

SURVEYOR

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Indiana Society of Professional Land Surveyors, Inc.

Affiliated with the American Congress on Surveying and Mapping

STATE OF INDIANA

EXECUTIVE DEPARTMENT
INDIANAPOLIS

PROCLAMATION

Executive Order

To All To Whom These Presents May Come, Greeting:

WHEREAS, the Indiana Society of Professional Land Surveyors will hold their annual convention on January 21, February 1 and 2, 1980, at the Holiday Inn North, Indianapolis, Indiana; and

WHEREAS, the surveyor's expertise helps us plan and develop Indiana's growth to make our state a better place to live; they have, thereby, contributed to the comfort and well-being of all Indiana citizens;

NOW, THEREFORE, I, Otis R. Bowen, Governor of the State of Indiana, do hereby proclaim the week of January 27 - February 2, 1980, as

SURVEYOR'S WEEK

in Indiana, and urge all citizens to recognize and honor this indispensable and specialized profession and its members.



IN TESTIMONY WHEREOF, I have hereunto set my hand and caused to be affixed, the great seal of the State of Indiana, at the Capitol, in the city of Indianapolis, this 12th day of October, 1979.

BY THE GOVERNOR

Edwin J. Gurnea
Edwin J. Gurnea
Secretary of State

Otis R. Bowen

Otis R. Bowen, M.D.
Governor of Indiana



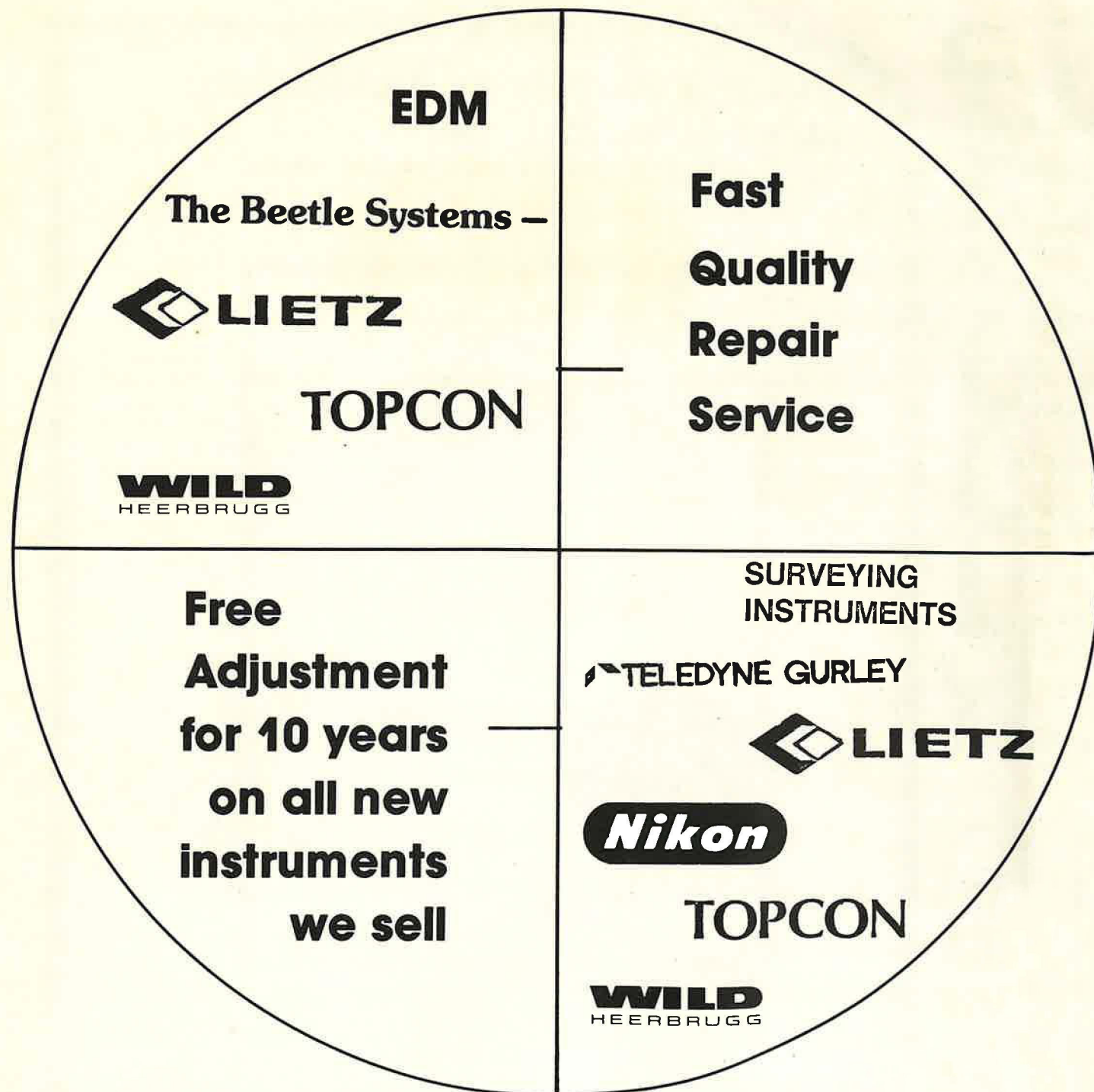
VOLUME 6
NUMBER 4
FALL 1979



REFERENCE LIBRARY • MAP ACCURACY STANDARDS
1980 CONVENTION IN INDIANAPOLIS • SURVEYOR'S WEEK
• ACSM DELEGATE REPORT • CERTIFICATE PRESENTATIONS •
NEW NAME FOR ECPD • ACQUIESCENCE AND PAROL
AGREEMENT • SURVEYING JOURNAL CONTENTS

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HOOSIER SURVEYOR

VOLUME 6, NUMBER 4, FALL 1979

Committee Assignments (1979)

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COVER: Indiana Governor Otis R. Bowen, M.D., has been a friend of Indiana land surveyors during his leadership. He has issued a proclamation establishing the week of the annual convention to be Surveyor's Week. Plans call for him to address the surveyors again this year.

EDITOR'S NOTE:

Deadlines for copy for various planned issues of the HOOSIER SURVEYOR are as follows:
Winter issue - January 31
Spring issue - April 30
Summer issue - July 31
Fall issue - October 31

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The Hoosier Surveyor is published quarterly by the Indiana Society of Professional Land Surveyors, to inform land surveyors and related professions, government officials, educational institutions, libraries, contractors, suppliers, and associated businesses and industries about land surveying affairs.

Editorial/Advertising offices: 3675 North Post Road, Indianapolis, IN 46226 (Telephone: 317/899-3685) Advertising rates, closing dates, circulation data on request. Contributed articles, photographs subject to space limitations.

Kenneth S. Curtis
Editor

Gary Kent
Associate Editor

THE PRESIDENT'S PAGE

PRESIDENT'S MESSAGE

By: Orwic Johnson

(Guest columnist is Albert McConahay, ISPLS Sec. Treas.)
CONVENTION 1980



Orwic Johnson
President

SLATE OF CANDIDATES FOR 1980 ISPLS BOARD OF DIRECTORS

The Nominating Committee, under chairman Jacob E. Hall, have nominated the following members. Ballots are due Jan. 30, 1980.

Emil P. Beeg, Jr. - Valparaiso
Charles A. Budnick - Indianapolis
Kenneth S. Curtis - West Lafayette
Voorhees C. Dalton - Indianapolis
William S. Davis - Indianapolis
John E. Fisher - Lafayette
Jack A. Irwin - Indianapolis
Orwic A. Johnson - Columbus
Jerry L. Martin - Vallonia
Albert L. McConahay - Indianapolis
Gene L. O'Brien - Madison
H. Lee Jarvis - Indianapolis
John W. Whitlock - Indianapolis
David K. Wolf - Garrett

IMPORTANT DATES TO REMEMBER

January 31 - February 2, 1980

1980 Annual Convention of Indiana Society of Professional Land Surveyors, Holiday Inn-North (I-465 and US 421) Indianapolis
February 14-16, 1980

Annual Meeting of Professional Land Surveyors of Ohio, Ramada Inn-South, Akron, Ohio

February 21-23, 1980

Annual Conference of Illinois Registered Land Surveyors Association, Holiday Inn-East, Springfield, Illinois

February 21-23, 1980

Joint Meeting of ACSM Kentucky Section and Tennessee Association of Professional Surveyors, Hilton Inn-Airport, Nashville, Tennessee

March 10-14, 1980

Annual Convention of American Congress on Surveying and Mapping, Chase Park Plaza Hotel, St. Louis, Missouri



Newsletter Editor Ken Curtis snapped this picture of the ISPLS Board of Directors meeting in Indianapolis, November 16, 1979. Seated, left to right, are Emil Beeg, Charles Budnick, and Byron Brady. Standing are Roger Woodfill, Orwic Johnson, and Albert McConahay.

CERTIFICATE PRESENTATION BY STATE REGISTRATION BOARD

November 16, 1979

Supreme Court Chambers
State Capital Building
Indianapolis, Indiana

Twice a year, in May and November, the State Registration Board for PE and LS conduct a very impressive certificate presentation for new registrants and guests in the State Supreme Court Chambers. Of the approximately 200 who were eligible, seventy-five were in attendance. Presiding, in the absence of board chairman Duane Monical, was Robert Richardson. He introduced Herman Moench who gave a short talk on professionalism. Other board members present were Oliver Summers and Robert Meek. Board secretary Otto Andres assisted in presenting certificates. A reception followed the presentation.



Jim Fisher, President of the Indiana Society of Professional Engineers, was given the opportunity to welcome the new PE registrants.



Robert Richardson, with the help of Otto Andres, presented certificates to approximately 75 new PE and LS registrants.



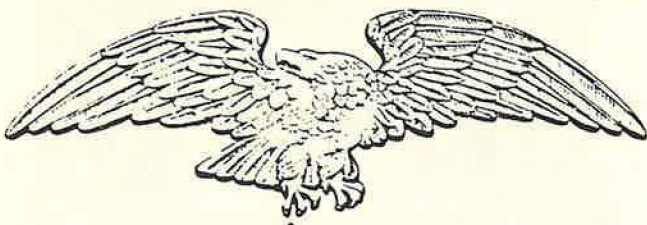
A large audience of new registrants and their relatives and friends filled the State Supreme Court Chambers



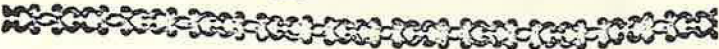
Orwic Johnson, President of the Indiana Society of Professional Land Surveyors, was given the opportunity to welcome the new LS registrants.



Orwic Johnson, center, president of ISPLS poses with two of the new LS registrants, David Quinn, left, of Indianapolis and Jerry Carter, right, of Zionsville.



Agenda



Thursday, Friday and Saturday
January 31, February 1 & 2, 1980

THURSDAY, JANUARY 31, 1980

- 7:30 A.M. - 12 NOON
Registration Desk will be open
Hospitality Room Available (Coffee & Donuts)
- 9:15 - 11:45 A.M.
Concurrent Workshops
1) Safeguard Business Systems - Edward Brooks
2) Coordinate Systems and their use - David A. Wahstrom
3) Human Relations in Supervision - Gerald L. Arffa
- 12:15 - 1:45 P.M.
Lunch - Governor Bowen
Urho A. Uotila (President A.C.S.M.)
- 2:00 - 4:30 P.M.
Repeat Concurrent Workshops
- 2:30 - 6:00 P.M.
EXHIBIT HALL OPEN
- OPTIONAL
Beef & Boards Dinner-Theatre
\$23 Couple (\$11.50 each)

FRIDAY, FEBRUARY 1, 1980

- 7:30 - 12:00 NOON
Registration Desk will be open
Hospitality Room available (Coffee & Donuts)
- 8:00 A.M. - 2:00 P.M.
EXHIBIT HALL OPEN
- 8:45 - 9:00 A.M.
Acknowledgement of Exhibitors
- 9:00 - 9:30 A.M.
Civil Engineering Design and Automated Drafting
System - David Glaudio (Holguin & Associates)
- 9:45 - 10:45 A.M.
"Sunset Legislation, Where are we Today" - Roger Woodfill
- 11:00 - 11:45 A.M.
IO SHA
George B. Reno, Director Bureau of Safety
Education and Training
- 12:15 - 1:30 P.M.
Lunch
- 2:00 - 3:00 P.M.
County Surveyor - is the Office necessary?
County Surveyors Association
- 3:15 - 3:45 P.M.
Report of Student Chapter Purdue
(Members of Student Chapter)

- 4:00 - 4:45 P.M.
CAMRAS - Computer Assisted Mapping & Records
Activities Systems - American Public Works Assn.
- 6:00 - 7:00 P.M.
Cocktail Hour
- 7:00 - ?
Banquet, Dance

SATURDAY, FEBRUARY 2, 1980

- 9:00 - 9:45 A.M.
Liability of Surveyors to 3rd Parties - John McEntyre
- 10:00 - 12 NOON
Annual Business Meeting

LADIES' PROGRAMS:

THURSDAY - January 31st

- 9:15 - 9:30
Assemble in Lobby
- 9:30
Bus departure from Holiday Inn
- 10:00
Tour of Children's Museum
- 12:00
Noon bus departure from Museum
- 12:30
Luncheon at the Iron Skillet
- 2:00
Bus departure from Iron Skillet
- 2:30 - 4:00
Shopping at Keystone at the Crossing
- DINNER - Beef & Boards (optional)

FRIDAY - February 1st

- 9:30 - 11:00
Crafts with Ann Grayson
- 12:15 - 1:30
Lunch with men
- 2:00 - 4:00
Ruth Loux on "Palmistry"
- 6:00 - 7:00
Cocktail Hour
- 7:00 - ?
Banquet, Dance (with men)

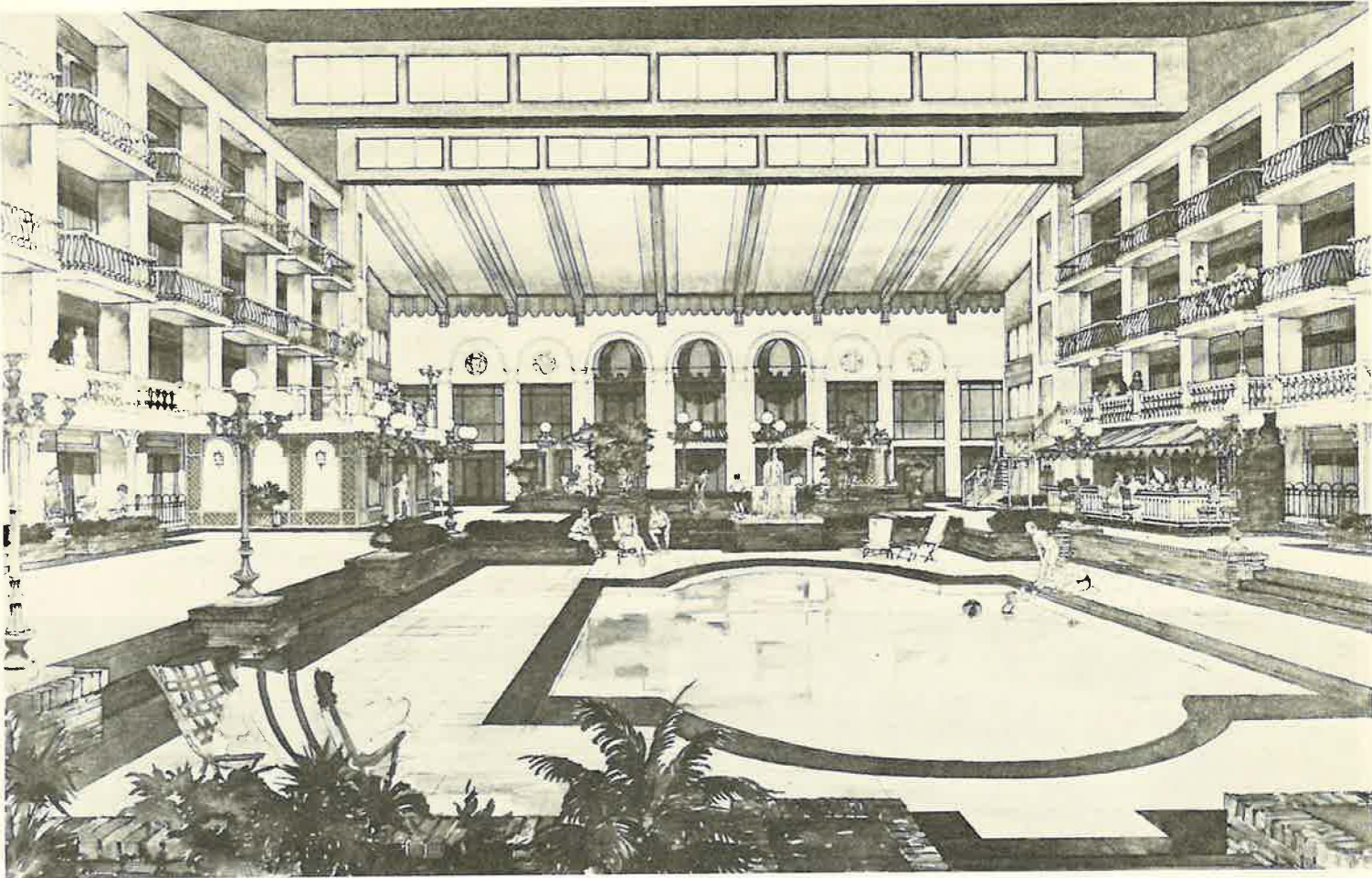
SATURDAY - February 2nd

- 9:00 - 11:30
Breakfast - Fashion Show

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- 3) San Remo...open evenings, serving Northern Italian cuisine
- 4) Le Club...open for luncheon buffet and all day for cocktails. Contemporary recorded music
- 5) The Rendezvous...(second level overlooking the atrium) open for cocktails beginning late afternoon.
- 6) Cafe St. Paul...full service restaurant and coffee shop (and sidewalk cafe')



The Rendezvous

New from Hewlett-Packard - Survey System One - boosts productivity from field to finish.

Introducing Hewlett-Packard's Survey System One.

A system designed to let you do more work in less time, and with much less chance for error. In brief, the system transfers all of your measurement data from the field to the office *electronically*, with speed and accuracy. In the office, your field data is reduced in a fraction of the time it would take using conventional methods, and you get answers while the job is still fresh in your crew's mind. Time savings are substantial, and the potential for error is all but eliminated.

Four key components make up the HP Survey System One. For field work, measurements are made electronically with the **HP 3810A Total Station**, a dependable easy-to-use instrument combining angle and horizontal distance measurements. The **HP 3851A Data Collector** is the link between field and office. Readings displayed by the Total Station are stored in the Data Collector's solid-state memory. Back at the office, the Data Collector transfers your field data to the **HP 9815 Surveying Calculator** for processing. This transfer is accomplished automatically, error free, and in a fraction of the time you now spend on the same task. The fourth

component is the **HP 9871A Page Printer**, which makes working plots in minutes and provides convenient page-width printouts.

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A.C.S.M. ANNUAL AND SEMI-ANNUAL CONVENTIONS

Each year the American Congress on Surveying and Mapping holds two general Membership Conventions. The one covered in the Spring is referred to as the "Annual" conference - the Fall meeting is called the "Semi-Annual" meeting. Both Conventions are joint ventures co-sponsored with the American Society of Photogrammetry.

A.C.S.M. usually assumes the leadership role in even numbered years, and A.S.P. leads in the odd numbered years. It is also generally true that the Annual Convention is held in Washington, D.C., home base for both Societies, and that the Semi-Annual meeting jumps around throughout the nation. There are exceptions to these rules, for that reason the schedule of approved A.C.S.M.-A.S.P. joint Conventions is listed as follows:

<u>YEAR</u>	<u>DATES</u>	<u>LEAD</u>	<u>LOCATION</u>
1979	Sept. 17-21	ASP	Sioux Falls, SD
1980	March 9-14	ACSM	St. Louis, MO
1980	Oct. 6-10	ACSM	Niagara Falls, NY
1981	Feb. 22-27	ASP	Washington, D.C.
1981	Sept. 8-12	ASP	San Francisco, CA
1982	March 14-20	ACSM	Denver, CO
1982	Sept. 19-25	ACSM	Miami, FL (Hollywood)
1983	March 13-18	ACSM	Washington, D.C.
1983	Sept. 19-23	ASP	Salt Lake City, UT
1984	March 11-16	ASP	Washington, D.C.
1984	Sept. 30-Oct 7	ACSM	Houston, Texas
1985	March 10-15	ASP	Washington, D.C.
1985	Oct.	ACSM	Indianapolis, IN
1986	March 16-21	ACSM	Washington, D.C.
1986		ACSM	

As you can see from the table, the Indiana Society of Professional Land Surveyors was successful securing the 1985 Semi-Annual convention for Indianapolis. The table also indicates that our presentation was strong enough that A.S.P. was willing to trade their leadership role in order to meet in Indianapolis.

I realize that 1985 is a long way down the road, but your support will be needed before, and during, this Semi-Annual national surveyor's meeting. I.S.P.L.S. has already asked for support from adjoining state professional societies, but our location (within one days drive of 100 million people) promises to make our convention one of the largest ever.

Specifically I would like for you to consider attending the St. Louis A.C.S.M. meeting March 9-14, 1980. It will be the closest one for five years, and it should give you an idea of what a national convention is all about. I am willing to organize a charter bus excursion from Indianapolis. If you are interested, contact me at the I.S.P.L.S. annual convention, January 31 - February 1 & 2, 1980.

Roger Woodfill
ACSM Delegate

USGS Book on Maps

A comprehensive hardback book covering 'almost everything you wanted to know about maps,' from their early history in the U.S. to future cartographic developments, has been published by the U.S. Geological Survey, Department of the Interior.

The 265-page publication, titled 'Maps for America' and subtitled 'Cartographic Products of the U.S. Geological Survey and Others,' was prepared in conjunction with the Survey's centennial celebration as the nation's largest earth science and civilian mapping agency. Produced in full color with over 200 illustrations, the book covers most aspects of mapping pertinent to user understanding of map content.

'The intent of this book is to condense into a couple of hundred pages what might normally be contained in dozens of technical reports totaling several thousand pages,' said Morris M. Thompson, author of the book. Thompson retired from the Survey in 1975 as Chief, Office of Research and Technical Standards, Topographic Division, and now works part-time as a civil engineer/cartographer of the USGS National Center.

'Of necessity, we concentrated only on the major areas of interest, with the net result being a book that is concise, yet is able to answer most of the questions people ask about maps,' Thompson said.

According to Thompson, the primary objectives of the publication are to inform the map user of the meanings of the various lines, colors, images, symbols, numbers, captions and notes that appear on maps; the possible errors and anomalies affecting the reliability and interpretation of maps; the different kinds of maps and map data; and the various sources of maps and related information.

At present, more than 30 federal agencies collect and prepare cartographic data. These data include more than 1.5 million separate maps and charts, 25 million different aerial and space photographs, records on 1.5 million geodetic control points, and a growing collection of map data in computer compatible form. The Survey's National Cartographic Information Center (NCIC) coordinates information on the availability of these materials through 26 NCIC and affiliate offices located throughout the country.

Some features of the book include full color satellite images of New Jersey and Florida, parts of Connecticut, New York, Massachusetts, and New Jersey, and the upper Chesapeake Bay; a table showing the different kinds of maps and map products, who produces them, and where they are available; tables of topographic and geologic maps showing the various map scales, percentage of U.S. mapped on those scales, the type of information usually shown on each scale, and the purpose of each of those scales; and an appendix on map projections, reference systems and control, and a glossary of mapping terminology.

Copies of the book, 'Maps for America,' may be purchased for \$11.00 each from the Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202.

AN ABSTRACT OF A PHD DISSERTATION ABSTRACT

Dean, Darrell R. Jr. Ph.D., Purdue University, December 1979. A Study of the Doctrines of Acquiescence and Parol Agreement as Related to Boundaries of Adjoining Properties. Major Professor: Dr. John G. McEntyre.

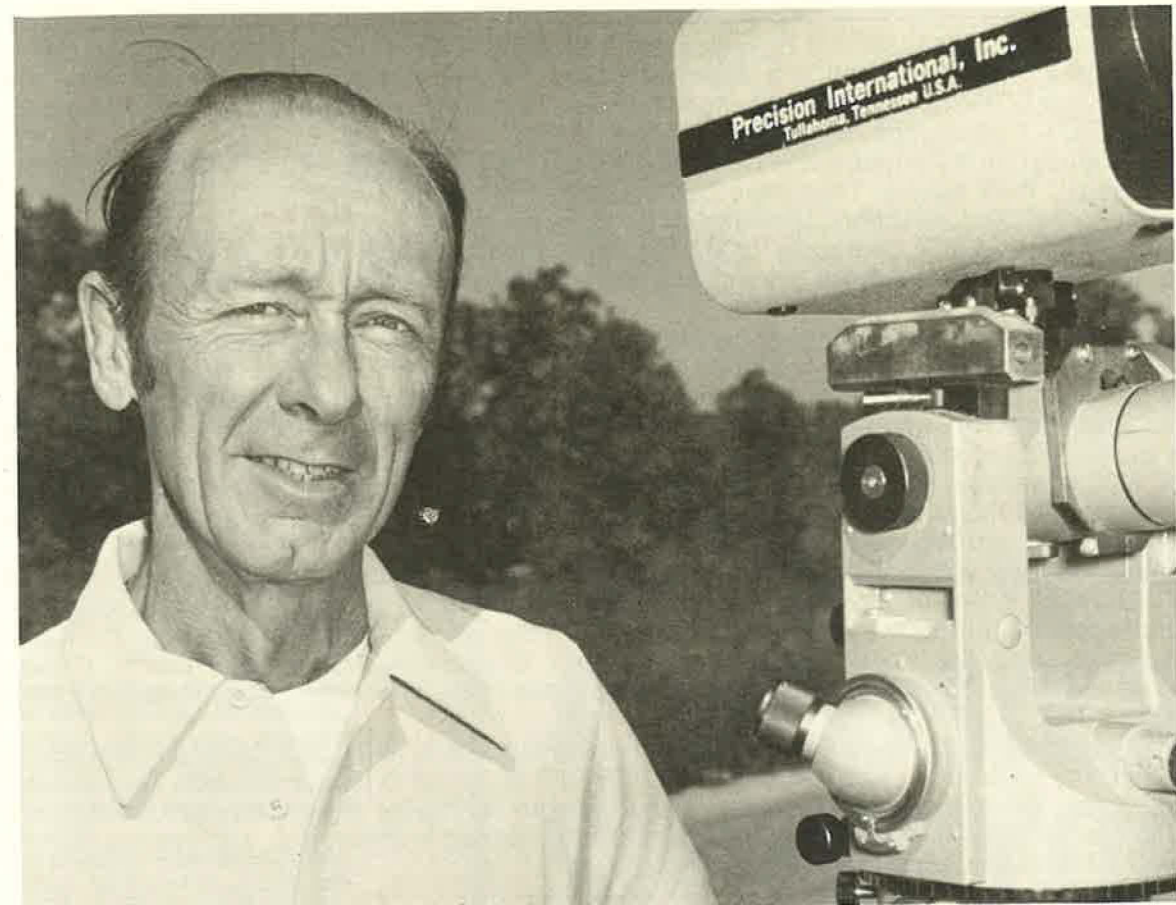
The boundary between adjoining properties may be established by a plat or a description found in a deed or some other recorded document in the public records. A boundary may also become established by unwritten methods. A problem arises when the boundary established by the written record conflicts with a boundary established by an unwritten method. These unwritten methods include the doctrines of adverse possession, estoppel, acquiescence, and parol agreement.

The rules for boundary establishment by unwritten methods are usually given in the opinions of appellate court cases rather than in state statutes. General principles concerning the establishment of boundaries by unwritten methods are available in textbooks discussing legal aspects of surveying. However, a comprehensive synthesis of the law on the details of the requirements for establishing boundary lines by unwritten methods is not available from the standpoint of the surveyor. The objective of this study is to provide such a comprehensive synthesis, by a study of appellate court cases, for the doctrines of acquiescence and parol agreement.

Elements found to apply to acquiescence in nearly all states include the following: (1) The line must be definitely marked for a period equal to that of the statute of limitations for adverse possession. (2) The acquiescence must be mutual, i.e., bilateral and not unilateral. (3) Naked possession or passive acquiescence in the existence of a fence as a barrier is insufficient. (4) Forested areas or areas not intensively used are land uses in which acquiescence is difficult to prove. (5) A marked irregular line on the ground is often not upheld as a line by acquiescence when it is known that the line is to be straight.

Elements that are required for a boundary to become established by the doctrine of parol agreement are as follows: (1) a disputed, doubtful, or unascertained line, (2) an agreement to establish a line, (3) a marking of the line, and (4) possession or acquiescence or a showing of faith in the agreement. The courts in the various states are in conflict as to what constitutes a disputed, doubtful, or unascertained line. Some courts require that the dispute, doubt, or uncertainty meet the subjective test and others require the objective test. A boundary location which was unknown in the minds of the adjoining parties at the time the agreement was made would meet the subjective test. A boundary for which the descriptions are ambiguous or one that is not susceptible of an unequivocal retracement because of lost original monuments would meet the objective test. Some states require that the possession or acquiescence subsequent to the parol agreement continue for the statutory period and others do not require any specific period.

Recommendations concerning the doctrine of acquiescence depend upon the length of the period of acquiescence and the presence or absence of original monuments. Recommendations concerning the doctrine of parol agreement depend upon whether the subjective or objective test of dispute or uncertainty existed, the nature of the agreement, whether valuable improvements were made relying on the agreement, and the period the agreement had been in effect. It is also recommended that the surveyor submit to the client a plat of survey, a description, and a written report of survey. The written report of survey should disclose all the facts and give the reasons for the recommendations that are made.



Beetle Field Report

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NEW NAME FOR E.C.P.D.

The Engineers' Council for Professional Development, Inc. (ECPD) founded in 1932, has undergone major organizational changes this year. With the approval of its 19 member societies, representing 674,843 engineers in the U.S., the ECPD has officially changed its name to the Accreditation Board for Engineering and Technology, Inc. (ABET). This change is effective January 1, 1980.

The Engineering Education & Accreditation Committee (EE&A) and the Engineering Technology Committee (ET) have also changed their names. They have been renamed the Engineering Accreditation Commission (EAC) and the Technology Accreditation Commission (TAC), respectively.

Under the new structure ABET continues to be responsible for accreditation activities in engineering, technology and engineering related areas keeping the same autonomous and independent status as that of the ECPD.

Currently, there are 239 colleges of engineering with 1295 ECPD/ABET accredited programs. In technology, there are 565 accredited programs, either two or four year, at 159 institutions of higher education. Accreditation of these programs is the responsibility of the accreditation commissions which in 1979 conducted 552 accreditation visits involving the same number of visitors who contributed their time and effort to assure the public that the accredited programs fulfilled the criteria established by the profession. This volunteer effort represents over 4000 man-days. Coupled with the ECPD/ABET operating budget of \$998,000 it represents a significant commitment by the profession to insure the viability of the accreditation program which attests to the quality of engineering and technology education in the U.S.

ABET will continue all accreditation and other education-related activities currently operating under ECPD. However, the ECPD/ABET Board of Directors has approved the transfer of several educational functions not directly related to accreditation to the appropriate Councils of the new umbrella organization, the American Association of Engineering Societies (AAES) over the next 12 months. The assignment of these non-accreditation activities will occur when the Councils are viable and able to accept the responsibility for these functions.

The ECPD/ABET in its 47th year of continuous operation, remains as a unity organization in the education area for the engineering profession. The purpose of ECPD/ABET is stated in its constitution as "...the promotion and advancement of engineering education with a view to furthering the public welfare through the development of the better educated and qualified engineer, engineering technologist, engineering technician, and others engaged in engineering or engineering related work."

At present the member organizations of ECPD/ABET are:

- American Congress on Surveying & Mapping (ACSM)
- American Institute of Aeronautics & Astronautics (AIAA)
- American Institute of Chemical Engineers (AIChE)
- American Institute of Industrial Engineers (AIIE)
- American Institute of Mining, Metallurgical and Petroleum Engineers (AIME)
- American Nuclear Society (ANS)
- American Society of Agricultural Engineers (ASAE)
- American Society of Civil Engineers (ASCE)
- American Society for Engineering Education (ASEE)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- Institute of Electrical & Electronics Engineers (IEEE)
- National Council of Engineering Examiners (NCEE)
- National Institute of Ceramic Engineers (NICE)
- National Society of Professional Engineers (NSPE)
- Society of Automotive Engineers (SAE)
- Society of Manufacturing Engineers (SME)
- American Academy of Environmental Engineers (AAEE)
- American Society for Metals (ASM)

The following is a list of ISPLS member firms:

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Anderson & Associates, Engrs. 222 E. Main Street, P.O. Box 585 Lebanon, Ind. 46052 (Carl M. Anderson)	Melton Associates, Inc. Rt. 2, Box 283 Zionsville, Ind. 46077 (James D. Melton)
H.R. Blankenbaker & Son P.O. Box 157 Jeffersonville, Ind. 47130 (Rollyn H. Blankenbaker)	Franklin C. Moses Route 4 Frankfort, Ind. 46041 (Franklin C. Moses)
Brady Land Surveying, Inc. 55308 Jay Dye Street Elkhart, Ind. 46514 (Byron M. Brady)	O'Brien Engineering 448 Meadow Lane Madison, Ind. 47250 (Eugene O'Brien)
Columbus Surveying & Engr., Co. P.O. Box 1171 Columbus, Ind. 47201 (Dwight A. Johnson)	T.F. Owens & Associates, Inc. 1136 E. Columbia Ave. Fort Wayne, Ind. 46805 (Timothy F. Owens)
Paul J. Cripe, Inc. 1712 Graham Road Indianapolis, Ind. 46250 (James Dankert)	H. Douglas Peirce, L.S. 51744 Throwbridge Lane South Bend, Ind. 46637 (H. Douglas Peirce)
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Thursday, September 13, 1979

INDIANAPOLIS STAR

Charles Marbaugh Of Engineering Firm

Charles Marbaugh, founder and retired board chairman of Marbaugh Engineering Supply Co., died today at his home, 5925 Andover Road.

He was 67.

Marbaugh, a native of Monterey, founded Marbaugh Engineering Supply Co. in 1949. He began branch operations in the Indianapolis area after opening the first store downtown. It was one of the first engineering supply firms in the nation to implement the branch concept.

He later diversified the firm's operations to offset printing, microfilming, photographic reproduction, computer output microfilming, audio-visual sales, calculators and video equipment sales.

Marbaugh retired as chairman of the board in 1977.

While attending South Bend Central High School, he played basketball and continued the sport while at the University of Notre Dame.

He was an Army major in World War II and was in the Army Corps of Engineers at Camp Crowder, Mo.

He was a member of Indiana Chamber of Commerce, Blue Printers Association and the Notre Dame Club of Indianapolis.

Services will be Saturday at 9:30 a.m. in Feeney-Hornak Keystone Mortuary and at 10 a.m. in St. Matthew Catholic Church. Friends may call tomorrow after 1 p.m. There will be a prayer service tomorrow at 7:30 p.m. Burial will be in Oak Lawn Cemetery.

Memorial contributions may be made to the American Cancer Society.

Survivors — wife Miriam; son Joseph; daughters Linda Green, Pam Dahn; sisters Rose Rolwing, Lillian Johnson, Miss Julia Marbaugh; brother the Rev. Meinrad Marbaugh.



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Marbaugh
1912 - 1979

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THE NEED FOR MAP ACCURACY STANDARDS
FOR LARGE-SCALE MAPS

EDITOR'S NOTE: In teaching the Purdue course in Topographic and Cartographic Surveying, I have been well aware of the fact that, even though we have acceptable "National Map Accuracy Standards" for small-scale maps, we don't have adequate standards and testing procedures for larger-scaled maps. Are the planimetric features plotted in their correct position? Have the elevations been correctly determined and the resulting contour lines properly placed? How does one test a map's accuracy? How many and where do test measurements need to be made? In an academic learning situation, I have occasionally had several field parties mapping the same area. Can you imagine the results? Mistakes are made in determining elevations and in positioning! In private practice, one cannot afford the luxury of duplicate mapping. Whether it is checkerboard grid mapping, controlling-points by stadia, plus and offset strip mapping or Photogrammetrically compiled maps, there is the clear possibility of mistakes entering into the process and resulting in inaccurate maps for our clients.

The articles that follow are an insight into what the consequences might be. They are used by permission the The Photogrammetric Coyote, a quarterly, published at Mineral Wells, Texas. The articles appeared in the December 1978, March 1979, September 1979, and December 1979 issues. The article by Prof. Frank Moffitt is reprinted by permission of Photogrammetric Engineering and Remote Sensing.

A Photogrammetrist Goes To Court And Loses

Gene Lafferty,
Great Basin Aerial Surveys
Sparks, Nevada

Today's photogrammetrist must be increasingly aware of the possible legal implications of his work. I recently had occasion to appear as an expert witness in a court case that involved the accuracy of a photogrammetric map, and as the case proceeded, it emphasized questions about liability, responsibility, and the relationship of a photogrammetrist with his client that all of us in the profession must be aware of.

The case involved an experienced, qualified, respectable individual, whose firm enjoys a fine reputation. Unfortunately, a map containing hidden vertical discrepancies was delivered out of his company. The engineer to who the map was delivered took the map, and without any field checks or tests used it to design a subdivision and to compute pay quantities. There was no communication between the photogrammetrist and the engineer as to what the map was to be used for.

After 30,000 yards of dirt had been removed, the discrepancies became apparent even to the engineer, who proceeded to execute field checks on the remainder of the property, which had not been disturbed, and found that there were indeed discrepancies. I prefer to call them discrepancies, rather than errors, because although according to the 1968 Reference Guide Outline of the Federal Highway Administration the map did indeed fail, by a manual of accuracies published by a highway department in the West, it could have been interpreted to have passed. Further complicating the issue was the photogrammetrist's own handout, which stated that he could accomplish certain accuracies for certain maps--and the handout was ambiguous as to whether the map in question passed or failed.

A suit for damages was brought against the photogrammetrist by the engineer's insurance company in the amount of \$40,000, the cost of correcting the excavation problem. One of the main questions posed by both sides at the trial was, "What is the USUAL relationship between a photogrammetrist and his client?" The answer seemed to be, "There IS no usual or common relationship." More specifically, two main questions were posed by the attorneys:

1. Does an photogrammetrist, as admitted expert in the preparation of maps, have an obligation to instruct his client in the uses for which the map is suitable?

(The photogrammetrist claimed that he understood the map would be used for preliminary subdivision design; the engineer claimed that the photogrammetrist knew the map would be used for earthwork pay quantities.)

2. Does the engineer have a responsibility to test any and every map before use to determine its accuracy and completeness?

(The photogrammetrist's attorney argued that prudent engineering practice would be always to check the map. The engineer's attorney argued that in prior years the engineer had checked this photogrammetrist's work and found it to be entirely acceptable. He had not checked this map since he professed to be a layman in photogrammetry and had no reason to doubt the map's accuracy.)

After a week of testimony, the jury found for the insurance company, assessing the photogrammetrist \$40,000 in damages on a job that cost about \$500, of which probably \$75.00 was profit.

What happened to that photogrammetrist, who I felt had committed no omission or error, could have happened to any of us. There are some remarkable aspects of this profession, brought into sharp focus by this case, that we must all become aware of. It was remarkable to the judge, and to both sides' attorneys, that in the United States today there is no one set of uniform standards that is uniformly used by the photogrammetric profession to test maps. While everyone has a set of specifications to follow, there does not seem to be a uniform set that can be presented to a court as the commonly used set employed by every prudent photogrammetrist.

So the jury of lay people was left to decide something as exotic as which of three sets of photogrammetric specifications should be applied. Obviously, they chose the most stringent.

It is also remarkable that in case law, or even among photogrammetrists, there is no policy regarding the checking of photogrammetric work in private practice. In questioning some of our colleagues, I found that about 50% tell their clients to check their maps.

The case was chilling in some respects. Think for a minute about a profession whose rate structure permits a \$75.00 profit to offset a \$40,000 liability!

Also chilling was the fact that the court regarded the photogrammetrist as an expert in his field, and the engineer as a layman. Even though he was a consulting engineer and a land surveyor, he was not considered to be expert in the field of photogrammetry. The photogrammetrist was, and this put the emphasis and responsibility on him.

In essence, the photogrammetrist was left holding the bag when he did not instruct his client in the use of the map, or that it should be checked before it was used. There may well be more and more suits of this nature if the photogrammetrist in private practice does not learn to protect himself.

There are several things, requiring national direction as well as individual action, that might be done:

1. Adopt a printed guideline covering map accuracy and testing. A document published by ASP, for example, setting out what is and what is not prudent practice would have been very persuasive to the jury in this case.

2. The profession should adopt some kind of printed uniform contract form, which specifies who has the responsibility, in a joint project, for what, and insisting in writing that the engineer check the map before doing anything. Had a contract covering these items been entered into in this case, the plaintiff's attorney assured me, there would have been no possibility of going to trial.

3. We should look into the possibility of creating an industry-wide errors and omissions policy. The price would be high, but after consulting a few people about it, I feel that with the use of written guidelines and consistent contracts spelling out who has liability for what, it might be possible to get a blanket policy for a large number of members at a relatively reasonable cost.

I would also urge photogrammetrists to resist by all means the urge to take on a job where the risks so far outweigh the profits. There will always be fly-by-night mapping outfits -- let them take the job and end up in the courts. One more piece of advice: retain for your firm a knowledgeable attorney, and let him advise you BEFORE you have to go to court, not after!

WE GET LETTERS . . .
WHEN THE PHOTOGRAMMETRIST IS THE SCAPEGOAT

By Vern W. Cartwright
Cartwright Aerial Surveys, Inc.
Sacramento, California

Because I'm not in total agreement with the conclusions of author Gene Lafferty in his article in the December issue of THE PHOTOGRAMMETRIC COYOTE, because it was my company--Cartwright Aerial Surveys, Inc.--that came out on the losing end of the fiasco, and because I feel it may benefit all photogrammetrists to know as much as possible about the incident, I'm presenting the facts as I know them.

Like any professional, a photogrammetrist is always open to a lawsuit. The fact that I consider my firm more than lucky in avoiding such legal action for more than 33 years comes from the experience of having compiled thousands of maps, encompassing over 100,000 stereo models and more than one million photographs.

Then, this happened: In 1971, we flew a one-model project for a client in Reno, Nevada for whom we'd performed services for at least five years. Flying at the prescribed altitude to give a final 5 diameter map at a scale of 1 inch equals 100 feet with five-foot contours and spot elevations every 200 feet, we noted the terrain was relatively flat, but was covered with grass at least a foot high. To accommodate the client, we also compiled a pencil manuscript.

It wasn't a particularly noteworthy task. As a matter of fact, it was performed as we were flying other projects for our client. Then in late 1973, the client decided to use this five-foot contour interval map to design a subdivision -- a project which includes earth movement.

We were never told the map would be used for this purpose, for which it was not suited. We had always sent this client the diapositives and pencil manuscripts to use in his own Kelsh plotter for possible additions of extra points and so forth. The person ordering the work knew photogrammetry and had made maps for many years using his Kelsh plotter.

Compounding the erroneous use of the map was the fact the project engineer, then fresh out of college and unlicensed, used the five-foot contour map to design and plan the subdivision. The project engineer stated under oath that he used the 5' contours not the spot elevations. Earthwork began and the project was underway.

On August 11, 1973, I was advised by the president of the company they "had a problem" with the map, which he alleged showed the ground to be one to two feet higher than it actually was.

Our people set up the model again in the plotter to check accuracies. They were found to be standard.

But, when I went to the client's office, I was shocked to see our 1 inch equals 100 feet map had been enlarged to 1 inch equals 40 feet, and that the subdivision (which includes earthmoving) was being planned on the enlarged pencil manuscript.

As we all know, no photogrammetrist would recommend such enlarging of maps to design scale. The client wasn't concerned with that, however. His attempt to cut costs had backfired, and he said that over 30,000 extra yards of earth had been moved in error "because your map's no good."

"Do you have errors and omissions insurance?" he asked. I said my firm did not and he replied the error was going to cost a lot of money, wanting to know what I was going to do about it.

My defense, of course, was that the map was being used for the wrong purpose, and couldn't see how my firm could be held to blame. He replied he was turning the matter over to his errors and omissions carrier, and was sorry that we didn't have the same type of insurance.

The next time the subject came up was a year later, when the insurance carrier offered to settle the matter out of court if I would pay them a fraction of the ultimate cost. I refused. The next communication was an official letter from the client's errors and omissions attorney, filing a lawsuit.

Because a Nevada jury would be hearing the case, I located a Reno attorney with some knowledge of surveying the mapping. Depositions started rolling and a trial date was set.

After two cancellations (one by the plaintiff, the other by me) the date was chosen. I packed my belongings and contacted as my expert witness Dr. Frank Moffitt (incoming president of ASP) of the University of California at Berkeley.

Watching the jury selection, and still fairly confident that we would be able to prove we had no liability in the matter of the mis-used map, I was happy to see a Nevada engineer and a person with mathematics background on the panel.

The trial began with witnesses for the engineering firm -- A NEVADA engineering firm -- and their attorneys telling the jury of the things we CALIFORNIA photogrammetrists had done "incorrectly," repeating the charge that the ground was actually one to two feet lower than our map showed, and saying our \$346 map had cost the plaintiff over \$39,000.

I emphasize "Nevada" and "California" in much the same manner the plaintiff's attorneys did, continually pointing out it was an out-of-state firm performing the work.

I do not mean to impugn the equity of the judicial system, but clearly the effort was being made to create the impression this dispute was between "neighbors" and "strangers."

Unbeknownst to the jury, their "neighbors" had suffered little more than embarrassment. They had already been reimbursed for their loss by their insurance company. But, apparently because jury members are thought to be overly generous with insurance company money, Nevada law does not allow mentioning the presence of an insurance carrier. That would be prejudicial. I firmly believe the constant mention of the defendant being an out-of-state firm is also prejudicial.

Back to the trial: The plaintiff's attorney produced a letter I had written to the president of the engineering company, in which I said I was sorry our map -- even though it met standards of map accuracy -- did not come up to the standards they had expected from us. Presentation of such evidence went on for a day and a half.

During that time, the foundation was laid that the firm did not check the map in question prior to use because they had done so with other of our maps in the past and had always found them to be correct. Thus, when they used the two-year-old map in 1973, they did so without checking its accuracy

The engineer on the project testified under oath that he did, indeed, use a map with five-foot contours and not the spot elevations on an earthmoving job where measurements of a few tenths of a foot were necessary.

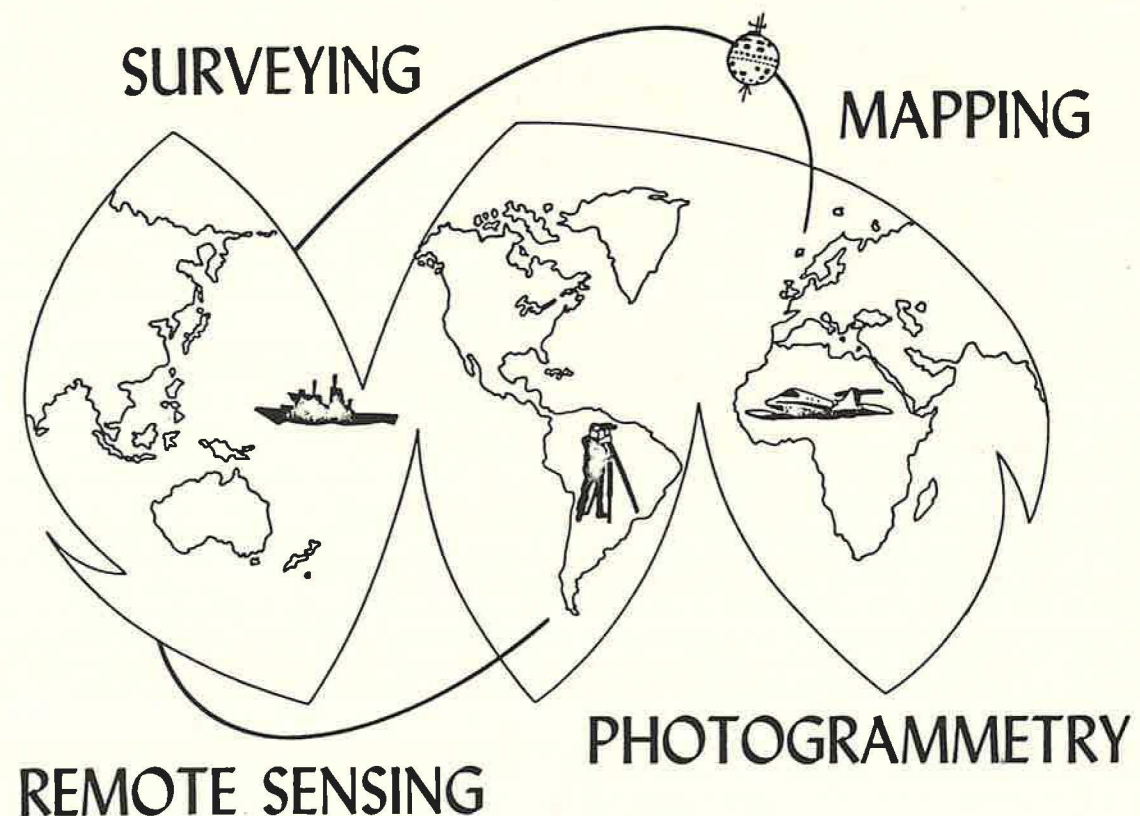
(All contours met standard map accuracies, and because the earth had been moved, it was impossible to recheck the majority of the ground control and spot elevations, and what they did check was performed by pacing.)



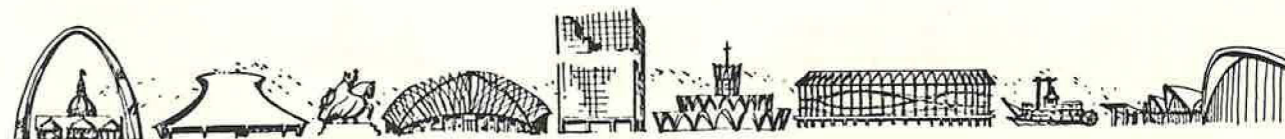
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George Cline
Director 1980 ACSM/ASP
Convention

So, the graders went to work, moving 30,000 yards of dirt from one end of a 30-acre area to the other. And, the damage might have been compounded further, had not a city engineer from the City of Sparks been driving by the project and noticed they were cutting considerably below the adjacent road level. He knew immediately something was wrong.

That's when the engineering firm contacted me, collected payment from their errors and omissions insurance company (a fact the jury was not aware of) and finished the job properly. The insurance company then proceeded with its lawsuit.

Our turn on the stand began with Professor Frank Moffitt as an expert witness, describing to the judge and jury what photogrammetry is, bringing out specific references to this project.

He concluded there's no way to tell if the map was correct or not, since the earth had been moved prior to checking. He stated, too, it wasn't good engineering practice to use a map before checking it. His testimony lasted half of the day.

During my turn on the stand, I testified we never knew what the map was going to be used for; that in fact the engineering firm had its own Kelsh plotter, to enhance our topographic maps when additional areas were needed, and that in all cases the firm always ordered the glass diapositives along with the manuscript, so they would perform this function themselves.

Witnesses for the plaintiff claimed we knew what the map was going to be used for. We were the "out-of-town experts" and should have made such recommendations to our clients, they said. Our contention was, and still is, that the firm knew photogrammetry and was responsible for ordering the proper maps for various uses.

Several days later, the jury deliberated for two hours before reaching the conclusion that even though sloppy engineering procedures had been employed, it did not alter the contention our map was in question, and we were ordered to pay nearly \$40,000 damages (to the insurance company.) Add to that another \$10,000 in attorney's fees. Plus, court costs which included the bitter pill of having to pay \$250 to Eugene Lafferty for testifying against us!

As Mr. Lafferty says he is, I, too, am concerned about professionalism in photogrammetry. And question whether he, as a professional, should not have disqualified himself as an expert witness on the basis his firm is controlled by the party which was suing mine, and that his firm is in direct competition with ours. I feel he should have, or at least made these facts know to the jury.

The \$50,000 loss hurts, but not nearly as much as the damage to my reputation and that of my company. I might have avoided this ordeal if I'd agreed to settle out of court and then all of this would simply be an entry in an accountant's ledger.

But, I thought I was right. I STILL DO!

Needless to say, my firm now has errors and omissions insurance and, if the occasion arises again, claims will go through our insurance carrier (under a \$5,000 deductible policy). But even this is not absolute protection. And, it's noteworthy to mention if my firm had carried errors and omissions insurance since it began operation, the cost in premiums would have been over \$150,000. Compared to losing \$50,000, I still come out "ahead."

Here are some questions we, as professionals, should address:

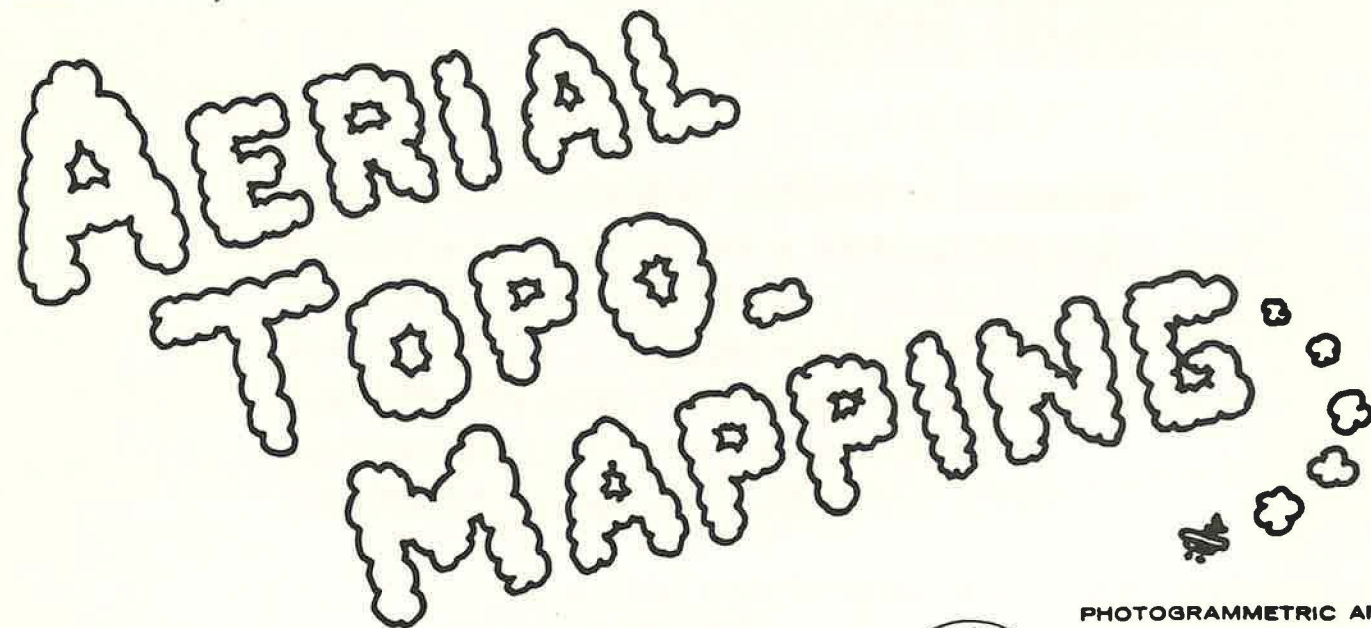
1. How can we limit our liability while performing small jobs for clients while doing bigger ones for the same clients? (Remember, this job was a mere "afterthought" while flying another project.)

2. Why is it that NONE of the textbooks on engineering and photogrammetry state maps must be checked before use?

3. Why should a photogrammetry firm be held accountable for the manner in which a map is improperly used, when the client isn't certain for what purpose it will be employed when it is ordered?

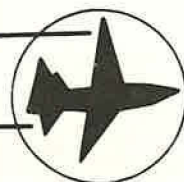
This is, as far as our attorneys have been able to determine, the first case of its kind in this country. If this decision is referred to as a legal precedent in subsequent court cases, it can have long-lasting detrimental effects upon our profession.

As the unhappy "guinea pig" in this case, I think the time has come for our professional societies to establish better guidelines to help the working photogrammetrist. If my experience helps to achieve this end, it will have been worth it.



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Random Thoughts On Map Testings

(OR DON'T SHOOT YOURSELF UNTIL YOU'VE SEEN THE PROFILES)

by Joseph P. Burns

If you're looking for a scholarly treatise on modern map testing read no farther. These few observations are dredged up from personal experiences as a mapping executive, federal contract "expert" and finally as a private consultant.

I learned years ago not to panic when confronted by an angry client, test profiles in hand. Now admittedly even the best mapping companies can deliver a real stinker upon occasion, often through causes beyond their control. Modern cameras and plotters are extremely complex affairs requiring calibration and adjustment by factory specialists. A small systematic--or much worse, intermittent--malfunction in camera or plotter can void a whole season's work and seriously damage a company's good name and bankroll.

However, for every legitimate gripe there are several false alarms arising from faulty test procedures. Personnel assigned to test the maps often lack not only survey experience but common sense and judgment as well.

Perhaps they fail to appreciate the importance of the task; they ignore the fact that the test survey must be above suspicion, that their work must be equal or superior to that of the original map makers.

Testing may be done by various types such as (a) a consultant's civil engineer whose last contact with surveying may have been in college (b) a local land surveyor's party chief whose experience may be mainly in lot surveys or stadia topography rather than precise traverses (c) a moonlighting professor from the local college whose survey knowledge is strictly theoretical. I'm sure the intentions are good in most cases but when they do find discrepancies do they ask themselves "is my work airtight?" "Have I taken a good representative cross-section of the map?" "Can I defend these profiles and prove their reliability?"

Although ample instructions have been published on proper procedures for map testing in many cases these standards are ignored, even on large projects. Common sense tells most of us that a test traverse must begin and close satisfactorily on control of known accuracy, that sufficient shots must be taken, that the profile must cross a reasonable number of contours and--particularly in rough terrain--must be plottable accurately on the map. These principles and others are clearly stated in the "Reference Guide Outline", developed by ASP-BPR as well as in specifications issued by other federal, state, and private agencies. Large mapping contracts that specify accuracy requirements usually spell out the test procedures to be followed.

A few horror stories may illustrate my point.

A cable came in from East Africa informing the mappers that the test profile showed the 1-meter maps to be 10' in error vertically. When the profiles arrived after a miserable waiting period the problem turned out to be caused by a small horizontal displacement along a very steep slope. Results looked bad to the unthinking but actually on examination the profiles were amazingly close in the featureless desert. Further client agitation was caused by a missed overgrown irrigation ditch, 2' wide x 10' deep, that could not be seen on the 4000' photos. Subsequent road construction proved the maps to be excellent.

In another case a West Coast consultant tested the maps by profiling a long, ragged descending ridge but failed to take enough shots. His oversimplified profile simply failed to pick up the grade changes and saddles shown by the map profile; vertical differences were called errors in the map. GRRRRRRR!

Sometimes, on large projects the adverse reports on the map may spring from motives far removed from technical considerations. "Blind ambition", disgruntled local competitors, personal vendettas--these things do happen outside the soap operas.

In one case an ambitious young state attorney, looking for a "cause", filed suit for a huge sum for improper stakeout of clearing limits. The line was actually staked and cleared simultaneously in subzero weather in several feet of snow. Obviously the contractor couldn't clear a neat 80-foot width; afterwards he claimed and was paid for the extra clearing involved.

The state's "evidence" consisted of a movie film taken with a hand-held camera from a moving helicopter over the cleared line--no markers, no measurements, strictly pictorial. After the election (the attorney lost) the state offered to drop the suit but only after the company's reputation had suffered, executive man-hours were wasted in the defense of a job very well done and the legal bills were substantial.

In one remarkable recent case the reputation of a competent firm was seriously impaired by a scathing report which totally rejected the maps for the intended purpose. While the technical data was not generally available it appeared that the rejection was based on results from an unchecked, open-end traverse in very rough, wooded terrain. The profile apparently started from an old intermediate traverse station of questionable accuracy, a point not identifiable on the maps nor used in the aerial mapping. An attempt was made to close the azimuths of this makeshift "test traverse" by a sun shot, a procedure unacceptable for even third-order work and certainly not recommended for a test traverse in rugged country where any discrepancy between ground and map profiles makes vertical comparison meaningless.

When I encounter something like this--and fortunately such cases are rare--I don't try to determine motives. Could it be ignorance, haste, carelessness, possibly something worse, who knows?

I just shake my head and think of the famous remark attributed to an Eastern businessman who bought a mapping company for his son. The latter, not too stupid, quickly left the mapping business whereupon pop sold out at a big loss saying, "I've never known a business where you put so much in and get so little out."

Never mind, sir. The reward will be handed out Up Yonder. To paraphrase Lincoln, the Lord must love the mapping companies. He created so many of them. It's a tough way to make a living but aside from the sparse dollars and hard work and constant risk most of us like it. And I find it hard to quit. Maybe I'm not too smart at that.

STANDARDS FOR MAP ACCURACY CONSIDERED

Dick Evans, Chairman of the Professional Activities Committee of ASP, reported on the progress of the development of standard accuracy specifications for map products, a topic much discussed at the Albuquerque meeting and brought into even sharper focus by the court action involving a photogrammetric firm as reported in THE PHOTOGRAMMETRIC COYOTE in December, 1978, and March, 1979. The ASP Journal, in reported actions of the Board of Direction meeting held at the Washington Convention, called the "most important recommendation of the PAC Committee" the setting up of a steering committee to develop procedure for producing such standards.

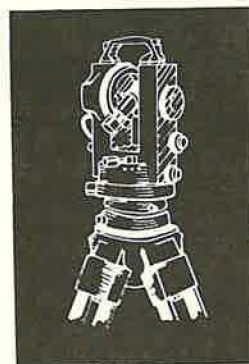
The first and possibly most important step is to develop a list of highly qualified people to write the standards. ASP President Dr. Frank Moffitt has appointed Dean Merchant of Ohio State as Chairman of the committee, which is presently working on development of such a list. Although the process of arriving at these standards must be thorough and deliberate, French expressed the hope that within a year a draft version would be ready for publication in the Journal of ASP for comment and suggestion.

During the discussion period, it was pointed out that standards do now exist; for smaller scales, "standards, map accuracy" is found in the index of the "Manual of Photogrammetry," and the section dealing with standards on page 1143 of that book. Larger scales standards are in ASCE Manual #10, "Technical Procedures for City Surveys." The hope was expressed that already existing literature would be carefully reviewed. It was again pointed out that the problem is not that there are no standards, but that there are no standards that are universally applied, and also that existing standards badly need to be updated, especially those dealing with large scale maps. There is also a strong feeling that ASP, as the leading organization of the profession, should publish its own list of standards.

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President

American Society of Photogrammetry

Photogrammetric Mapping Standards*

A program for developing photogrammetric mapping standards directed towards large-scale mapping in the private sector is outlined.

THE SUBJECT of Standards for Photogrammetric Mapping has been of concern to map producers in this country ever since the early 1930's when farsighted practitioners saw the potential superiority of the photogrammetric process over field methods. Of course, photogrammetric maps were produced even before standards existed for their preparation. The first concrete set of accuracy specifications was published in 1941 by the Federal Bureau of the Budget and was referred to as "Standards of Accuracy for a National Map Production Program." A modification of this set of standards was reported out in 1947 and is referred to as "National Map Accuracy Standards." It is presently applied to all topographic mapping produced by government mapping agencies, and is used by many state, county, and private agencies involved in the production of or the use of maps. These standards could probably be applied to a substantial amount of mapping performed by members of the Council, particularly in the area of relatively small scale mapping (1:10,000 or smaller). However, much of your mapping is done for detailed engineering studies for which small-scale mapping is not appropriate. And the National Map Accuracy Standards are not always suitable for this type of mapping.

You will note that I dwell on the accuracy aspect of photogrammetric mapping and not on such things as line widths, content, color, and the like. This is simply because I feel that specifications and standards for these latter items are usually not subjects of dispute between the mapmaker and the user/client, and are not nearly as serious as an

inaccurate map because they are fairly easy to correct.

There are relatively few causes for serious inaccuracies or errors in maps produced by the photogrammetric method. If we can assume that the flying height-vertical accuracy relation is reasonable, based on past systems performance, then these causes can be reduced to the following:

- Bad control, whether obtained by direct field surveys or by some type of aerotriangulation (which in itself may be based on bad field surveys);
- A warped stereoscopic model;
- Uncompensated instrument-lens distortions; and
- Ground cover.

The field control is placed either by the mapmaker or by the client. In the former case, the mapmaker is at fault for bad control, and in the latter case, the client is at fault. This latter situation can be dealt with by including the appropriate wording in the written agreement between the contractor and the client.

A warped model can be prevented by specifying adequate model control such as three horizontal control points per model and at least five vertical control points, one in each corner and one in the middle.

Lens distortion should have only a slight effect on the accuracy of a map if a modern "distortion-free" camera lens is used for obtaining the photography. And a plotting instrument should always be kept in reasonably good calibration as a matter of prudence.

Ground cover can be handled either by expensive supplementary field completion, or else by allowing for this troublesome source of error by loosening up on the standards of accuracy in these areas. There are occasions when the area covered by vegetation *must* be mapped to the same degree of

* Presented at the Annual Meeting of the Legislative Council for Photogrammetry, Teton Village, Wyoming, 8-11 July 1979.

accuracy as the rest of the map, as in the use of the map for determining pay quantities. This must be understood, then, by the client in order to justify a higher price tag on the mapping.

Of the four error sources cited above, the contractor can protect himself in three instances by properly written specifications. Instrument-lens distortion errors, of course, are fully the responsibility of the mapmaker.

It would be ideal if the contractor could charge enough for a map to allow him to make a complete check on the accuracy of the map before delivery in order to give him the opportunity to evaluate his system and correct the deficiencies. This, however, is just not feasible in the majority of mapping projects. I would like to quote a letter which I received from a member of a private mapping firm regarding this point.

"The government agencies often do a lot of field checking, I'm told, that could provide feedback on the quality of work they perform. However, it may not be entirely valid to apply the results of such checks to private industry in that government agencies are not under the same pressure to provide quality services and still show a profit. I don't doubt the dedication of many government employees, but I don't think that most of them are under the same pressure to perform as we are. Field checks are seldom performed by private mapping firms due to the expense. In my own experience with a number of private firms, I have seldom seen a map bounce as a result of checking on the part of a client. This may speak well of the expertise of the firms with which I have been associated, but it may also indicate that our clients have had such faith in our abilities that they didn't feel the need to do much checking. If the latter case is true, someday somebody is going to be put out of business by a lawsuit that could have been avoided."

Well, I don't have to tell you that this can happen. Clients can be very changeable in their attitude toward the quality of your work. All it takes is an error in one small corner of one lone model resulting in costing the client some money, and the worm will turn.

I had occasion to make field tests of a very large mapping project outside of the United States done by a foreign private mapping firm. I found the maps which contained 5-metre contours to be entirely inadequate for their intended use, with vertical errors of as much as 40 metres over large areas. We are talking about 130 ft errors. In a discussion

with a private photogrammetrist regarding this project, I was told that, probably because of the remoteness of the area, the contractor did not expect the work to be checked anywhere except in those areas that were reasonably accessible and, incidentally, where the control was available. I was told further that this attitude is fairly common. Now, a job of this size could in truth put someone out of business with a lawsuit.

Having discussed some points regarding this business of map accuracy, I would like to set forth some reasons why I feel a need for up-to-date standards for photogrammetric mapping, particularly in the private sector as represented by members of the Council.

(1) You deal with a wide variety of clients with different backgrounds. Many of these clients are managers and planners whose technical background in mapping is very limited if it exists at all. These clients depend entirely on your advice and expertise. As a professional, you are bound to operate against a set of standards for the protection of your client (and, not incidentally, for your own protection). Probably most of your clients do have some sort of a technical background which makes your job of communication somewhat easier. They are more likely to hold you to a set of standards on which you have mutually agreed. Then we have the civil engineer client who is supposed to know what a map is, what is involved in its production, and what map accuracy means to his operation. He will surely hold you to map standards.

In the litigation described by Gene Laferty in the *Photogrammetric Coyote* (Vol. 1, No. 4) and in the responding article by Vern Cartwright (Vol. 2, No. 1), the engineering firm ran into trouble on earthwork which was based on a map which in no way was prepared for the development of grading plans. At the trial, the jury was convinced that there was no reason to assume that the civil engineers should know anything about the accuracy of a map because that was the expertise of the photogrammetrist. So, even in dealing with civil engineers, trouble can develop.

(2) The development and universal application of a set of mapping standards for the profession will lend more credence to a map, and will give a quasi-legal standing to the standards. I am convinced that in the litigation cited above, if such a set of standards had been in existence, the photogrammetrist would have had a better chance to successfully defend himself. We live in an era of consumer activism. Litigation is much more

prevalent than it was when the National Map Accuracy Standards were first published. These standards are the most widely used throughout the profession at present. But other conflicting standards exist for individual agencies which can be used in court to confuse a jury.

(3) Photogrammetry can offer a wide variety of products in addition to the standard topographic map. These include digital and graphical profiles, digital and graphical cross-sections, digital and graphical flood plain limits, orthophotos and mosaics with or without superimposed contours, and digital terrain models. Very few standards exist for these products, and yet the private photogrammetrist is heavily engaged in the development of these varied products.

(4) We are all coming to depend more and more on the establishment of model control by analytical and semi-analytical methods, simply as a matter of economics. The Standards Committee of the Digital Processing and Photogrammetric Surveys Division of the American Society of Photogrammetry is at present developing standards for establishing geodetic control by analytic aerotriangulation methods. These standards will serve the industry when you are engaged in establishing, by photogrammetric measurements, the positions and elevations of subdivision monuments, in performing cadastral-type surveys, or in establishing control for construction surveys.

(5) Universally adopted standards will raise the professional level of the entire photogrammetric community in public and the private sector.

Recognizing that 36 percent of the members of the American Society of Photogrammetry are drawn from the members of the private sector, I've appointed a Task Committee on Photogrammetric Standards to develop standards for the private photogrammetrists as well as for government agencies. The committee consists of the following:

Chairmen:

- Dr. Dean C. Merchant, The Ohio State University (Educator)
- Mr. Morris M. Thompson, Formerly USGS (Federal Government)
- Mr. L. R. Evans, Madison, Wisc. (Private Practice)
- Mr. Richard G. Crouse, your President
- Mr. Elmer M. Clark, Englewood, Colo. (Private Practice)
- Mr. Alex R. Hoffman, Oakland, Calif. (Private Practice)
- Mr. Robert F. McGivern, Rochester, N.Y. (Private Practice)
- Mr. Donald Reid, Anaheim, Calif. (Private Practice)
- Mr. Francis Moffitt, Berkeley, Calif. (Educator)

Dr. Merchant has had a considerable amount of experience with studying mapping standards through his work with the American Society of Civil Engineers. Morris Thompson, the only other non-private photogrammetrist besides myself, is well-known to you all. He is Mr. Standards of the USGS. We are fortunate to have him serve on this committee.

The tentative procedure outline which we have developed is as follows:

- I. Develop standards for conventional line maps produced by photogrammetric methods.
 - A. Develop and define map classifications.
 1. For each intended map use, specify:
 - a. Appropriate ranges of scale and contour interval
 - b. Content
 - Reference system, planimetric data, hypsographic data, names and labels, marginal data, symbolization, colors, legibility, esthetic factors.
 - c. Horizontal accuracy
 - d. Vertical accuracy
 - B. Develop inspection, testing, and checking procedures for each class of map.
 1. Specify testing organization, instruments, and/or operations for checking and testing
 - a. Horizontal accuracy
 - b. Vertical accuracy
 - c. Content: appearance, completeness, and correctness
 2. Specify procedures and a time limit for rectifying discrepancies and errors.
 3. Specify a time frame for accepting or rejecting a map.
 - C. Develop schedule of materials to be delivered.
 1. Aerial photographs and photoindexes
 2. Ground control

3. Manuscript map
 4. Reproductions
- II. Develop standards for photomaps
- A. Uncontrolled mosaics
 - B. Controlled mosaics
 - C. Orthophotographic maps, orthophotomosaics, orthophotoquads, orthophotomaps.
(For A, B, and C, develop classifications, checking procedures, and schedule of materials, following the outline for I, as appropriate.)
- III. Develop standards for aerial photography.
(Adapt existing standards.)

Since the goals of both ASP and LCP are pretty much the same in the matter of Standards, I would like to see a cooperative effort develop between the two organizations. I

would at this time like to pledge our cooperation with the Council.

Thank you for the opportunity to discuss this with you.

REFERENCE LIBRARY TO BE ESTABLISHED AT ISPLS HEADQUARTERS

The board of directors of ISPLS considered the possibility of establishing a reference library of surveying books and manuals at state headquarters office and voted to appropriate \$1000 for its establishment. A book selection committee, composed essentially of the publications committee, has been appointed by the President. The committee is composed of Ken Curtis, Dan Pusey, Gary Kent, and John McEntyre. A list of newly donated and purchased books will be published periodically as well as guidelines for the use of the library, when they are eventually developed.

Anyone wishing to donate surveying books or manuals (new or used) to ISPLS for this reference library are encouraged to do so. Eventually it would be nice to have a full set of ACSM publications available in the library. Excess books of the same title may be further donated to appropriate college libraries. A display of books may eventually become a part of an exhibit at the annual state convention. Suggestions are being solicited by the committee.

K. S. Curtis, Chairman

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A NOTE OF THANKS TO ISPLS

September 16, 1979

Gentlemen:

Upon opening my fee statement from Purdue for the Fall 1979 Semester, I find my fees paid in full. I am reminded of the generous gift of \$1000 in scholarship money awarded to me by I.S.P.L.S. I would like to take this opportunity to say thank you very much indeed for the scholarship.

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PHOTOGRAMMETRIC ENGINEERING and REMOTE SENSING

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COVER PHOTO — This is the centennial year of the U.S. Geological Survey. Since 1879 the USGS has served federal, state, and local governments, and the public, by collecting, analyzing, and publishing detailed information about the nation's energy, land, and water resources. Photos on the cover show scenes relating to USGS activities under a wide variety of conditions. The photos were furnished by the U.S. Geological Survey.

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DISCUSSION

Proc. Paper 14937

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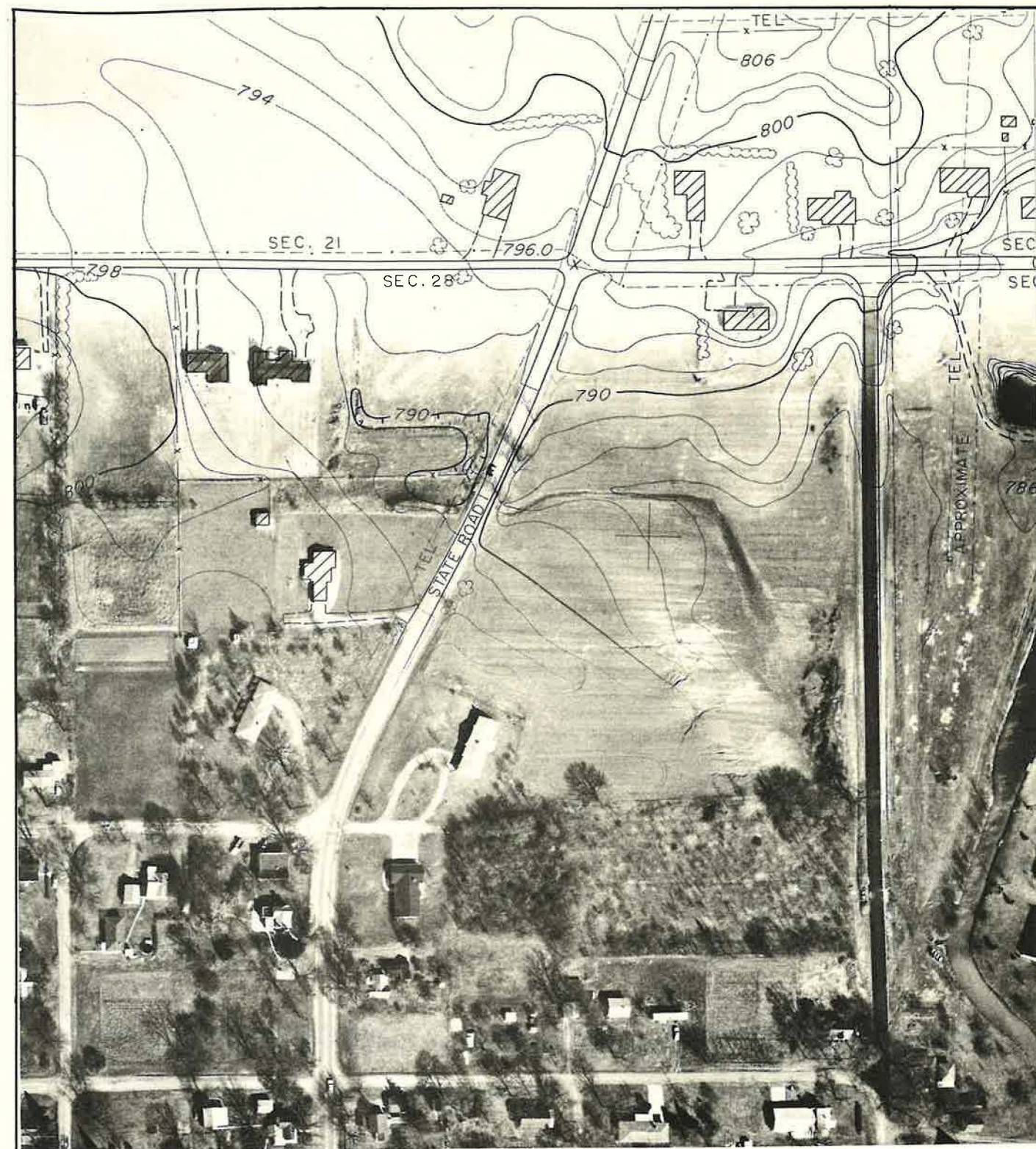
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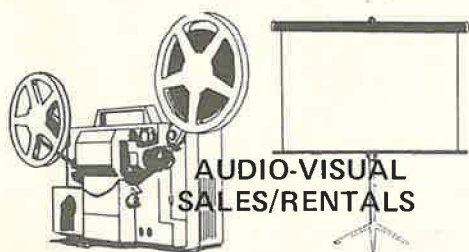
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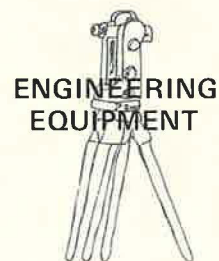
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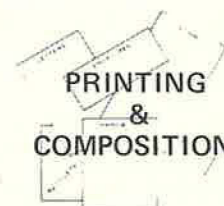
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