Institutional Affiliate of American Congress on Surveying and Mapping

The California Surveyor

THE VOICE OF THE LAND SURVEYORS OF CALIFORNIA

NO. 47 FALL 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
LAST OF THREE INSTALLMENTS.

The old laws and rules constantly refer to those responsible for surveying of public lands as "engineers." Chapter I, Section 7d, speaks of the "authority for the employment of a permanent corps of United States cadastral engineers." Field surveying service is "known as the cadastral engineering service." One finds here "duly appointed engineers," a "regional Branch of Engineering and Construction," an "officer cadastral engineer," the "regional engineer," a "mountain engineer's transit," "engineering astronomy," and so on.

The manual makes a difference, however, between those employed by the U.S. Government and others. It refers to "county surveyors" and "local surveyors." Is that because in the early days one was usually a political appointee and the other a self-taught native, both with little or no formal education in surveying? Were they found to be less trained than the government-employed "cadastral engineers"? Whatever the reason, a distinction is made. But there is no hesitance here to associate property surveying with engineering.

The U.S. Forest Service

The U.S. Department of Agriculture Forest Service has compiled a partial collection of original instructions written to the U.S. Deputy Surveyors between 1811 and 1844. This publication and the old documents use the term "surveyor" consistently and exclusively. The foreword, however, is written and signed by a "regional engineer."[11]

The U.S. Geological Survey

Another major American employer of surveyors is the Geological Survey. Professional employees are classified as civil engineers or cartographers. On the technician level the two categories are civil engineering technician and cartographic technician. In addition, a third group known as "wage board employees" or blue-collar workers is employed.

The U.S. Corps of Engineers

In 1794 the Corps of Engineers was reconstituted. The Congress enacted legislation in 1821 directing the Corps of Engineers "to make surveys of major roads and canals." The work was to be performed by office and field parties under the direction of a joint supervisory board of "engineer officers" and "civil engineers."[19]

(Continued on Page 14)

CONVENTION '78

Mark your calendar now for the California Land Surveyors Association convention for March 29th through April 1st of 1978! Beautiful San Diego will be the site of this years' fun and meetings. The Town and Country Hotel in the "Hotel Circle" of Mission Valley in San Diego will be the location. Featuring San Diego's lovely warm March weather, beaches, pools, and many points of interest, this setting promises to be very enjoyable for visitors and natives alike.

Topics for meeting sessions will be focused on practical application for the surveyor. Business management, laws pertaining to the surveyor, field applications for photogrammetry, and the surveyor's relationship with the Board of Registration will be among subjects to be presented. Subjects will pertain to everyday usage by the surveyor and his crews.

A golf tournament will open the convention on a course adjoining the hotel. Mexico's beautiful Jai Alai Palace is a probable site for an evening's enjoyment with dinner and games. Women will enjoy a trip to the historic Hotel del Coronado for a luncheon and shopping trip. Visits to the famous San Diego Zoo, the Wild Animal Park, Sea World, and historic Old Town will be available to the ladies. Sailboating, fishing, and cruises have naturally great appeal in San Diego.

Four swimming pools and six dining rooms, make the Town and Country Hotel very comfortable for the guests. Located in Mission Valley, the hotel is handy to two large shopping centers and within walking distance of golf courses. A shuttle bus wisks guests to tennis courts and handball/racquetball courts.

1978—here we come! ▲

CALIFORNIA LAND SURVEYORS ASSOCIATION
HEADQUARTERS: P.O. BOX 1363
SANTA ROSA, CA 95402
TELEPHONE: 707-536-3572

CALIFORNIA BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

Written Examination Schedule

1978

Examination Dates	*Final Filing Dates
Land Surveyor-in-Training—LSIT	
April 15, 1978	January 30, 1978
Land Surveyor—LS	
November 4, 1978	July 10, 1978

*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. ▲

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

DEADLINE DATES FOR THE CALIFORNIA SURVEYOR

WINTER . . . . . NOVEMBER 11, 1977
CONVENTION . . . JANUARY 20, 1978

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

Why is AUTORANGER the hottest EDM in sight?

It's the most automatic EDM ever...reaching a new dimension in versatility, speed and reliability.

All these automatic features—

- Gain control regulates internal signal.
- Touch button attenuates return signal.
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- Dial in correction allows for input for ppm (environment) and feeds correction to computer.
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Unit of measure: meters or feet.

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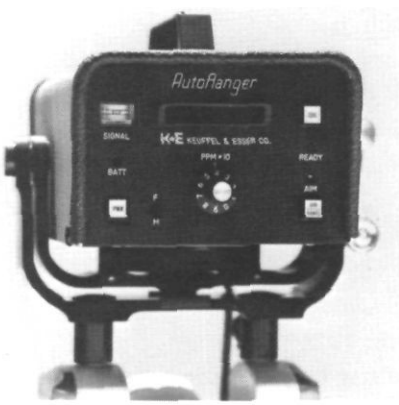

K+E

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DATELINE

October 12, 1977
Board of Registration Board meeting, Pacifica Hotel, Culver City, California

October 13-15, 1977
ACSM California Conference in Berkeley @ Marriott.

October 17-21, 1977
ASCE Annual Convention, Hyatt Regency, San Francisco, California

October 18-21, 1977
Fall ACSM Convention, Camelot Inn in Little Rock, Arkansas

October 22, 1977
CLSA Board of Directors meeting

October 29, 1977
CLSA Feather River/Northern Counties Annual Conference

November 5, 1977
L.S. Examination

November 9, 1977
Board of Registration Board meeting, Airport Marina Hotel, Burlingame, CA

November 11, 1977
Deadline, Winter edition, The California Surveyor

November 30, 1977
CLSA Feather River/Northern Counties Chapter meeting, Willows

December 2-3, 1977
Professional Land Surveyors of Oregon Annual Convention, The Sheridan Hotel, Lloyd Center, Portland, Oregon

December 10, 1977
CLSA Feather River/Northern Counties Chapter meeting, Red Bluff

December 14, 1977
Board of Registration Board meeting, Pacifica Hotel, Culver City, CA

January 7, 1978
ACSM-ASP Dinner Dance at Fort Mason, San Francisco

January 13-14, 1978
California State University—Fresno Surveying and Photogrammetric Convention

January 16-21, 1978
Auto-Carto III Symposium, St. Francis Hotel, San Francisco, California

January 28, 1978
CLSA Board of Directors meeting

January 30, 1978
Final filing data LSIT examination

March 29-April 1, 1978
CLSA Annual Convention, San Diego

April 15, 1978
LSIT examination

July 10, 1978
Final filing date LS examination

October 16-20, 1978
Fall ACSM Convention, Alburquerque, New Mexico

November 4, 1978
LS Examination ▲

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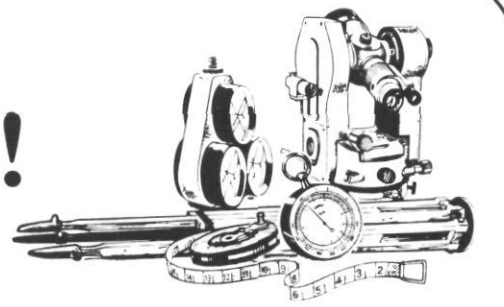

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†Hewlett-Packard 3810 Total Station	60.00	36.00	24.00
*†K & E Microranger Distance Meter	30.00	18.00	12.00
*†K & E Autoranger with Azimuth Base or mount for Theodolite	30.00	18.00	12.00
*†Geodimeter Model 78	35.00	21.00	14.00
*†Precision International Beetle 500 Distance Meter	20.00	12.00	8.00
Cubic DM-20 Electrotapes—Two Units	40.00	24.00	16.00
Positioning Equipment:			
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Cubic DM-40 Autotape with Two Responders	300.00	150.00	100.00
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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	5.50	3.30	2.20
*Lietz B-1 Engineers Precision Automatic Level	5.25	3.15	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:			
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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
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*Lietz #7533-10 3½" x 8 or #7533-20 5/8" x 11 Standard Wooden Tripods	.50	.30	.20
*Lietz #7311-35 or Wild GDF-6 Tribrach with Optical Plummet	1.50	.90	.60
*Lietz #7311-38 Tribrach Prism Adaptor	.50	.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
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NOTE: For 30-day minimum contract rate, disregard "1st 10 days" column above.

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4TH ANNUAL NORTHERN CALIFORNIA LAND SURVEYORS CONFERENCE

HOLIDAY INN CHICO, CALIFORNIA

Saturday--October 29, 1977

Seminar on "BOUNDARIES"

Presented by - WALTER G. ROBILLARD,
Regional Cadastral Surveyor
U.S. Forest Service, Atlanta

8 a.m. Registration

9 a.m. Lecture and Workshop

12 a.m. Lunch Break

1:30 p.m. Lecture and Workshop

Exhibtor Demonstrations to be presented during Registration, Lunch and Coffee Breaks.

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REGISTRATION FORM

Name

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Employer

REGISTRATION

CLSA or Chapter Members ____ for Conference and Lunch a $ 20.00 ea. = _____

Non-Member _____ for Conference and Lunch a 25.00 ea. = _____

TOTAL = _____

Make Payable to: FEATHER RIVER and NORTHERN COUNTIES CHAPTER - CLSA

Mail to - MARGARET HARP
124 Fourth Street
Orland, CA 95963

Registrations accepted until October 19th (or for the First 125 Registrations)

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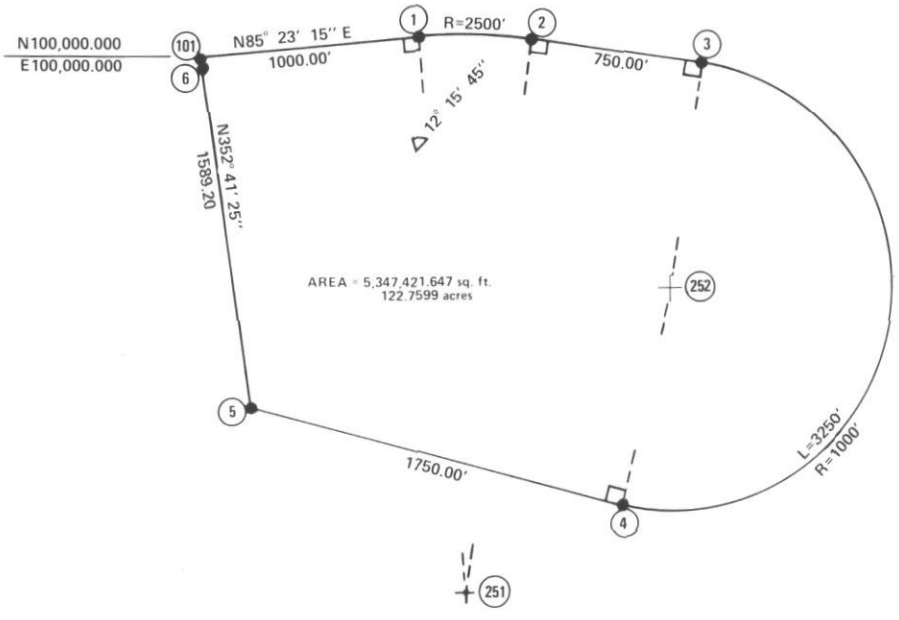
I can remember all surveying formulas and can instantaneously use them to solve most any surveying problem. I can also remember and instantaneously recall 300 pairs of coordinates for use in any of the formulas. And, I can also type out all answers at a speed of 144 words per minute!

I can completely solve the following problem in less than 2 minutes!



I will work 24 hours per day, 7 days per week without expecting overtime pay, sick pay, vacation pay, retirement pay or any other fringe benefits.

I can do all of these things for you, plus more, for a salary of just $140 per month!

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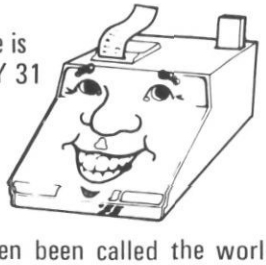

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I'll also be available for job interviews in the Keuffel & Esser booth at the California ACSM convention in Berkeley on October 14 & 15.

PRESIDENT'S CORNER

PRESIDENT'S MESSAGE
by James E. Adams, LS

The surveyor should be looking ahead as to what surveying will be in the future. For example, with the implementation of the new North American Datum in 1983, there will eventually be an increase in the density of horizontal and vertical control stations within the United States. With this increase in the density of control and the equipment that will be available, the method of locating property boundaries will change. The traditional role of the land surveyor will change as the correct location of re-established property boundaries are referenced to a control system. In the future, it will be increasingly important to consider the geophysical characteristics of the land so as to be able to place the boundary lines in their most advantageous position. The surveyor will have duties other than those of establishing and re-establishing property boundaries. The surveyor will need knowledge in cartography, geodesy, geology, geography, photogrammetry, dentology, urban planning, remote sensing, law, etc., so he will be able to fulfill the needs of a more complex society. The surveyor, in the future, should also be versed in liberal arts subjects so that he can communicate with his fellow professionals. Of course, this calls for a surveyor who is educated and can use the alternatives given to him to apply his knowledge in the way best suited to the needs of society. If the surveyor does not look into the future and prepare for what is coming, his function will fall upon other professions to carry them out.

This association believes that the apprentice system for training land surveyors must give way to formal education. The Association's policy is to encourage formal surveying education in California. It is hoped that the surveyors in California will concur with the Association's objectives. For the surveyor to stand by and do nothing with regard to planning for his future, will only mean that the future will pass the surveyor by. Changes in the practice of surveying are constantly taking place and it behooves the surveyor to recognize these changes so that he may adapt to them in a logical way. It is my hope that the future surveyor will have the education he needs and the recognition he deserves. ▲

C.L.S.A. MEMBERSHIP

C.L.S.A. MEMBERSHIP

Members as of June 30, 1977	706
Sustaining Members	12
Regular Members	403
Associate Members	179
Affiliate Members	43
Student Members	58
Life Members	11

NEW MEMBERS AS OF SECOND QUARTER, 1977

CORPORATE MEMBERS
R. A. "Alan" Roy, LS
John M. Bolin, LS
John D. Mitchell, LS
William W. Grimm, LS
George P. Otterbeck, LS
Dale Allen White, LS
Frank P. Bellecci, LS
Wiley Pierce, LS
Gary T. Sanderson, LS
Dale G. Waag, LS

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Daniel K. Y. Chun
Larry Arnold
Eusebio B. Baptista
James William Crabtree
John Rea
Frank Nichols
Jeannie Chau
Curtis James Chapman
Ronald A. Rook
Russell E. Webb

ASSOCIATE MEMBERS
David Donald Vincent
David H. Coker
Robert W. Cambron
Robert E. Lea
Jacob F. Rems
Robert D. Parker
Mark G. Matteson
Robert L. Jones
Alan E. Jacobsen

AFFILIATE MEMBERS
Sam Crabtree
Vern Mathis
Curt George Dunbar

Letters to the Editor

Editor:

Recently I was one of two students from California State University, Fresno, invited to attend the C.L.S.A.'s Water & Water Boundary workshop held at Irvine, California on May 20-21, 1977.

In my last year of study at CSUF, I will be conducting an independent study of water boundaries and water related surveys. The opportunity to attend this workshop, thus, provided a foundation with which to continue research.

The program was well-balanced and informative. Overall, an excellent job on the part of all those involved.

I wish to express my appreciation to the members of C.L.S.A. for the chance to attend this seminar. A special thanks to Mr. James Dowden, workshop chairman, who handled all the arrangements.

Sincerely,

Russell Shaw
Triple C Ranch
Auberry, CA 93602

AGA

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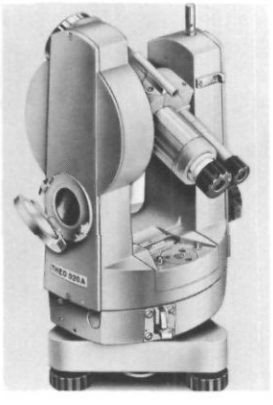
Medium range EDM using low power visible laser for distances up to 6 miles. The Model 78 is an improved version of the well-known Model 76.

JENA THEODOLITES & LEVELS



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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.

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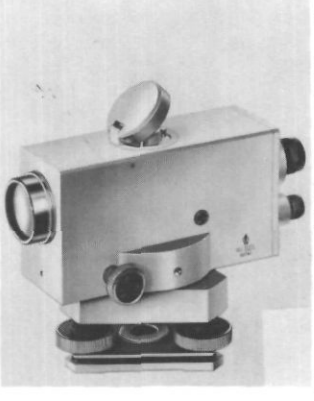

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Model Ni025 – A self-leveling instrument suitable for all 2nd, 3rd, and 4th order work. Ideal for engineering – contractors and surveyors. Also available with graduated horizontal circle, direct reading to 10', estimation to 1'.

Model Ni050 – for builders.

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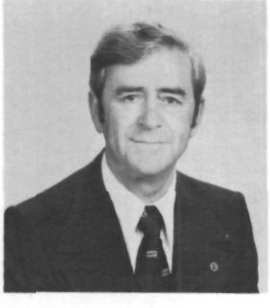

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RODMAN'S REVERIE

R. S. Clark

When Life's last traverse is finished
And the notes are computed and checked,
When angles and levels and chainage
Are purged of the last defect,
We shall turn in the tools and the notebooks
And stamp off the ice and the snow
And take us a good long noon hour
Of a thousand years or so.

Then, when we are all quite rested,
The Chief will announce a plan
For a Galaxydetic survey job
With a trillion miles to span.
Out past the far horizons,
Out past the Pleiades,
To tie in the solar system
With the neighboring galaxies.

All distances chained precisely
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All levels referred to datum
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In twenty decimal places,
Or possibly twenty-one,
With never a doubtful reading,
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Of a pip on the Zodiac;
Doubled and thrice redoubled;
Repeated forward and back.
Horizons exactly closing,
All pink and purple and gold,
Where instruments read to millionths
And fingers are never cold.

The rodmen will not be footmen,
Pacing a weary route,
But will ride two weeks in a rocket ship
To set the front target out.
The chain gang will not inch along
With bucks and tension bars,
But will shoot by stadia just like that,
From here to the horns of Mars!

And, 'ere we have measured and plotted
The infinite boundaries of Space,
The rumbling March of the Alphabet
Shall have passed the decimal place,
And each in his separate station
Shall labor as best he can
For the profit of all creation
And the good of the General Plan.

(Excerpt from No. 8 Field Engineers Bulletin, U.S. Coast & Geodetic Survey, December, 1934.)

▲

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LEGISLATIVE BULLETIN

James M. Prendergast, LS
Chairman, Legislative Committee

The Legislative Committee of the California Land Surveyors Association is made up of thirteen (13) members, including a three member Review Committee.

The Review Committee examines the weekly histories of the California Senate and Assembly. From this examination, the members submit a list of bills to the chairman which they feel should be examined in bill form. After a study of these bills, the Review Committee decides which of these bills should be studied by the full committee. The full committee meets approximately once a month.

To date (June 3, 1977) there have been 1248 bills, 46 Senate Constitutional Amendments, 44 Senate Concurrent Resolutions introduced into the Senate.

To date (June 3, 1977) there have been 1991 bills, 62 Assembly Constitutional Amendments, 64 Assembly Concurrent Resolutions and 40 Assembly Joint Resolutions.

The Review Committee, so far this year, has examined in detail, approximately 150 which they thought would affect the land surveying profession. Of these, approximately 70 have been distributed to the full committee.

The full committee has reviewed these and about 50 are still on our list. Most of them, the committee is following as they would have no great affect on us.

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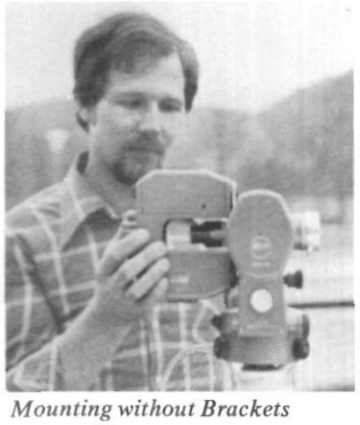

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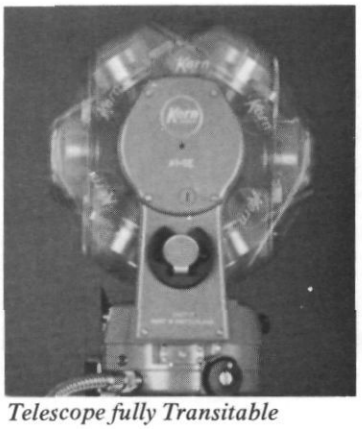

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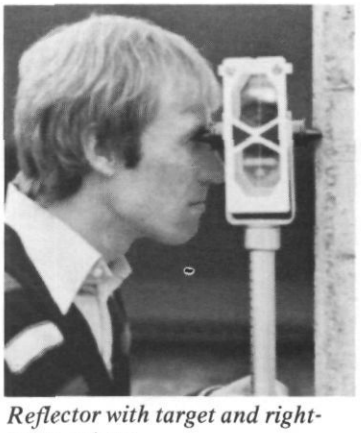

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Surveyor vs. Engineer—No Contest
(Continued from Page 1)

Professional Associations

ASCE (American Society of Civil Engineers)—Has adopted a policy statement (Manual 45A) in 1959, part of which reads:

"The American Society of Civil Engineers, on the basis of thorough studies carried out by a Task Committee on the Status of Surveying and Mapping, declares that the following four major categories in the field of activity commonly disignated as surveying and mapping are a part of the Civil Engineering profession:

I. Land Surveying
II. Engineering Surveying
III. Geodetic Surveying
IV. Cartogrpahic Surveying."

ACSM (American Congress on Surveying and Mapping)—Has endorsed this ASCE report and distributed it to the ACSM membership on August 4, 1965. On March 7, 1970, ACSM issued a policy statement, which reads in part:

"Land surveying in the United States is a separate and distinct field of professional practice, based on a unique educational background. It requires entirely separate licensing and fully qualified representation on examining and licensing boards."

NSPE (National Society of Professional Engineers)—Professional Policy No. 42 states: "The planning, execution and direction of professional surveying activities necessary for the production of the Federal Government's standard series of maps and charts, as well as similar work, is considered professional engineering."[16]

ASP (American Society of Photogrammetry)—Publishes a monthly journal under the name of *Photogrammetric Engineering and Remote Sensing*.

NCEE (National Council of Engineering Examiners)—Has approved a reconciled version of the model law, also known as the ACSM-NCEE Unified Model Law, in 1968. Here, "engineering surveys" are included in the "Practice of Engineering."

Educational Institutions

The University of New Brunswick, Canada, grants a bachelor of science degree in surveying engineering.

The Ohio State University offers a bachelor of science in surveying through the joint efforts of the Departments of Civil Engineering and Geodetic Science. Its surveying curriculum includes the basic requirements of the College of Engineering.

The Oregon State University offers a graduate program leading to the master of science degree in engineering surveying and is administered by its Department of Civil Engineering.

The Iowa State University has a Surveying and Mapping Program, leading to a bachelor of science degree which is administered by the Department of Industrial Engineering in cooperation with the Department of Civil Engineering.

Purdue University offers a four-year professional curriculum for the bachelor of science degree in land surveying, again, taught in the School of Civil Engineering.

Public Agencies

Towns usually handle surveying functions within their "Engineering Department" headed by a "town engineer."

Counties often have fairly large "Engineering Departments." One of their major tasks consists of maintaining survey control, maps, plats, and survey records.

The Massachusetts Land Court decrees permanent registration of land title. The department which accepts, prepares, and issues boundary plans is called the "Engineering Department." It is headed by a "chief engineer" or "engineer for court" and two "deputy engineers." Their sole function relates to land surveying.

The U.S. Army agency which accomplishes research, development, test, and evaluation applicable to the topographic sciences including mapping, surveying, and geodesy calls itself the "Engineer Topographic Laboratories."

The General Public

What does the public think of the land surveyor? Where does he fit in? How do a surveyor's clients refer to him?

Nine out of ten construction contractors will call him "my engineer." Labor unions refer to survey technicians as "field engineers." Lawyers advise their clients to call in an "engineer" to clear up a boundary dispute. Conveyancing attorneys always distinguish between "legal matters" and "engineering matters," when discussing a deed.

Surveyors in Private Practice

Brother B. Austin Barry estimates that 75 percent of the surveying in New Jersey is being done by professional engineers. Registered land surveyors without a P.E. (professional engineer) license perform the remaining 25 percent of the work.

Can a registered land surveyor, who is not also registered a professional engineer, practice independently and effectively? The answer has to be a cautious "yes," qualified by the present-day fact that most surveyors choose not to do it. Most surveyors in private practice either carry dual registration as L.S. (land surveyor) and P.E., or have joined in partnership with a professional engineer.

Massachusetts, for instance, seems to bear this out. The Proprietors' Council of the Eastern Massachusetts Association of Professional Engineers and Land Surveyors represents 35 surveying firms. Only four of them are headed by a registered land surveyor. Six are represented by a registered land surveyour who is in partnership with a professional engineer.

(Continued on Page 18)

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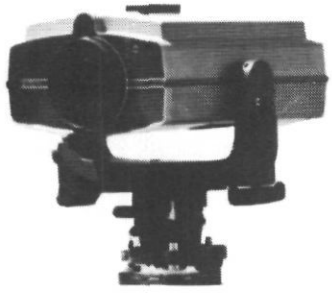

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BOOK NOOK

1. *Shore and Sea Boundaries* (1962) Reprint 1975—Aaron L. Shalowitz, U.S. Department of Commerce Publication #10-1
   Vol. I-Boundary Problems Associated With The Submerged Lands Cases And The Submerged Lands Acts (Including Recent Developments In The International Law Of The Sea) ..... $ 9.45 ea.
   Vol. II-The Interpretation and Use of U.S. Coast and Geodetic Survey Data ..... $11.95 ea.
2. *Tide and Current Glossary*-U.S. Department of Commerce, N.O.A.A.—National Ocean Survey (1949) Revised 1975. Special Publication No. 228 .... $ 0.75 ea.
3. *Proceedings; Water and Water Related Boundaries Workshop II, May 20 & 21, 1977, Irvine, CA* (262 pages)
   CLSA Members ..... $15.00 ea.
   Non Members ..... $20.00 ea.
4. *Coastal Zone Map #TP-00189-Florida, Palm Beach County, Lantana to Boynton Beach-1:10,000 (1970)*
   An extremely interesting map format which contains detailed printed instructions to Surveyors on How to Locate a Mean High Water Line According to Law, adopted by the Florida State Legislature.
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   3. *California Law Looks at the Water Boundary*-Peter H. F. Graber, Esq., Deputy Attorney General, Land Law Section, Department of Justice.
   4. *The Ordinary High Water Mark-How Determined!*-Ned Washburn, Esq., Attorney at Law, Landes, Ripley & Diamond, San Francisco, CA.
   5. *To Insure or Not to Insure-That is the Exception!*-James R. Dorsey, L.S., Executive Vice President, Winter, Durnford, Dorsey and Associates, Land Consultants.
   6. *More Muddles in the Puddle-The Jurisdictional Aspects and Boundaries of the California Coastal Zone Commission and San Francisco Bay Conservation and Development Commission*-Raymond B. Thinggaard, L.S., Assistant Manager Real Property, Leslie Salt Co.
   7. *Internal Conflicts-State V. Federal Rules, Sovereign Lands and Rights*-Ed Griffin, L.S., Chief, Branch of Cadastral Surveys, California State Office of U.S. Bureau of Land Management.
   8. *The Restless Tides and the Marine Boundary Program of the National Ocean Survey*-Carrol I. Thurlow, Deputy Chief, Oceanographic Division, Office of Marine Surveys and Maps, N.O.S.
   9. *Slope and Undulations of Tidal Datum Planes and Quantification of Accuracy of Various Methods*-Cdr. A. Nicholas Bodnar, R.C.E. (California) Principal Engineer, Requirements and Facilities Section, Tides and Water Levels Branch, Oceanographic Division, Office of Marine Surveys and Maps, N.O.S.
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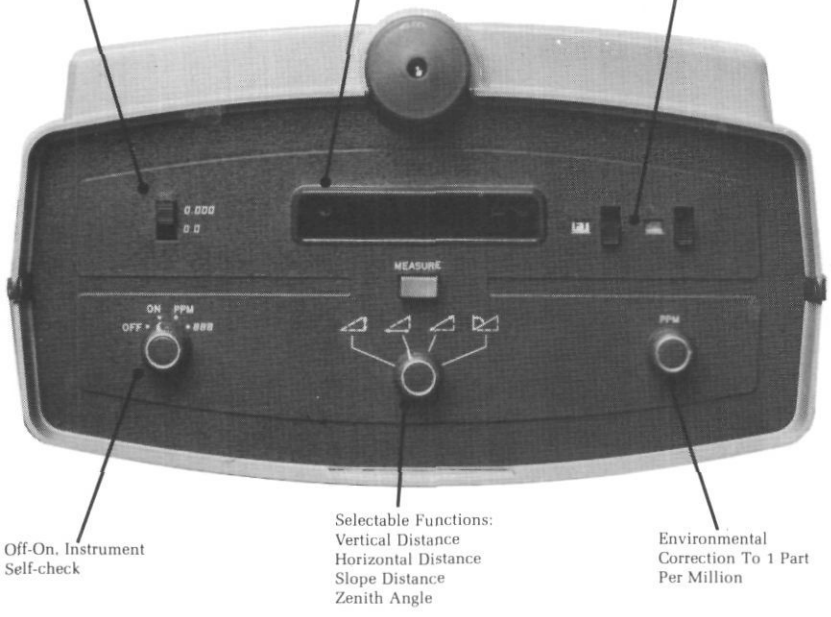

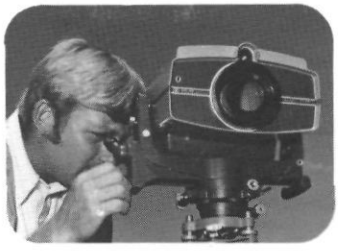

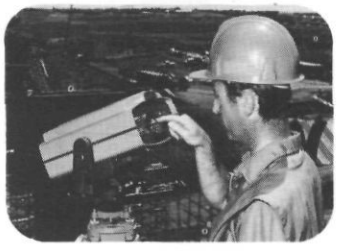

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Surveyor vs. Engineer—No Contest
(Continued from Page 14)

Twenty-five proprietors are registered as both P.E. and L.S. This is certainly clear evidence that, if surveyors are not registered engineers themselves, they seek close cooperation with them.

The Numbers Game

It is known that there are approximately 360,000 lawyers in this country, 180,000 of whom are members of the American Bar Association. "There is strength in numbers" is an old saying. J. Caldwell Wilson, P.E., keynote speaker at the ACSM-ASP Convention held in St. Louis, March 1974, emphasized that "the name of the game in politics is numbers of warm bodies." The Joint Engineering Legislative Forum, led by NSPE, now represents a membership of over half a million!

The yellow pages of the local telephone company are an excellent indicator of the minority role surveyors play. When comparing them with other professional individuals or firms listed in the book, it becomes glaringly obvious why other professions are more successful in getting their message across—sheer numbers!

This writer counted them in three major cities and found a few surprises. For instance, there are 109 land surveyors listed in the Washington, D.C., yellow pages against 6,920 lawyers. In Boston (Mass.) the ratio is 73 land surveyors to 5,580 lawyers. For every surveyor there are men of each and every other profession as shown below:

	CPA	L.S.	Eng.	Arch.	Lwyr.	Physi-cians
Boston ('73)	12	1	17	8	76	62
Washington ('74)	8	1	10	5	63	72
Little Rock ('73)	—	1	—	4	33	57

Four national associations are representing surveyors: The American Congress on Surveying and Mapping, the American Society of Civil Engineers, the American Society of photogrammetry, and the National Society of Professional Engineers.

ASP—is perhaps the least discriminating society and can be discounted from a purely professional point of view. Its membership is open to almost anybody.

ASCE—requires a degree in engineering and/or registration as P.E. or L.S. for full membership. Associate membership requirements are less stringent.

ACSM—represents the greatest number of professionals in surveying and mapping. Membership requirements are less stringent than those of ASCE.

NSPE—now has a surveyor membership grade for the registered land surveyor. Although membership seems desirable from a political point of view, very few surveyors have, so far, taken advantage of it.

Total membership in ACSM (as of March 17, 1975) is 6,832.

The division breakdown in ACSM is as follows:

Land Surveys	4,595
Cartography	1,241
Control Surveys	996
	6,832

ASCE membership was 68,296 in 1974; 3,928 members are enrolled in its Surveying and Mapping Division.

There is no question that surveyors are a minority group among the professions and need all the help they can get. Surveyors in ACSM must work together with surveyors in ASCE.

Where Do We Stand?

History, tradition, and logic have placed surveying within or close to the larger field of engineering. The week of George Washington's birthday is traditionally observed as National Engineers' Week because our nation's first President was "himself a trained land surveyor and a designer of roads and fortifications," explains NSPE. Of all the basic engineering categories, surveying is and always has been closest to civil engineering. Most state registration boards and most educational institutions have recognized this fact and act accordingly.

Then, why is there still a problem, and what causes it? Some of it is caused by low requirements to serve at the technician level. The problem is compounded by the not so obvious distinction between the technician level and the professional level. After a few weeks of on-the-job training anyone can give line, measure a horizontal distance, or manipulate the knobs of a transit. The casual observer understandably confuses the technique of measuring with the art and science of surveying. Everybody in a survey party is called a surveyor, particularly the instrumentman.

A man who has spent four years of his life and his money on a college education doesn't see this as a desirable goal—and

rightly so. Why waste an education?

Another contributor to the problem is the young civil engineer. His education may have exposed him to the bare minimum, if any, of basic surveying. He believes he knows all there is to know about it. He gets bored quickly and moves on to what he sees as a more challenging and more rewarding field, say, environmental engineering. He may forever judge surveying from the basis of his own limited knowledge. To his regret, he may discover someday that the most ingenious design is worthless, if it is based on a faulty survey.

The 1959 ASCE definition has caused a great deal of controversy among surveyors. To this day, however, nobody has come up with a better one. The ACSM policy statement in 1970 did little to rescind its 1965 endorsement. If the intent was to wrest surveying away from civil engineering, it failed. Actually, the ASCE definition and the ACSM policy statement are not in conflict. Both ACSM and ASCE equate land surveying with property surveying. The declaration of its being a "separate and distinct field of professional practice," therefore, refers to that one category of surveying only. It would be difficult to read it any other way. The other three main branches of surveying are not included.

Being a "separate field of professional practice" does not necessarily preclude land surveying from being part of or related to the larger field of engineering. No one can argue the point that mechanical engineering, chemical engineering, or architectural engineering are also separate fields of professional practice.

Some of today's problem is caused by those within the profession. In the 1890's civil engineering designers were afraid of being overwhelmed by civil engineering surveyors. Today, 85 years later, the opposite is true. The surveyor is being outnumbered by the designer, and he is concerned. Surveyors should recognize that the end of a 50-year transition period has just about been reached. Exactly six years ago, the last state in the Union made registration for land surveyors mandatory.

That generation of surveyor-engineers who turned designers and had considered surveying a mere stepping stone to "greater things" has now retired. That generation of land surveyors which was without concern for its own professional advancement, many of them registered under a grandfather clause, has begun to retire and will have died out within the next 25 years. The professionally concerned surveyor is now ready to lead.

We have reached a threshold, and we can't go back. Well-known science fiction and religious writer Isaac Asimov has pointed out that in spite of many problems caused by fundamental technological advances, none has ever been given up willingly by any society. "We can save, we can conserve, we can cut out waste, but we must keep what we have. The only solution, as has always been true in the history of mankind, it to solve problems by still further advances. . . ."

Where Do We Go From Here?

Land surveyors have come a long way from the days of the

(Continued on Page 21)

Dr. h. c. Heinrich Wild

The Story of Dr. h.c. Heinrich Wild

If one is at all familiar with surveying instruments, one will recognize Dr. Wild as the inventor of modern instruments and also as the man who originated the company which still bears his name. Yet another fact about Dr. Wild is that he later on was associated with Kern & Co. designing a complete new line of levels and theodolites.

Dr. Heinrich Wild was born in Switzerland in 1877. Having taken an interest in surveying while still in his teens, he became the apprentice to a surveyor at the age of fifteen. Dr. Wild later studied surveying at the Engineering School of Winterthur and by 1899 was employed by the Swiss Ordnance Department which he left in 1900 for the Swiss Topographic Survey.

It was through practical experience that Wild found that surveying instruments were lacking in many respects. These instruments were heavy and bulky. Their controls and leveling screws were exposed to dust and dirt. The telescopes had poor optics and were not dust or moisture proof because they had external focusing. To read the theodolites, it was necessary to walk around the instrument and endanger the stability of the setup and squint through magnifiers or microscopes placed at opposed points of the circle. Considering the terrain which prevails in the Swiss Alps, this did not add to the operator's comfort and hence prolonged the work and affected the results adversely.

Yet it wasn't until 1908, while working for Zeiss, then the largest manufacturer of optical instruments, that he was able to head a new department whose sole purpose was the improvement of surveying instruments. He had the assistance of astronomers, mathematicians and specialists in optics. During this time, numerous inventions were made which are still in use today. These include the anallactic (internal focusing) telescope, the coincidence level, the cylindrical vertical axis, and the wide frame, or "European Type" tripod.

World War I stopped the manufacture of surveying instruments in favor of military equipment, and only at the end of the war was Zeiss able to produce a theodolite based on Dr. Wild's design. Right after World War I, the situation in Germany was not favorable for an ambitious inventor, so Dr. Wild left Zeiss and returned to his native Switzerland, where he formed his own company which still bears his name. He designed a new line of instruments, beginning with the T2. Dr. Wild's design has proven itself over half a century and is still manufactured, with minor modifications, and sold world wide by his former company.

In 1930, the Swiss Federal Institute of Technology awarded Heinrich Wild an honorary doctors degree of technical sciences, in recognition of his outstanding contribution to the design of geodetic instruments.

Dr. Wild still had new ideas, to take his revolutionary designs even further. However, his original designs being a huge commercial success, his company was not prepared to retool. Dedicated to progress as he was, Dr. Wild left the firm he had helped to create, and worked independently for a few years, selling some of his patents to his former company. In 1935, he became associated with Kern & Co. Ltd. Kern had been manufacturing a broad variety of optical instruments since 1819. To produce Dr. Wild's latest designs, Kern had to retool completely, and shortly before World War II production was rolling. Dr. Wild passed away after a heart attack late in 1951 at age 74, leaving a rich heritage of ideas, designs and high principles to his son, Heinrich Wild Jr., who was Technical Director of Kern & Co. Ltd. until about ten years ago, when he retired.

Dr. Wild's goals were governed by one most important prerequisite: Any instrument which is to be truly useful must be fundamentally balanced. Every element of which it is composed must have a quality and precision correlated to the rest of the elements and to the specific requirements which the instrument, as a whole, has to meet. For instance, the finest glass circle does not make a first class theodolite out of an instrument which has poor axis systems or an inadequate telescope. Therefore, balance, or harmony of design, is of utmost importance.

The following are some of the improvements which were made by Dr. Wild and those who were inspired by him:

One improvement was the replacement of the leveling screws with a leveling knob/cam system. Turning a leveling knob, an eccentric cam, resting on a three-point base plate raises or lowers the instrument. The use of leveling cams eliminates many of the instabilities inherent in leveling screws. To obtain maximum stability, the leveling cam system intentionally provides limited vertical motion. Preliminary leveling is accomplished by means of the centering tripod head which is not affected by wear and needs no close fit to achieve stability.

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Surveyor vs. Engineer—No Contest

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rope stretchers on the Nile. Land surveying has become synonymous with all surveying. Surveyors are rapidly becoming the sole experts in engineering measurements. Contrary to the opinion of some, surveying is not only concerned with data acquisition. One of the most important responsibilities of the land surveyor, expressed in all state registration laws, is the subdivision of land—clearly a design function.

Because engineering surveys are fundamental to civil engineering design, surveyors must expect that basics of the subject be taught to thd later on practiced by the civil design engineer, certainly in conjunction with his own design work. Conversely, because surveying involves civil engineering design, surveyors must demand that road and drainage design be included in a four-year surveying curriculum.

Professional engineers are registered by specialty branches. It does not preclude them from practicing in any other branch of engineering in which they may feel competent. Apparently, this has not caused many problems. Perhaps there is a good reason. Engineering design leads to construction, sooner or later. A foundation will settle, a bridge may collapse, an electric system may short circuit, a machine will not function if improperly designed.

A surveyor's work is different, however. It may take years, even decades, before errors or blunders in a poorly prepared survey plan are discovered. This is particularly true for property plans which are to be recorded. Often, change of ownership is the initial and only reason for a survey plan. It is this change of ownership which enables the surveyor to escape responsibility. Real property may change hands several times before its corresponding plan is put to the test. The temptation for a professional engineer, who had received only basic instructions in surveying, to sign and seal such a plan and get away with it, is far greater than in design work.

The myth that everybody is a surveyor has hurt many land owners in the past.

It is for these reasons alone that licensing as cadastral or property line surveyor must be kept separate from other engineering registration. Although surveying is an ancient and honorable profession, it should be identifiable with modern engineering. As the surgeon is a recognized member of the medical team, so must the surveyor be a member of the engineering profession.

It is unlikely that the profession is willing to abandon the title "surveyor," in spite of all its shortcomings and public misinterpretations. An historic precedent does exist, however, in Germany, where up to the 1920's the surveying professional was known as "landmesser," literally meaning land measurer. The title was then changed to the more modern "vermessungsingenieur" (survey engineer), followed by a complete revitalization of corresponding educational programs. As a result, survey engineers today occupy high political and administrative positions in West Germany's state and federal government, land use planning being one of their major concerns.

Chances are that future American surveyors will have a choice between two educational routes, the bachelor of science in land surveying and the bachelor of science in survey engineering. One graduate may conveniently be called "land surveyor" and the other "survey engineer." Both will be eligible for registration as land surveyor and, therefore, be

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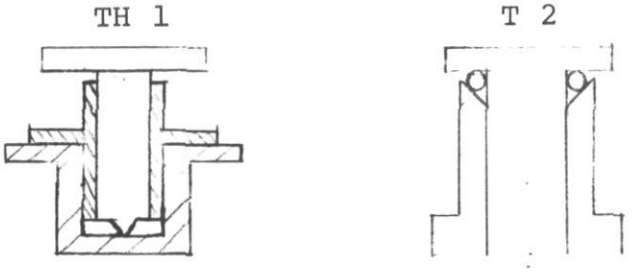
Dr. Heinrich Wild (Continued from Page 20)

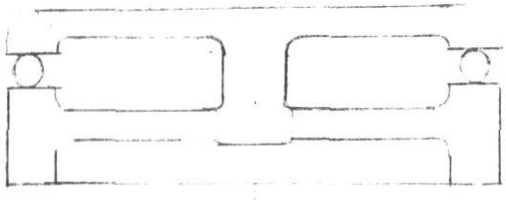
The desire to increase the rotational stability of the vertical axis resulted in the design by Dr. Wild of a completely new axis system for the Kern DK theodolites. The principal elements of the DK-axis are two flanges of relatively large diameter, each with a precise, optically flat surface. These flanges, together with a large number of accurately matched steel balls, form a precision ball bearing. The DKM3 triangulation theodolite uses sixty 4mm balls, each carrying 150 grams (one ball could be loaded with 10 kilograms without damage). This new design resulted in a rotational accuracy of ±0.35″. Dr. Wild states that a cylindrical spindle axis can at best yield an accuracy of ±1.5″.

The evolution of Dr. Wild's design of the vertical axis. All three axis systems are still used today by various manufacturers.



Zeiss 1919 **Wild 1925**

DKM 2



Kern 1936

Dr. Wild's genius covers such a large area in designing and manufacturing geodetic instruments that this paper could not possibly describe more than a portion of it. However, if this information aroused your curiosity to put your hands on the most refined surveying instruments, you may contact us at: KERN INSTRUMENTS INC. 154-A Hamilton Dr., Novato, CA 94947 (415) 883-0616. ▲

Surveyor vs. Engineer—No Contest
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authorized to perform property or cadastral surveys.

It is important to recognize, however, that only the survey engineer may be eligible for registration as professional engineer. While both will have plenty of career opportunities in government, only the survey engineer will be truly independent in private practice. The B.S. degree ''land surveyor'' will not be able to subdivide land without the assistance of a professional engineer. Some states will not even allow him to perform engineering surveys.

It is assumed, of course, that in time NCEE will have accredited certain survey engineering programs for the purpose of engineering registration. It is also hoped that registration boards will revise their sometimes narrow-minded attitude towards surveying and credit certain surveying experience toward engineering registration. One former member of the Massachusetts Board of Registration used to insist on ''elegant engineering'' experience. He failed to recognize that many more miles of residential subdivision roads than those of super highways have been designed and need to be designed. The protection of the public from an experience in the basic engineering functions is as important as ''elegant'' bridge design.

Registration boards must stick to the letter of the law when evaluating the experience of an applicant. They must acknowledge that ''design of engineering works'' is no more important than ''consultation, investigation, evaluation and planning,'' as the law states. It is ingenuity and integrity which distinguishes the engineer from others. Surveyors and designers are both engineers, or should be.

Much like the family doctor, who is the general practitioner in medicine, should the survey engineer be the general expert in land planning, land engineering, and land development. He will call in the engineering specialist for a sewage treatment plant design and a landscape architect for the aesthetic enhancement of a subdivision, when he needs them.

A surveying student needs to be taught the importance of his work to society and posterity. Most architects will be forgotten after their buildings have been demolished. No sanitary engineer is long remembered for his sewage treatment plant. 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, will enable him to do the thoroughly professional job the public has a right to expect.

Food for Thought

The following statements of fact are a summary of professional concerns and may encourage others to expand on them:

- All civil engineering starts with surveying.
- Surveying may or may not lead to design and construction.
- Rodmen, chainmen, and transitmen are not surveyors.
- A chief-of-party may or may not be a surveyor.
- The surveyor is a member of the engineering team.
- Civil engineering is an umbrella term for many different engineering specialities.
- Separate registration for structural and sanitary engineers is the beginning of a trend.
- The issue is not surveyor *vs* engineer, but rather surveyor *and* designer, both being engineers.
- A surveyor may be a planner as well as a designer.
- Ingenuity is a surveyor's trademark.
- There is as much future in surveys as there may be in sewers.
- The apprenticeship system has been a necessary stop-gap for the profession, but times are changing.
- The United States needs autonomous surveying departments within Schools of Engineering.

- The profession needs surveying graduates who can innovate and lead.
- Private practitioners with a master's degree in surveying will become the leaders of the profession.
- A special license for property surveying must be retained.
- The survey engineer of the future will be a truly independent professional because registration as both L.S. and P.E. will be available to him alone.

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