Editor:

George Dunbar's letter (Winter Edition, 1976) regarding "accuracy" is very accurate. I have put it in my file, labeled "Best Letters of 1976."

I would suggest that everyone re-read that letter; particularly omniscient "Armchair Surveyors" that get all hung up on all the wrong things about surveying.

However, it is my opinion that George made one small mistake. I don't agree that Land Surveying is an Art. I've always contended that it is a philosophy.

Sincerely,
Ray J. Peters

Dear Editor:

This is to comment on the article in the Winter 1976 edition, No. 44, entitled "Do our Laws Work?"

The "corner" record procedure was set up by the statutes of 1973 and went into effect on January 1, 1974. Since that time, the county surveyor's office in Orange County has received three corner records: one from the state, one from the county staff, and one from a private engineer. Apparently, there are two reasons for this meager response:

1. Survey monuments pertinent to a given survey will almost invariably be shown on a record map and filing a corner record would not be required.
2. A survey monument not pertinent to a given survey would require additional surveying and drafting for a corner record to be filed, all at the surveyor's expense.

The foregoing does not seem to generate much enthusiasm for corner records in the surveying community of Orange County, California.

Very truly yours,
C. R. Nelson, County Surveyor

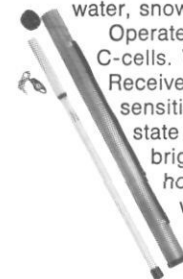
Magna-Track



... the new locator
good enough
to carry the
Lietz name!

The new Magna-Track is manufactured and tested to our specifications. Engineered with the user in mind, here is a locator that's both accurate and durable. It efficiently locates ferrous objects — markers, pipes, shutoff valves — by their magnetic fields, even when buried under earth, shallow water, snow or pavement!

Operates on three ordinary C-cells. Weighs only 1½ lbs. Receiver fits one ear. Simple sensitivity adjustment. Solid state circuitry built into a bright yellow aluminum housing. One year warranty. Realistically priced at \$450.



LIETZ

THE LIETZ COMPANY

1124 E. Del Amo Blvd./Carson, CA 90746
835 Industrial Hwy./Cinnaminson, NJ 08077
829 Cowan Rd./Burlingame, CA 94010

REGISTRATION OF SURVEYORS?

Continued from page 4

as it is kept in most counties in the original colonies. This five years would be required of an intelligent degreed, engineering professional, of high ethical standards, receiving close expert guidance and supervision. If any of these favorable elements are weakened, a much longer time will be required or the neophyte may not live long enough to gain a good understanding of the structure of the record and the demands it places on him in difficult cases.

The law and the record play little part in construction or topographic surveying. Division of labor with field crews, calculators, draftsmen, etc., works rather well with this type of surveying. It can work rather well with laying out new lines. Bright youngsters with some native talent and some high school math can be taught most of these jobs fairly quickly. They can become rather proficient in a few months or years."

The Registration Board's interpretation also agrees with the definition given in the "Encyclopedia Britannica," 15th edition, which is as follows:

"Land Surveying — Surveys to establish boundaries constitute a large highly specialized branch of surveying known as land surveying. Not only must a land surveyor be thoroughly versed in surveying techniques but he must understand real property law, be familiar with property lines within the area in which he works and be able to make decisions that he can justify in court when appearing as an expert witness."

There has been some question as to whether this interpretation of Land Surveying conforms to the definition contained in Act 73 of 1950 which is as follows:

"Land Surveying. The "Practice of Land Surveying" within the meaning and intent of this Act includes measuring of areas, land surfaces, streams, bodies of water and swamps for their correct determination and description, for the establishment, re-establishment, ascertainment or description of land boundaries, corners, divisions, distances and directions, the plotting and monumenting of lands and subdivisions thereof,

and mapping and topographical work."

We believe that it does. The only clause in question is the last one "and mapping and topographical work," which, if taken out of context, might be interpreted to mean that no one but a Registered Land Surveyor could legally perform the myriad tasks that are now done by sub-professionals and technicians with little or no college training. Our interpretation is that this clause actually refers back to the preceding clause and infers that the "mapping and topographical work" covered is that done in connection with Boundary Surveying. Bring all Civil Engineering work to a halt until the hundreds of party chiefs now engaged on route surveys, construction surveys, etc. could become registered, which would be never under our present law. ▲



APPLICATION FOR MEMBERSHIP IN THE CALIFORNIA LAND SURVEYOR'S ASSOCIATION

- MEMBER GRADE:** Have a valid California Land Surveyor's or Photogrammetric Surveyor's License
- AFFILIATE MEMBER GRADE:** R.C.E. or those who rely upon the principles of land surveying.
- ASSOCIATE MEMBER GRADE:** Work in land surveying and be recommended by a member.
- STUDENT MEMBER GRADE:** Actively pursuing a Land Surveying Education.

a. Name _____ County _____

b. Address _____ Zip _____

c. Mailing Address _____ Phone No. _____

d. Employment: Private _____ (Principal _____) Retired _____ Public _____
 Name of Firm or Agency _____

e. Signature and L.S., P.S. or C.E. No. _____

f. Recommended by (Associate & Affiliate Grade Only) _____

Dues schedule: *Member \$50.00 Corporate \$60.00 Affiliate \$30.00 Associate \$30.00 Student \$6.00 (*Entrance Fee \$15.00)

Mail application and check to: California Land Surveyor Association • P.O. Box 1363, Santa Rosa, Ca. 95403

I authorize charge to my: Master Charge Account No: _____
Enter 4 numbers which appear on Master Charge card directly above your name

BankAmericard No: _____ Expires: _____
Date

FIRST YEAR'S ANNUAL DUES ARE TO BE PRO RATED FROM DATE OF APPLICATION

SUSTAINING MEMBERS

<p>HEWLETT  PACKARD</p> <p>Electronic Distance Meters Total Station Programmable Calculators</p>		<p style="text-align: center;"></p> <p>SURVEYORS SERVICE CO. P.O. Box 1500 COSTA MESA, CALIF. 92626</p>
<p style="text-align: center;"></p> <p>9936 EAST RUSH STREET SOUTH EL MONTE, CALIFORNIA</p>	<p>AGA</p> <p>Service throughout the world.</p>	<p>LEWIS & LEWIS</p> <hr style="width: 20%; margin: auto;"/> <p>surveying equipment</p> <p>Ventura, California</p>
<p style="text-align: center;"></p> <p>KEUFFEL & ESSER CO.</p>	<p> LIETZ</p>	<p>I ENGINEERING III COMPUTER IIII SERVICES</p> <p>2200 'F' St. Bakersfield, Calif. 93301 Phone (805) 325-7012</p>
<p>ENGINEERING SERVICES COMPANY</p> <p>14604 205th S.E. Renton, Washington 98055</p>		<p style="text-align: center;"> Electro Rent Corporation A Telecor Company</p>

The California Surveyor

Published Quarterly by the
CALIFORNIA LAND SURVEYORS ASSOCIATION

P.O. Box 1363
Santa Rosa, CA 95403

BULK RATE
U.S. POSTAGE
PAID
PERMIT NO. 302
Santa Rosa, Calif.

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

FORWARDING AND RETURN POSTAGE GUARANTEED
ADDRESS CORRECTION REQUESTED