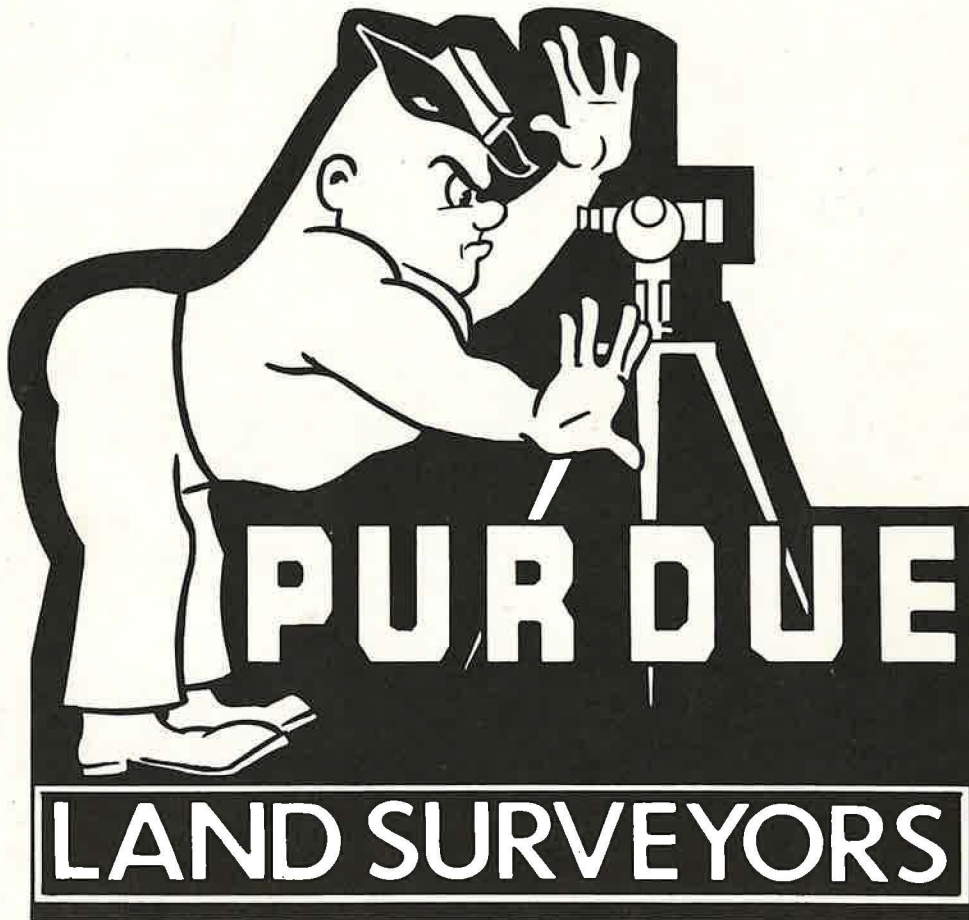


# SURVEYOR

# HOOSIER

**Indiana Society of Professional  
Land Surveyors, Inc.**

**SPECIAL EDUCATION ISSUE**



**VOLUME 4  
NUMBER 3  
SUMMER 1977**



• EDUCATION ISSUE • REPORT ON PURDUE'S LAND  
SURVEYING PROGRAM AFTER SIX YEARS • PURDUE  
STUDENT CHAPTER REPORT • NEW REGISTRANTS • NEW  
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## HOOSIER SURVEYOR

VOLUME 4, NO. 3, SUMMER 1977

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**COVER:** The cover picture depicts the latest artist's conception of the familiar Purdue University symbol, Boilermaker Pete, as a land surveyor. This issue of the HOOSIER SURVEYOR contains a report to the profession of Purdue's land surveying program after six years. The artist is Keith Butz.

### 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

The HOOSIER SURVEYOR is reproduced by the Printing Department of Marbaugh Engineering Supply Co., Inc., Indianapolis, Indiana.

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Kenneth S. Curtis  
Editor



# THE PRESIDENT'S PAGE

## PRESIDENT'S MESSAGE

By John Schneider

I am sure most ISPLS members received a flier about the Land Surveyor's Seminar held in Indianapolis August 19th - 21st. The ISPLS Board was contacted by Mr. F. S. Madson II of Florida in hope that we would indorse this Seminar. It was decided however, to decline since the Board had no first hand knowledge of the value of the program. Since the Seminar, I have been contacted by Lee Jarvis of our Society who was in attendance, and informed of the many merits of the seminar. Apparently Mr. Madson is an extremely accomplished instructor who utilizes class participation rather than lecturing to deliver his message. Lee reports that he totally enjoyed the three days and Mr. Madson's techniques; however, he was completely exhausted each evening. He summarized with "those in attendance would agree, that this Seminar was probably one of the finest and most imformative ever presented". I for one, now regret not finding the time to attend.

This issue of the HOOSIER SURVEYOR is almost entirely devoted to education and, in particular, a report on Purdue's land surveying program after six years of existence. The members of our Society have followed this development very closely and, indeed, several have played a vital role in its beginnings. Even though I am personally a graduate of the University of Notre Dame, my hat is off to Purdue University and its faculty for making a success of this new approach to educating future land surveyors and the leadership it has provided to surveying education in the United States.



John Schneider  
President



## DATES TO REMEMBER

Sunday, October 9, 1977	Picnic at Initial Point Memorial Park, South of Paoli, Orange County
October 18-21, 1977	Fall Convention of American Congress on Surveying and Mapping, Little Rock, Arkansas
February 16-18, 1978	Tri-State Land Surveyors' Convention, Drawbridge Motor Inn, Ft. Mitchell, Kentucky
February 27 - March 3, 1978	Annual Convention of American Congress on Surveying and Mapping, Washington, D.C.

## TRI-STATE IN '78



TRI-STATE LAND SURVEYORS' CONVENTION  
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## I.S.P.L.S. - SUMMER TRAVELING WORKSHOP - 1977

A series of one-day workshops were conducted in four cities (Merrillville, Fort Wayne, Indianapolis, and Scottsburg) around the state of Indiana in July 1977. The subject this summer was "The Land Surveyor and The Soils". The Society is indebted to the Soil Conservation Service and to Purdue University for providing the instructors. A new format utilizing afternoon-evening sessions from 2:00 to 8:30 p.m. was used. A total of eighty registrants attended the workshops. Roger Woodfill, ISPLS president-elect, and his wife, traveled with the entourage around Indiana and managed the registration desk. Attendance record was as follows: Merrillville - 28; Fort Wayne - 12; Indianapolis - 20; and Scottsburg - 20.



Instructors included, left to right, Joe Yahner, Gary Steinhardt, Rolland Wheaton, of Purdue University Extension Service, and Ray Sinclair and Frank Sanders, of Soil Conservation Service in Indianapolis.



ISPLS President-Elect Roger Woodfill of Lawrenceburg organized the workshop and manned the registration desk.



Twenty-eight of the eighty participants attended the workshop at Merrillville site and most of them "passed" the practical exercise at the evening session.



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**NEW FILM AVAILABLE FROM SOCIETY**

A new 25-minute, 16mm, 1976, color film has been purchased and is available on loan from the Indiana Society of Professional Land Surveyors at State Headquarters for showing to local lay groups, county and city officials, attorneys, realtors, abstractors, technical groups, service clubs, high schools, etc. The film entitled "The Land Surveyor and You" was made by the Wisconsin Society of Land Surveyors and therefore has a "Wisconsin flavor", but is very appropriate for Indiana showings. Reservations should be made well in advance of planned meetings due to numerous expected commitments. It was shown at the Annual Convention in Indianapolis last January.

"The Land Surveyor and You" has become a highly sought means of informing the layman of the history and background of land surveying. It tells about the ancient Egyptian "rope-stretchers", Colonial surveyors and the many early surveyors who were responsible for the layout of the rectangular system. It shows the surveyor's compass and chain of the early 1800's as well as the transit, tape, theodolite and EDM equipment of today."

"The film depicts the surveyor as a "digger" for evidence, both on the job site and in the records. It tells how aerial photography complements the work of the land surveyor. In sum, the film informs the public of something it has known very little about. . .the profession of land surveying."

Members of ISPLS may schedule the film without charge. Non-members will be charged \$25 per reservation.

**FILM STRIP OR SLIDE SET ALSO AVAILABLE FROM SOCIETY**

A film strip entitled "Time For A Man" was prepared by the Virginia Association of Surveyors in 1970. The primary purpose of the 12 minute filmstrip is to attract young people into the surveying profession. The presentation is aimed toward high school students and should be previewed before using. The program is available from the ISPLS state society headquarters in two forms:

1. Film strip and a 33 1/3 RPM record with audio beeps.
2. Set of 2 x 2 slides in Carosel and a cassette narration with audio beeps

When this program is reserved, be sure to state which form is desired.

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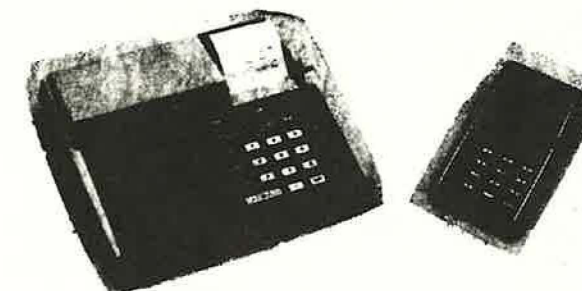
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# REPORT ON PURDUE'S LAND SURVEYING PROGRAM AFTER SIX YEARS

by

Kenneth S. Curtis<sup>1</sup> and John G. McEntyre<sup>2</sup>  
Purdue University

## POSITION

What will the land surveying profession be like in the future? Say in another ten or twenty years or by the year 2000? Will it be a truly professional activity or will it be subordinated to that of a highly-specialized technical activity? It is said that you have to earn the right to be considered by your peers as a professional! Are we attempting to do this? Are we really organized in our societies to promote professionalism in all that we do? This has to be an individual matter for each of us-yet collectively we can do certain things that will promote and help each of us to seek true professionalism.

How can we have a true profession without a formalized course of instruction and educational opportunity for the future generation of professionals who want to practice land surveying?

We know that many of us have reached professional land surveyor status, as represented by Land Surveyor registration, by apprenticeships and/or self-study programs and many by studying engineering, forestry, or more science but particularly through collegiate courses in civil engineering. We say that the future holds that these avenues will become less frequently used in the years ahead. There is just too much to learn if we expect to be adequately prepared for future assignments!

Have you taken a good look at the current civil engineering curricula in our universities? The emphasis on surveying has almost reached the stage of annihilation. We're not debating the pros and cons-we're simply stating facts. The civil engineering profession is a very broad one-transportation, structures, environmental, materials, hydraulic-water resources, etc. Purdue's civil engineering curriculum is now down to a 2 credit-hour appreciation-level course in surveying. We must not depend on civil engineering programs for our future professional land surveyors and we don't wish to belittle those of us "who came up from the ranks", so to speak, through apprenticing and self-study to reach our present status. But is this the solution for the future?

It is our conviction and that of most progressive present-day practitioners that a four-year professional university program is the absolute minimum for future professional practice. The Purdue program is, after six years, "alive and healthy"! This article serves as a progress report to the profession.

## HISTORICAL DEVELOPMENT

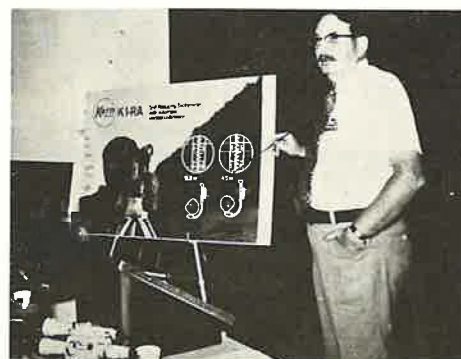
Surveying has, for many years, been a necessary tool and an integral part of the civil engineering profession. Civil engineering curricula before 1960 reflected this relationship by invariably including several courses in surveying. With the explosion of scientific developments and knowledge within the broad discipline called civil engineering and the seeming desire to keep the curriculum to four-years, surveying courses, in spite of great advancements in this field as well, were one of the first subjects to have their time reduced in the civil engineering curriculum. As a result civil engineers who, in the past, were probably adequately prepared in surveying, are no longer properly prepared for present-day surveying practice unless the student elects to take additional courses in this speciality, if in fact they are available.

In 1959 an ASCE Committee recommended that the four major areas of surveying and mapping - land surveying, engineering surveying, geodetic surveying, and cartographic surveying - be acknowledged as engineering. It was hoped that engineering schools would make an effort to teach this body of knowledge and that surveying would be firmly established as a profession. Many difficulties were experienced. There is a difference between the formal education needed for land surveying as compared to that needed for civil engineering. The needs are different, although they are rather closely interrelated. ASCE's model law which in turn differs some from that contained in the individual state's registration acts. This gray area of overlap or interface with civil engineering involves the designing of roads, streets, and sewer extensions in land subdivisions.

After a thorough Manpower Study and several years of discussion, thought, and effort, a new four-year professional curriculum in land surveying was inaugurated at Purdue University in 1971 under the administration of the School of Civil Engineering. It leads to the degree Bachelor of Science in Land Surveying and currently has 85 students enrolled in the program. Other schools and the land surveying profession across the country are anxiously awaiting to see if this is the answer to the land surveyors educational and professional dilemma.

<sup>1</sup> Professor of Surveying and Mapping, School of Civil Engineering, Purdue University, West Lafayette, Indiana, 47907.

<sup>2</sup> Professor of Land Surveying, School of Civil Engineering, Purdue University, West Lafayette, Indiana, 47907.





The first ad hoc committee appointed within Purdue University to study the educational needs for the land surveying profession consisted of nine members, six from the educational field, two from private practice and one from a governmental agency. This group held two joint meetings with the Indiana State Board of Registration for Professional Engineers and Land Surveyors to receive guidance in their deliberations. Their final report included recommendations as to registration of land surveyors, feasibility of a four-year program in land surveying, desired objectives of a four-year program in land surveying, and a curriculum for a four-year program in land surveying.

During this period of time, Professor Curtis spent a six-month's sabbatical leave traveling 12,000 miles visiting governmental surveying and mapping agencies, industrial concerns, private practitioners, and nine different state land surveyor conferences. He returned, convinced that a separate educational program was the only salvation for the land surveying profession.

OBJECTIVES

After the Faculty of the School of Civil Engineering of Purdue University decided to propose a program leading to a Bachelor of Science in Land Surveying, a Committee was appointed to draft the proposal. The objectives of the four-year program as recommended by this committee and eventually adopted by Purdue University are (it should be noted that objectives were formulated precisely by each committee before a detailed curriculum was designed);

- I. With regard to the student, the objectives of the land surveying curriculum are to provide the graduate with a university education to the bachelor of science level and:
  - A. General - To develop a graduate who is:
    - 1. Aware of the requirements for and is motivated to attain professional status;
    - 2. Capable of meeting the requirements for registration as a professional land surveyor after appropriate experience;
    - 3. Capable of productive effort for his employer shortly after graduation;
    - 4. Motivated and competent for continued education in the changing technology of land surveying.
  - B. Technical Competence - To prepare a person knowledgeable concerning:
    - 1. Mathematical and physical sciences related to surveying;
    - 2. Legal aspects of land surveying;
    - 3. Pertinent surveying subject areas;
    - 4. Field procedures, office practices, and computational methods used in land surveying;
    - 5. Engineering fundamentals related to land surveying;
    - 6. Subdivision design, including roads, storm drainage, and sanitary sewer extensions.
  - C. General Education - To expand the competence of the individual in:
    - 1. Humanities and social science;
    - 2. Oral and written communication;
    - 3. Further individual development.
- II. With regard to the program, the objectives are to provide a land surveying curriculum which is:
  - A. Acceptable for accreditation by appropriate agencies;
  - B. Viable and responsive to the changing technology of land surveying;
  - C. Adequate preparation for further education at the graduate level in land surveying;
  - D. Practically available to students from upper one-third of their high school classes, from Freshman Engineering, and from Engineering Technology and other colleges and universities after completion of one or two years in a related program;
  - E. Economical to initiate and administer within the Schools of Engineering and the School of Civil Engineering at Purdue University.
  - F. Acceptable to the faculty of the Schools of Engineering and the School of Civil Engineering as a non-engineering degree program within the School of Civil Engineering at Purdue University.

CURRICULUM

The general requirements for the Bachelor of Science Degree in Land Surveying are as follows:

REQUIRED PROGRAM

(Total Credits - 126 Semester Hours)

Subject Area	Level Attained	Credits
Communications (English composition and Speech)	Ability to communicate correctly (written and oral)	5
Mathematics	Differential and integral calculus (start with analytical geometry)	10
Physics	Mechanics, sound	4
Basic Science	Sequence in geology, descriptive astronomy, biology, chemistry, etc.	6
Freshman Lectures	Orientation in engineering and land surveying areas	1
Computer Science	Ability to program on a basic system	2
Engineering Graphics	Ability to communicate neatly graphically	5
Electricity	Basic electricity, electronics and instrumentation	6
Mechanics	Proficiency in applied statics and strength of materials	6
Geology	Preferable engineering geology	3
General Education Electives	Broadening of student's education to enable him to lead fuller life	15
Basic Surveying	Proficiency in surveying fundamentals	5
Statistics and Probability	Understanding of elementary probability and errors in measurements	3
Legal Aspects	Understanding of professional registration. Relationship of law and court decisions to surveying problems	6
Civil Engineering Subjects	Basic engineering principles required for subdivision design	12
Surveying Subjects	Proficiency in surveying required in land surveying practice	28
Free Electives	Strengthening of area, option to student	9

The program includes a four-week, foursemester credit summer project in the summer following the sixth semester. This project has the objective of integrating the coursework taken through the first six semesters into an actual problem. The usual program, semester by semester, will be found in the appendix.



In order to provide the student with additional surveying electives and to encourage more in-depth study of some subject areas, mini-courses of one-credit each will be (or have been) offered from time to time. Some of these are (a) dendrology for surveyors, (b) right-of-way acquisition, (c) land parcel identifiers, (d) unwritten rights, (e) hydrographic surveying, (f) coastal boundary mapping, and (g) history of surveying and/or cartography.

To be practical such a program should be planned so as to have a full section for each course. Purdue University planned and budgeted the program for one section of each course consisting of an enrollment of twenty-five students per class. Now, after six years, enrollments have reached 30 to 35 in some classes and we are concerned about class sizes. The recent decision to limit future engineering enrollment may contain the answer to this problem. Otherwise some other approach must be taken.

The curriculum now in effect, although carefully studied and deemed an optimum one at its initiation, should never be considered a static one. Already we have submitted proposals for some necessary changes. It is difficult to satisfy all the ideas concerning the subjects which should be covered in a land surveying curriculum. There is a difference in the profession as practiced by a predominantly rural practitioner with strong emphasis on retracements and by a predominantly urban practitioner involved with considerable subdivision land development. Laws regulating the practice of land surveying vary somewhat in different states. In Indiana, land surveyors are involved in some engineering design work related to subdivisions and therefore courses in engineering materials, hydraulics-hydrology-drainage, roads-streets, and urban planning lead to the final course in subdivision planning and design.

#### GRADUATES AND SALARIES

Since the initiation of the four-year professional degree program in Land Surveying, Purdue University has graduated seventy-four students with a Bachelor of Science in Land Surveying (These graduates and their home towns are listed elsewhere in this issue). Eighteen of these graduates have received a dual degree, sixteen with a dual degree in Civil Engineering, one in Construction Technology and one in Agricultural Engineering. A fifth year is needed for a dual degree. The first degree was awarded in May, 1973; it was the only Land Surveying degree granted in May, 1973. Seventeen degrees in Land Surveying were awarded in May, 1977. Others finish their requirements in August or December.

The graduates have been successful in obtaining positions after graduation. A partial list of employers includes Amax Coal Company, Amoco Production Company, Michael Baker Associates, private practitioners, county and city government, state agencies, and federal agencies (U.S. Forest Service, U.S. Corps of Engineers). Four of the graduates entered graduate school and one entered law school. Sixty-three percent of the graduates accepted positions with private surveying and/or engineering firms. Fifty-one percent were employed within the State of Indiana. In the period since May 1973 starting salaries have ranged from \$700 per month (\$8400 annually) to \$1720 per month (\$20640). It is difficult to determine an average salary for graduates from the land surveying program since there are many ramifications to the positions which they accept. Profit sharing arrangements and overtime provisions make an average of fixed salaries somewhat meaningless.

Land surveying graduates who accept a position with a larger corporation or firm receive a salary in the range of \$1000 - 1150 monthly (\$12000 - 13800 annually). Graduates who accept a position with a smaller organization in a typical Indiana community receive a salary from \$850 - 950 per month (\$10,200 - 11,400 annually). Furthermore, one or two students per year accept a federal civil service position. Civil service positions offer a very low starting salary for surveyors (a situation which should be corrected); for a conscientious professional surveyor, civil service salaries rise rapidly in the first two years.

An important factor should be realized, however. It is logical that a young man who is interested in surveying will be interested in civil engineering. The starting salary for graduates of a four-year surveying program should compare favorably with the salary for graduates from a Civil Engineering program. To attract our share of good students this must be true. This comparison was adequate in 1975; it is somewhat unfavorable at the present time. The average salary of a graduate of the Civil Engineering program at Purdue in the academic year 1976-77 was \$1191 per month (\$14292 annually). This is almost \$200 (20%) more than the average salary of a graduate of the four-year land surveying program. This is too large a discrepancy. Positions with adequate compensation must continue to be available to insure the continued advancement of the surveying profession and the attraction of good students to the program.

#### ACCREDITATION

Shortly after the new curriculum began in 1971, the Indiana State Board of Registration for Professional Engineers and Land Surveyors examined the curriculum and declared the Purdue degree as "an approved land surveying curriculum". It was anticipated that some time in the future some national accrediting agency would have to assume the task of accrediting four-year surveying programs. Several two-year surveying technology programs have been accredited by the Engineering Technology Committee of the Engineer's Council for Professional Development (ECPD). Another arm of ECPD, the Engineering Education and Accreditation Committee (EE & AC) has

been investigating and accrediting four-year professional engineering programs for some time.

The American Congress on Surveying and Mapping has recently applied for, and become, a member of ECPD and will become the voice of the surveying profession within that Council. Although ACSM is currently working toward the development of criteria for evaluating general surveying programs, in the meantime, they have joined with ASCE and NCEE to develop a guide for surveying visitors who visit schools which have bachelor-level surveying programs which are highly engineering oriented. Some programs which do not have as much basic science, mathematics, and engineering science are awaiting the anticipated development of another similar set of criteria by a yet-to-be-approved new ECPD Committee on "related programs".

It is anticipated that Purdue University will soon seek accreditation through one of these criteria.

#### SUPPORT BY THE PROFESSIONAL LAND SURVEYOR

Since the beginning, the professional land surveyors of Indiana, both individually and collectively through the state society, have supported the program at Purdue. The program would not be a reality today had it not been for the unselfish expenditure of time and effort by several interested surveyors. Most of the support was of an intangible nature through written and vocal support, although there has been some tangible evidence such as the gifts of money for printing programs for annual dinner by LS alumni Sam Wolf, walkie-talkies by Schneider Engineering Co., and the AGA model 4D geodimeter by George Trabits and Warrick County. The Indiana Society of Professional Land Surveyors currently budgets \$500 a year for a scholarship to an outstanding junior in the program. Other evidence of support through summer jobs has been most welcome.

Now, however, after six years and with the program operating at its full capacity with twenty-five graduates per year, it is time to contemplate what the professional land surveyor in Indiana could be doing to support the program. The original University budget to purchase equipment and hire necessary supporting staff has not kept pace with increasing numbers of students, obsolescence of equipment, purchase of new equipment, etc. therefore surveyors are reminded to remember the land surveying program at Purdue in the preparation of their wills, their taxdeductible gifts of money or instruments, their funding of named scholarships, their hiring of undergraduate students during summer months, and their employing them upon graduation.

Purdue University, as a state school, is really tax-assisted, not tax-supported. About 36 percent of the University's total budget of over \$162 million comes from tax monies. The rest comes from student fees, return on investments, charges for public services, research grants, and private gifts. With public funds providing a decreasing proportion of the total, the need for gifts has never been greater. The increased costs necessary to maintain Purdue's quality must be met in part by private support. We are convinced that the future welfare of the land surveying program depends on the level of its private support. Remember that most gifts of money and/or instruments are tax-deductible. Continued & increased support by the practicing professional land surveyor is needed!

#### PROGRAMS IN OTHER STATES

The Purdue program is the only known one which is administered under Civil Engineering and actually offering the degree, Bachelor of Science in Land Surveying. It is, of course, designed to match the requirements for practicing land surveying and becoming registered in Indiana. Different states, understandably, differ somewhat in their definition of land surveying and in future educational requirements for registration. Michigan requires that after 1976 applicants for registration shall have a baccalaureate degree. To this end Ferris State College at Big Rapids, with State approval, initiated in September 1972 an extension of their two-year Surveying and Highway Technology programs and now offer a Bachelor of Science in Surveying. California State University at Fresno initiated a surveying program several years ago and currently has students enrolled in a curriculum leading to a degree Bachelor of Science in Surveying and Photogrammetry. The program is strongly supported by the California Land Surveyors Association. Erindale College, a new college of the University of Toronto, working closely with the Association of Ontario Land Surveyors has initiated a four-year program leading to a Bachelor of Science in Survey Science. Ontario had long been under the apprenticeship method for entry into the profession. The University of New Brunswick offers the Bachelor of Science in Surveying Engineering by a Department of Surveying Engineering. A four-year surveying and mapping program available at Iowa State University is administratively under the Department of Industrial Engineering and leads to a Bachelor of Science with a major in Engineering Operations. The University of Florida, working closely with the Florida Society of Professional Land Surveyors, has announced the availability of a four-year program in land surveying patterned after Purdue's program administered under the Department of Technology, and the degree offered is a Bachelor of Engineering Technology. A new four-year program in surveying has been initiated at Ohio State University and is offered cooperatively by the Department of Civil Engineering and Department of Geodetic Science and leads to the degree Bachelor of Science in Surveying. The University of Maine at Orono has



apparently been chosen as the location for a new degree program for the New England states. This cooperative regional venture, to be housed initially in the department of civil engineering, will offer a degree Bachelor of Science in Survey Engineering. Some other schools such as Clarkson College of Technology and Virginia Polytechnic Institute, have a rather freely-structured civil engineering curriculum where a considerable number of surveying courses can be elected, but the degree is still a Bachelor of Science in Civil Engineering. Several schools offer two-year technician programs, but these are not aimed to produce professional land surveyors.

We have had many inquiries from other states concerning Purdue's program, its contents, and its successes. Strong interest in such programs in Land Surveying has been evident in New York, Mississippi, Alabama, Pennsylvania, Kentucky, Illinois and others. A word of caution appears appropriate at this point. Such a program should not be initiated unless appropriate staff and finances are made available by the university! Purdue was fortunate to have had underway a successful graduate program in surveying, mapping, geodesy, and photogrammetry and basic staff and equipment were already available.

CONCLUSION

All of the ingredients are available to us to develop this activity, that we know as land surveying, into a recognized and honored profession. The continued and expanded support of the practicing land surveyor toward a quality educational base is needed now more than ever before. Will the practitioner assume the responsibility of providing employers or clients with competent technical services, of conducting his business affairs fairly and ethically, of upgrading himself personally, and of striving to take the professional responsibilities discussed in the classroom and meetings into the real world? The land surveyor is being scrutinized by the public continuously. The basic foundation of a true profession-a four-year professional university program - is now a reality! Can we not base our future maturity on this benchmark? The opportunity is ours!

APPENDIX A

Typical Program  
126 Credit Hours

A typical program for a Bachelor of Science in Land Surveying is as follows: (Numbers in parenthesis represent semester hours credit for course.)

First Semester	Second Semester
(5) Plane Analytical Geometry & Calculus I	(5) Plane Analytical Geometry & Calculus II
(3-4) Science Elective	(3-4) Science Elective
(2) English Composition	(4) Physics, Mechanics & Sound
(3) Fundamentals of Speech	(2) Graphics I
(2) Computer Programming	(1) Freshman Lectures
(0) Freshman Lectures	
15-16	15-16
Third Semester	Fourth Semester
(3) Descriptive Geometry	(3) Statistics
(3) Statics	(3) Strength of Materials
(2) Electricity Fundamentals	(3) Electronics Fundamentals
(2) Fundamentals of Surveying	(3) Photogrammetry & Photointerpretation
(2) Geology or Math-Science Elective	(2) Math-Science Elective
(3) General Education Elective	(3) General Education Elective
15	17
Fifth Semester	Sixth Semester
(3) Land Survey Systems	(3) Property Surveys & Descriptions
(3) Route & Construction Surveying	(3) Surveying Computations
(3) Engineering Materials	(3) Hydraulics, Hydrology & Drainage
(3) Surveying Instrumentation and Astronomy	(3) Topographic and Cartographic Surveying
(3) General Education Elective	(3) General Education Elective
15	15

(4) Summer Surveying Field Project

Seventh Semester	Eighth Semester
(3) Legal Aspects of Surveying	(3) Legal Aspects of Engineering Practice
(3) Geodetic Control Surveying	(3) Subdivision Planning & Design
(3) Roads and Streets	(3) General Education Elective
(3) Urban Planning	(6) Elective
(3) Elective	
15	15

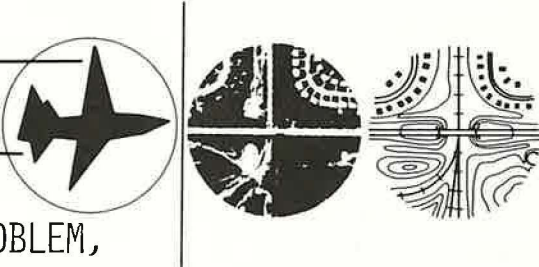
ACSM STUDENT CHAPTERS

The American Congress on Surveying and Mapping has approved and chartered thirteen student chapters of the parent organization. They are:

- California State University - Fresno
- Purdue University
- University of Florida
- Iowa State University
- Ferris State College
- University of Akron
- Clarkson College
- Virginia Polytechnic Institute and State University
- State University of New York, Alfred - SUNY
- Vermont Technical College
- Gateway Technical Institute
- Hennepin Technical Center
- Brinker School of Surveying and Mapping, Inc.

This list would appear to indicate where there is substantial interest in either 2-year or 4-year educational programs in surveying.

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LIST OF PURDUE GRADUATES IN LAND SURVEYING

Those who have received their Bachelor of Science in Land Surveying degree from Purdue University since the inception of the program in 1971 are:

(Qualified as of May 1973)	
Dale V. Weaver	Greenwood
(Qualified as of August 1973)	
Dennis Lowell Grumpp	Greenfield
Lowell Dean Hamilton, Jr.	Indianapolis
(Qualified as of December 1973)	
Daniel John Conklin	Osceola, Arkansas
(Qualified as of May 1974)	
Eric Steven Cenovich	Merriam, Kansas
John Michael Gaydos	Highland
Kurtis Lyman Maynard	Clayton
John King Schlegelmilch	Monticello
Brent Loren Smith	Cambridge City
Mark Steven Todd	Altura, Minnesota
Michael Irving Troup	Plymouth
Ronald Alan Weis	West Bend, Wisconsin
Samuel Eugene Wolfe	LaPorte
Steven Arthur Wood	Zionsville
(Qualified as of December 1974)	
Alan Paul Kramer	West Point
Larry Eugene Manship	Anderson
Delmar Claude Maudlin, Jr.	Indianapolis
Patrick William Naville	New Albany
George Anthony Venditti, Jr.	Syracuse, New York
(Qualified as of May 1975)	
Gregory Win Asher	Attica
William David Barker	Pittsburgh, Pennsylvania
Paul Lee Bender, Jr.	Bluffton
John Richard Heis	Cambridge City
Richard Fred Lewis	Lucerne
Robert William Marks II	Frankfort
Lawrence Eugene Morris	Walkerton
Eugene Paul Olinger	Ferdinand
Thomas Pastore	Rockville
David Herbert Riley	Newark, Ohio
(Qualified as of August 1975)	
Stephen Edward Colchin	Decatur
Douglas Owen Dowling	St. James, New York
(Qualified as of December 1975)	
Wesley George Crawford	Bedford, Pennsylvania
Douglas Kent Lechner	Acton
Nicholas Angelo Piccini	Archbold, Pennsylvania
Ray William Scott	Crawfordsville

(Qualified as of May 1976)	
Phillip Louis Burress	Scottsburg
Bruce Allen Copp	Woodruff, Wisconsin
James Jerman Cramer	Nashville
Patrick Neal Cunningham	Crawfordsville
Jeffrey Todd Jones	Connersville
Gary Robert Kent	Indianapolis
Kevin Burton Potter	Ridgeville
Neil Alan Rissman	DeKalb, Illinois
Vernon Arthur Shaklin	Vincennes
Gary Roderick Smith	Avalon, New Jersey
Timothy Ray Warner	Indianapolis
Ronald Eugene Wharry	Frankfort
(Qualified as August 1976)	
Jerry Phillip Brothers	Mishawaka
Roland Shelton Corning II	Cincinnati, Ohio
Timothy Joseph Jennings	Indianapolis
David Wonn	Greensburg
(Qualified as December 1976)	
Eugene Charles Dorn	Sterling, New York
James Eugene Kovas	New Carlisle
William Louis Watson	Mount Morris, Illinois
(Qualified as May 1977)	
David Armstrong Bortner	Lineboro, Maryland
Mike Thomas Buti	Point Arena, California
Paul William Clark, Jr.	Sciota, Pennsylvania
Robert Eugene Dillon, Jr.	Brownsburg
Rodger Winston Durham	Greensboro, North Carolina
Roger Allen Fine	Crawfordsville
Jeffrey Kip Inman	West Lafayette
Dallas Earl Montgomery	Scottsburg
David Wallace Moore	Monticello
Willard Richard Notestine	Ann Arbor, Michigan
Daniel Irvin Pusey	Logansport
Julian Sidney Rouch	Plymouth
Dennis Keith Singer	Salem
Thomas Sharrock Speight, Jr.	Winsor, North Carolina
Charles Michael Storey	Hammond
Jeffrey Arthur Tuttle	Scottsburg
Steven Robert Wiehe	Fort Wayne
(Qualified as of August 1977)	
John Wesley Bauer	Williamsville, New York
Larry Alan Fisher	Crawfordsville
Dale Lawson Grimes	Romney

1977 PURDUE SUMMER SURVEYING FIELD PROJECT  
IN PERRY COUNTY, INDIANA



Twenty-five senior land surveying students attended the course this summer. No attempt is made to identify each student but they are, in alphabetical order: Kelly Anspach, Bluffton; John Bauer, Williamsville, NY; Joseph Bishop, Auburn; Ben Bledose, Loogootee; Michael Buettmer, Lima, OH; Marian Clark, Indianapolis; Greg Eveslage, New Salisbury; Ken Frolicher, Cincinnati, OH; Wesley Garris, Otwell; Dale Grimes, Romney; Fred Groth, Winchester; Phillip Hoene, Seymour; Jacob Klara, Woonsocket, RI; Gerald McEntyre, West Lafayette; Randy Mull, Spencerville; James North, West Lafayette; David Penturf, Greencastle; Matt Pietryka, Randolph, VT; Mark Quandee, Itasca, IL; Dan Rice, Monticello, IL; Stephen Schultz, Michigan City; Michael Sexton, Ottawa, IL; James Tolbert, Indianapolis; Roger Walton, Loogootee; and Tim Winings, Brazil. Most of these students will graduate in May 1978.

WARRICK COUNTY DONATES GEODIMETER  
TO PURDUE UNIVERSITY

Through the efforts of George A. Trabits, Warrick County Surveyor, Boonville, Indiana, the Warrick County Commissioners have donated an AGA Model 4B geodimeter to the School of Civil Engineering at Purdue University for use in their surveying program. Although this model geodimeter, based on light waves, has been superceded by newer models, it will serve to inform students and to permit the operation of instruments which have contributed so much to the recent revolution in electronic distance measurement. It will be used in teaching surveying to land surveying and civil engineering students. Don Beaman of the Evansville Blue Print Company donated the shipping cost from Boonville, Indiana, to Wayne, Michigan, where it was repaired and shipped to Purdue University.



HIGHLIGHTS OF 5TH ANNUAL RECOGNITION DINNER  
OF  
PURDUE STUDENT CHAPTER A.C.S.M. - I.S.P.L.S., APRIL 1977



Eighty-six student land surveyors, faculty, wives or girl friends, and invited guests attended dinner held at The Trails, near Battle Ground, Indiana.



Other outstanding seniors receiving ACSM membership awards were not photographed at the dinner. They were, left to right, Robert Dillon, Brownsburg; David Penturf, Greencastle; and David Bortner, Lineboro, Maryland.



May 1977 graduates attending dinner included, seated, left to right, Dennis Singer, Willard Notestine, Roger Fine, Mike Buti, Paul Clark; standing, Jeffrey Inman, Robert Dillon, Dallas Montgomery, Steven Wiehe, and Julian Rouch.



Guest speaker Gerald V. Larsen, Chief Cadastral Engineer, U.S. Forest Service, Dept. of Agriculture, Washington, D.C.



More May 1977 graduates attending dinner included, seated, left to right, David Bortner, Roger Walton (December), Charles Storey; standing, Daniel Pusey, Rodger Durham, and David Moore. Several other current year graduates were unable to attend.



Greg Eveslage, right, of New Salisbury receiving the ISPLS \$500 Scholarship (for Junior students) from John Fisher, chairman of the ISPLS Scholarship Committee.



Roger Fine, right, of Crawfordsville, receiving the faculty Award from Prof. Curtis as the Outstanding 1977 Graduating Senior Award.

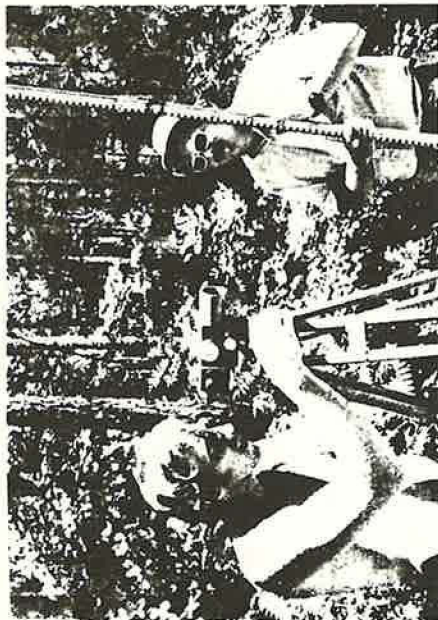


Several past graduates of Purdue's land surveying program attended the dinner: left to right, Dennis Grumpp (LS73), Greenfield; Greg Asher (LS75), Bedford; Lowell Hamilton (LS73), Indianapolis; James Kovas (LS76), Crawfordsville.



1977-78 school year officers of Purdue Student Chapter, ACSM-ISPLS, are, seated left to right, Charles Forbush, vice-president; Brenda Schlosser, director; Jim Tolbert, treasurer; standing, Jerry McEntyre, director; Randy Sexton, director; Randy Mull, president, and Mark Quadee, secretary.





LEVELING FOR bench mark elevations are Purdue land surveying students Date Grimmer (left) of Ramsey in Tippecanoe County and Randy Mull, formerly of Spencerville in DeKalb County.



MEASURING ANGLES on a traverse are Purdue land surveying students David Penhurf (left) of Greencastle in Putnam County and Tim Winings of Brazil in Clay County.



CHECKING A field notebook are Purdue land surveying students Wesley Garris (left) of Otwell in Dubois County and Greg Eveslage of New Salisbury in Harrison County.

## Land surveying students hone skills on tract near Branchville

(Editor's Note: The following article was specially prepared for The News by Prof. Kenneth Curtis of Purdue University's School of Civil Engineering.)

**BRANCHVILLE**—Twenty-five senior Purdue University land surveying students are enrolled in a four-week summer field project course that involves the surveying of a 36-acre tract leased to Purdue University in northern Perry County.

The tract is a part of the now-defunct government Job Corps Center which was located on U.S. Forest Service property near Branchville on State Highway 37. The tract was purchased by the Purdue University Forestry Center and 105 senior forestry students are also currently in residence for six weeks taking a different required field course. The land surveying students and the forestry students are sharing the same facilities.

The four-credit course is required of all students enrolled in the relatively new four-year professional land surveying curriculum and comes at the end of the

junior year and after six to eight on-campus surveying and mapping courses. The purpose is to provide students with practical experience in the field.

The other is in subdivision planning and design. Five years ago, when the course was inaugurated, the students surveyed a Boy Scout wilderness area in Warren County. The next two summers they surveyed the YMCA camp and the Tecumseh in Carroll County and Camp Tecumseh in Tippecanoe County. The past two years the students surveyed the 36-acre tract at Branchville.

This year's project in northern Perry County is the first time the course has been moved away from the environs of Purdue's main campus at West Lafayette.

The tract leased to Purdue University is not a square or rectangle but instead is defined by about 30 courses (bearings and distances) protracted on a map of Forest Service land at the Branchville site.

Several types of surveys make up the project. One is a boundary survey which will establish the lease lines on the ground. None of the boundary is currently marked on the ground except that portion along the right-of-way line of highway 37. Another abutting lease holder is the headquarters of the Branchville sub-district of the Indiana State Highway Commission. Since all of the tract is on government property, no private land owners are involved, as with other surveys. However, in order to properly locate the leased land to the public land survey system of townships, sections, and fractions thereof, it is necessary to locate the section corners and quarter corners of Section 23, a one-mile "square".

With the help of local residents, adjoining land owners, Forest Service technicians, and much study, these corner stones are being located and perpetuated for future lies. Residents have been very cooperative. In no area, where the course has been taught before, has there been such an elaborate system of found corners, including the sixteenth

corners which were not set in the original surveys in 1806. The Perry County Surveyor in 1874 carried out an apparently successful program of replacing the original wooden posts with sandstone monuments properly marked and identified. Several corners were previously found and perpetuated by Forest Service personnel. Bearing trees or witness trees are important keys. One tool used by the land surveyors has been the inspection of both current and earlier aerial photography of the Section. The earliest aerial photography of Perry County was in 1940. Subsequent photography in 1953, 1958, 1967 and 1974 is available from the Agricultural Stabilization and Conservation Service or the Forest Service.

In northern Indiana, many of the corners are buried under the roads because of the adopted road patterns. Not so, however, in the rolling topography of Perry County where roads rarely follow section lines. Thus, a higher percentage of searched corners are being found undisturbed.

After a visit with the "fictitious client", the U.S. Forest Service, at their headquarters in Bedford, the students visited the Perry County Courthouse in Camletton in order to check on all possible data that might help them, including adjoiners' descriptions. Offices with a helpful assist from Hubert Voges, the county surveyor. Additional valuable data were obtained from Lester Perison and the Tell City Ranger's Office.

In order to complete the problem, a tie to the Indiana State Plane Coordinate System was desirable. This was accomplished by a three-mile traverse line between two horizontal control stations, one about a mile north of Perry Central High School and the other about five miles north of Bandon, both near Highway 37. These triangulation stations were originally set in 1946 by the

U.S. Coast and Geodetic Survey as a part of a nationwide network. (Older residents of the county may remember when the work was completed because the government survey parties built and used steel towers 77 to 116 feet high for observing angles between stations.)

All modern equipment, such as electronic distance measuring (EDM) equipment, optical-reading theodolites, walkie-talkies, electronic calculators, rota-beam lasers, etc. are used by each student. The students, working in five-man parties, also have an opportunity to use the conventional tape and transit. The staff consists of Profs. Kenneth Curtis and John McEntyre of Purdue University, assisted by Darrell Dean, a professor from Glendale State College in West Virginia, two graduate students, Roger Durham and Peter Messier, and Bob Parks, an equipment technician. All are from the Purdue School of Civil Engineering, except Dean.

Bench marks for vertical control were available in the area as the result of extensive leveling accomplished by the U.S. Geological Survey in 1955 as the elevation control for the state-wide topographic mapping program. At least three such bench marks were available within a mile. Also several bench marks set by the state highway department along the proposed new alignment of Hwy. 37 were available.

Another concurrent project is the preparation of a topographic contour map of the leased tract. This is being accomplished by checker-board grid mapping and transit-stadia mapping using auto-reduction tachometers and plane tables.

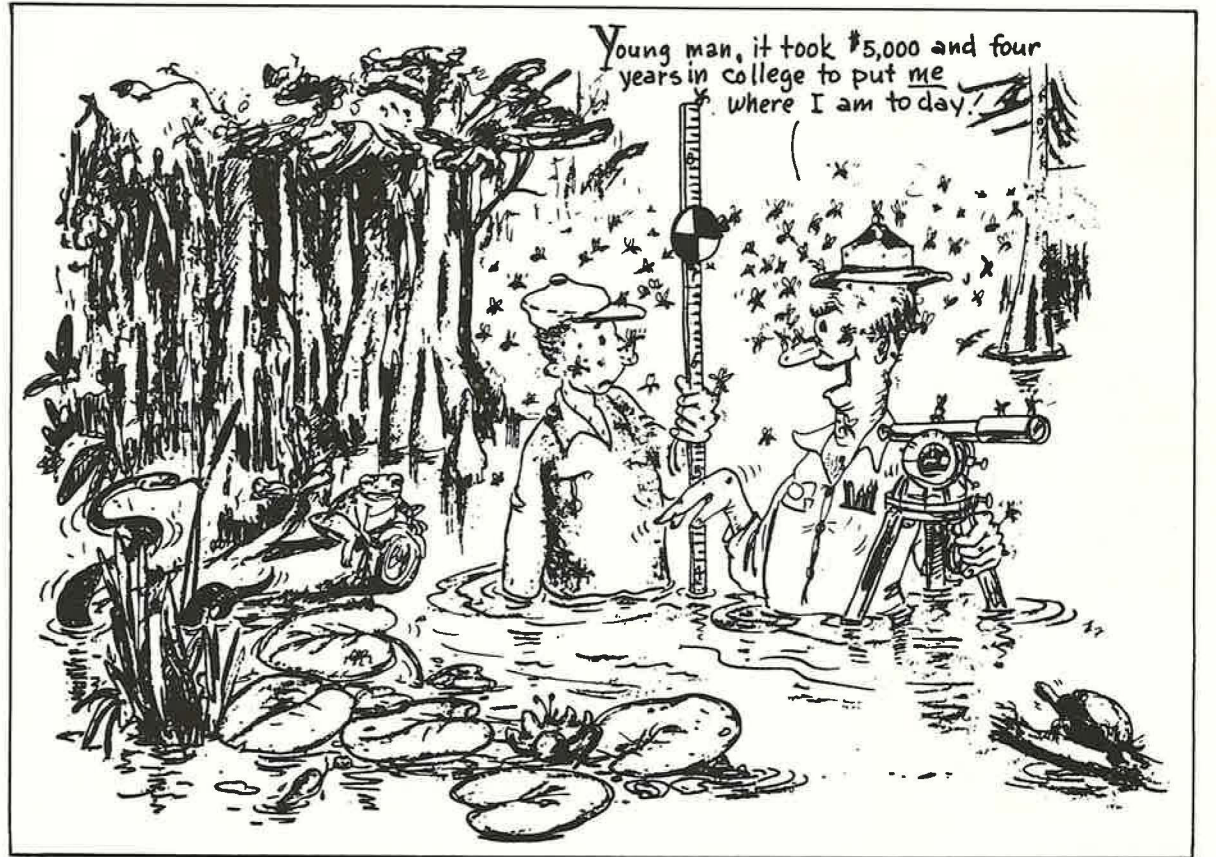
As time is available several construction sites will be visited in order to discuss control survey layout requirements and methods with job superintendents. Usually some kind of route survey is projected in the area covered by the topographic map. This summer this may be accomplished by

helping the Forest Service stake their proposed new access road to Tipton Lake. This survey includes laying out horizontal curves, taking cross-sections, setting slope stakes, etc.

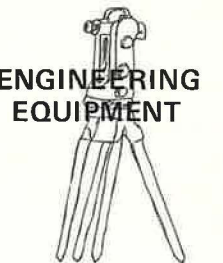
During the last week a special report meeting will be held with several representatives of the Forest Service where the project activities will be reviewed and accomplishments discussed.

Purdue's professional land surveying curriculum is now six years old and is administered under the School of Civil Engineering. It is the first program in the United States offering a B.S. in Land Surveying and leads directly toward registration as a professional land surveyor.

Surveying instruction has almost been eliminated from the curriculum in civil engineering, necessitating the creation of a separate program. So far, almost 70 students have received a bachelor of science in land surveying from Purdue.



from The Texas Surveyor, July/August 1976

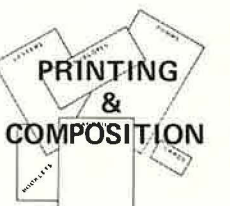
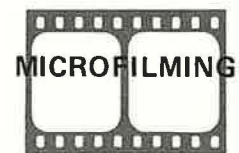
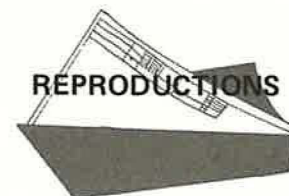
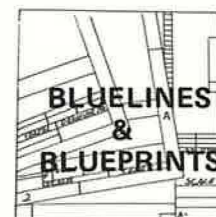


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## SURVEYING TEACHERS LOOK TO THE FUTURE

The Eighth National Surveying Teachers Conference held at Mont Alto, Pennsylvania, in 1974, after some papers and several panel discussions, adopted a set of recommendations that indicates the progressive attitudes of surveying teachers.

1. It is recommended that the minimum education level of the registered land surveyor be equivalent to a four-year college degree in surveying.
2. It is recommended that an accreditation policy or guidelines for surveying programs be developed as an aid to surveying teachers in planning and evaluation of programs.
3. It is recommended that the integrated regional approach to the establishment of professional and technical programs in surveying, such as that of the Federation of New England Surveyors' Associations, be studied carefully, and used where appropriate as a model for similar efforts in other parts of the nation.
4. It is recommended further that a transmittal letter be sent immediately by the 1974 Conference Chairman to the Federation of New England Surveyors' Associations, containing the following endorsement:  
The participants of the 8th National Surveying Teachers Conference endorse and support the regional approach and methods of the New England Federation of Surveyors' Association in their effort to establish professional and technical programs in surveying for the six New England States.
5. It is recommended that some form of professional development, such as continuing education, be a requirement for maintaining registration in land surveying.

## A POLICY ON SURVEYING AND MAPPING EDUCATION

(As proposed to the American Congress on Surveying and Mapping by its Education Committee in 1976)

The American Congress on Surveying and Mapping directs the attention of its members to their responsibility in both the education of those people preparing to enter the profession, and the continuing professional development of those presently in the profession.

The acceptance of this responsibility and the special requirements of surveying and mapping practice imposed upon the American Congress on Surveying and Mapping the need to devote a large portion of its energy and resources to surveying and mapping education. In addition, it is incumbent on members of ACSM to participate in both on-campus and off-campus educational activities and to provide substantial support and economic assistance for professional education and training.

The educational process must provide the proper balance of theory and practice. Emphasis should be placed on the comprehension of and adaptation to continuously accelerating changes in science and technology, as well as the economic and political developments in a complex society. Educational programs must be aimed at developing curricula that will qualify neophytes to enter the profession as well as directing them toward involvement in public service.

## GENERAL EDUCATIONAL NEEDS

Recognizing that the avenues of professional engagements for surveyors and cartographers include both the public and private sectors and that these engagements can encompass an extremely broad range of responsibilities including but not limited to planning, resource development, consulting, research, and education; an equally broad range of practice and research oriented educational programs are required to adequately support the profession. Further recognizing that these responsibilities which must be met by the profession, all involve the welfare of the general public, all education programs, whether they be research or practice oriented, must provide a fundamental understanding of the nature of the practice of surveying and its significance to the general public.

As a whole, the leaders of this educational process, the faculty of the teaching institutions, should have a background of successful practice in addition to academic qualifications. They should be able to instill in the students a deep respect for surveying and mapping as a profession, and a willingness to walk the second mile.

Because surveyors and cartographers, working at the professional level, will be in close contact with civil engineers, architects, landscape architects, planners, economists, financiers, sociologists, and lawyers, the student should be coached on interdisciplinary team work. Their education should be broad enough so that they can assume roles of leadership in such teams. The assurance of development of surveyors and cartographers for such leadership is an obligation of the American Congress on Surveying and Mapping.

## DIVERSITY OF EDUCATIONAL PROGRAMS

The complexity of present day projects involving highly sophisticated technology, as they frequently do, requires a high degree of expertise in several related disciplines. Most projects require a team effort using the talents of persons with different levels of proficiency. A professional surveyor or cartographer is in responsible charge of significant phases of work supported by technologists and technicians. For this reason it is the policy of ACSM to support and influence the full range of education and training needed to develop and keep current the knowledge and skills of all members of the surveying and mapping team and to insure that the potential users of the surveying and mapping services and products are informed as to their capabilities and limitations.

The American Congress on Surveying and Mapping approves and encourages diversity and flexibility in college programs. Good educational philosophy discourages over-standardization of curricula, teaching methods, or length of programs at each institution. A diversity of programs can provide the proper choice of needed options and careers only if developed under the guidance of an overall national educational policy.

The ACSM shall assume responsibility for identifying the important elements of such a policy and for assisting universities in determining their special directions to assure that a balanced and complete range of program offerings exist on a national scale. The profession must influence the content of curricula leading to degrees designated as surveying and cartography through its participation in the accreditation activities of the Engineers Council for Professional Development (ECPD). This influence will reflect the needs of practice and will be exerted by Congress representatives on the E.C.P.D. Board of Directors and accreditation committees and by accreditation visitors appointed by ACSM.

Degree programs of concern include those leading to basic and advanced degrees in surveying and cartography, to the four year bachelor of surveying technology degree, and to the surveying technician degree, and to the surveying technician associate degree. The American Congress on Surveying and Mapping encourages study past the level of the basic degree, either in practice-oriented or research-oriented advanced programs, as preparation for the broad scope of activities that may be the opportunity of the professional surveyor or cartographer.

## CONTINUING EDUCATION

Surveyors and cartographers must continue their education throughout their careers in order to ensure that practice is adaptable to current technology and responsive to changing needs. Although continuing education requires a commitment on the part of the individual, the ACSM and employers of surveyors and cartographers must assume responsibility for making the continuing education process effective. The American Congress on Surveying and Mapping holds the view that continuing education needs may be met through either professional development activities or formal educational processes.

## THE GROMATICI ARE COMING! THE GROMATICI ARE COMING!

(The following abstract was the basis of a discussion on surveying education by Prof. Kenneth Curtis at the February 1977 Annual Meeting of the Illinois Registered Land Surveyors Association at Arlington Heights, Illinois)

## ABSTRACT

77AD: "The gromatici (Roman surveyors) came to be known as the members of a recognized profession. The number increased steadily and schools were established for training the members of the profession. As the legal aspects of landownership became more complicated, this phase of the training was recognized in the schools for gromatici in the establishment of a separate course of study for those who wished to specialize in this class of surveys. In the later years of the Roman empire, the members of this profession were in receipt of large salaries and were honored with titles."

1977AD: The land surveyors are becoming known as members of a recognized profession. Well-qualified surveyors are steadily increasing and schools are being established for training members of the profession. As modern land data systems become a necessity for the future, schools have begun to offer separate courses of study for those who wish to specialize in land surveying. In future years the university-trained land surveyor will provide the leadership for the profession. The gromatici are coming! The gromatici are coming!

## PURDUE STUDENT CHAPTER ACTIVITIES

The Purdue Student Chapter of ACSM-ISPLS had a very successful year in 1976-77. The highlights included a record high membership of fifty, several informative chapter meetings, the 5th Annual Student Recognition Dinner,



and the completion of several service projects including the measurement, for Purdue Airport officials, of certain potential ground obstructions.

The principal topics of the chapter meetings were:

1. "Work of the County Surveyor", Robert L. Martin, Tippecanoe County Surveyor.
2. "Roll of Surveying in Archaeological Expeditions", Professor James Bellows, University of Notre Dame.
3. "Summer Work Experience with the U.S. Forest Service", Rodger W. Durham, student in undergraduate land surveying program.
4. "Photogrammetric Operations", Brian Dickerson, Dickerson Aerial Surveys, Lafayette.
5. "Surveying for the Indiana Department of Natural Resources", Robert C. Vollmer, Loogootee.
6. "Sport of Orienteering", William Wildprett, Executive Director, Orienteering Services USA, LaPorte, Indiana.
7. "Land Surveying Practice in New Jersey", Thomas J. Herits, graduate student at Purdue from New Jersey.

The Original News Release - December 1971

### PURDUE UNIVERSITY OFFERS NEW BACHELOR OF SCIENCE DEGREE IN LAND SURVEYING

In October 1971, the Indiana Commission on Higher Education gave the final approval to Purdue University to offer a new four-year curriculum leading to the degree of Bachelor of Science in Land Surveying. It is believed that this is the first such program in the United States devoted entirely to the profession of land surveying, although there are two other new programs now available elsewhere, in related areas of surveying and photogrammetry.

This approval marks the culmination of several years of effort by many devoted land surveyors in Indiana who recognized that the future of the land surveying profession rests heavily on the method of educating future practitioners. A rather thorough Indiana manpower study completed three years ago gave added impetus to the need for such a program. The Indiana Society of Professional Land Surveyors, the State Registration Board, and the Civil Engineering faculty at Purdue University cooperated to develop the curriculum and to seek implementation.

The curriculum will be administered under the School of Civil Engineering with a limited enrollment of 25 per class and graduates will receive a Bachelor of Science in Land Surveying. It is essentially a non-engineering degree program containing adequate contact with several basic civil engineering subjects to allow application to subdivision land development in an urban practice. Through electives, one could specialize in urban practice and/or rural practice (retracement) and also include some small-business management courses. Students may transfer into the program at any level and their previous course work and credits will be carefully evaluated. Transfer students from other colleges, universities, and two-year technical institutes are encouraged to apply.

After taking basic courses in mathematics, physics, science, English, speech, statistics, statics, materials, electricity, electronics, graphics, and descriptive geometry the student proceeds with the following courses:

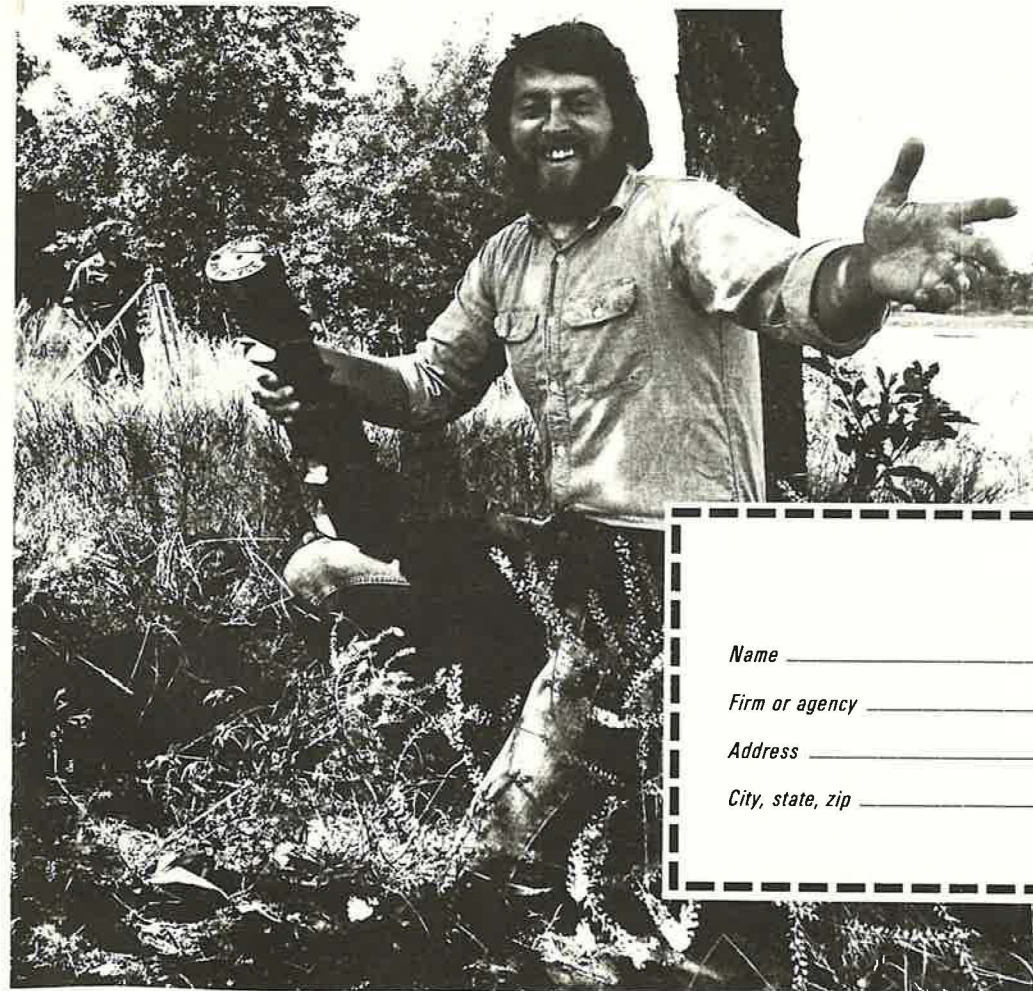
- engineering surveys;
- hydraulics, hydrology, and drainage;
- roads and streets;
- land survey systems;
- property surveys and descriptions;
- geodetic control surveying;
- engineering astronomy;
- cartographic surveying;
- photogrammetry and airphoto interpretation;
- summer surveying field project (4 weeks);
- legal aspects of surveying;
- geometronic data adjustment;
- urban planning;
- legal aspects in engineering practice;
- subdivision planning and design;
- technical electives (9 credit hours);
- general education electives (15 credit hours);

A total of 126 semester hours is required. Obviously, graduates would also be well qualified for positions in the other closely-related areas of surveying and mapping. More details on the land surveying profession, the four-year curriculum, and enrollment procedures can be obtained from either Professor John G. McEntyre or Professor Kenneth S. Curtis, School of Civil Engineering, Purdue University, Lafayette, Indiana 47907.

Advanced graduate study and research in surveying, mapping, geodesy, photogrammetry, and airphoto interpretation have been offered by Purdue University during the last seven years. An average of twenty graduate students each year have been enrolled in programs leading toward the master's or PhD degrees during this period of time. Six full-time faculty members, in the various specialties, comprise the surveying and mapping staff. More detailed information concerning graduate work is available on request.

## NEW LAND SURVEYOR (LS) REGISTRANTS 1977

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## SURVEY ENGINEERING PROGRESS AND FUTURE U.S. LAND USE

By Basil R. Myers,

Dean, College of Engineering and Science  
University of Maine at Orono

The most critical of our natural resources is the very land itself. It harbors most other resources, and is the one we depend on for our livelihood.

There is a need, in light of our dependence for development and maintenance of a modern, multi-purpose national cadastre in the United States. It would be a system of modern maps and data register of the land, its attributes, and the tenure rights associated with it. It would be fashioned a bit after the cadastral systems which European and the Iron Curtain countries have had for centuries, and which now exist in the neighboring countries of Mexico and Canada.

Sophisticated cadastres are also being adopted in many of the so called development nations, such as Honduras, Costa Rica and Ethiopia.

The United States stands alone among the developed nations of the world as having no cadastre. It is a situation which calls for early remedy if policy planning and decision making in resource problem situations is to be at all meaningful and effective.

It is a harsh fact that the U.S. has a longstanding disregard for the land as nothing more than a commodity to be exploited for profit. The attitude recently started to yield to a land ethic, with a move toward the development of a unified land resource and information system in the U.S. by various state and federal agencies and by sectors of the legal, and survey and map professions.

There is a underway the Canada Land Inventory, a comprehensive survey of present land use and its capability for various purposes, including agriculture, forestry, recreation and wildlife. This is a cooperative federal-provincial operation. The vast amount of information obtained will be stored in computer banks to become a working tool in resource planning and in rural development. Maps on land capability have been published and may be purchased from Information Canada.

It has always been the lot of mappers and surveyors to extract, organize and monitor land-related information and resource data. The lack of a traditional cadastre in the U.S., however, is accompanied by a lack of those surveyors who have cadastral expertise. That is, those that are survey engineers.

It is a matter of education. Because there has been no call for them, the U.S., unlike other developed countries, still does not have a survey engineering degree program or department in higher education. It must rely, when it needs it, on expertise imported from abroad.

It is true that at the technician level, there has been an increase in the number of two-year associate degree programs available. More recently, the first four-year

baccalaureate programs in surveying this country were introduced at Ohio State University, Purdue University, Clarkson College of Technology, and Fresno State College.

Valuable as they are in specialized areas of surveying expertise, these programs are not designed to produce fully professional survey engineers with capabilities on cadastral systems. They nevertheless represent a step towards alleviating the stress which the informal or quasi-apprenticeship system has traditionally been under in this country in filling the ranks of registered professional surveyors.

The national deficiency is made manifest in a 1967 report of the American Congress on Surveying and Mapping, which stated that there was an estimated need at that time for 2,750 bachelor's level graduates in surveying, when only 34 were, in fact, available.

The deficiency is being addressed by the College of Engineering and Science of University of Maine with a new and unique New England regional four-year Bachelor of Science degree program in Survey Engineering. It is set for implementation in the 1977 academic year.

The key concept that has been overlooked or neglected in surveying programs is the commonality which spans the many separate, specialized disciplines within the field itself and the intersections with other disciplines (law, economics, information and computer sciences, geology, geodesy, and natural resource management in particular). While it provides a comprehensive education spanning the surveying field (geodesy, photogrammetry, remote sensing, cadastral systems, cartography, urban, hydrographic, mining, engineering and control surveys), the new UMO program also encompasses the legal and social aspects of surveying, thereby precluding the limited specialization of traditional and extant programs.

It was the New England Section of the American Congress on Surveying and Mapping which recently, first brought the educational concern to the College at University of Maine Orono. The College took the initiative to obtain a mandate from the Joint Operations Committee of the Land Grant Universities of New England to plan the new program as a regional one. It will be offered only at UMO among the New England land grant institutions, and that all New England students may enroll at Maine's in-state tuition rates. It will be housed initially in the department of civil engineering (though the degree and course requirements will neither relate to nor depend in any particular way on those for civil degree graduates). Two or three years from now, it is intended that it will be housed in a new and separate department of survey engineering.

There has already been a significant demand from potential students for it - to the extent that a ceiling will have to be placed on the initial enrollment. A four-year steady state enrollment of 150 to 200 is envisaged when the program reaches maturity. Responses to a recent questionnaire on placement indicated that New England surveyors would hire 60 graduates in the next two years from programs of this nature, were they available. Hence, the program should never be in jeopardy so far as enrollment in it and placements of graduates is concerned.

The College has received a wealth of unsolicited endorsements and encouragements, as well as equipment and other promises of support for the program, including an endorsement from the White House, the National Geodetic Survey (NOAA), the United States Geological Survey, and the Defense Mapping Agency. The latter agency has also already supported several costly items of equipment, and its educational equipment loan program, for use in the instructional laboratories.

\* Reprinted from the Massachusetts Surveyor, September 1977.

PURDUE UNIVERSITY SCHOOL OF CIVIL ENGINEERING

September 13, 1977

Dr. Basil R. Myers  
Dean, School of Engineering and Science  
University of Maine  
Orono, Maine

Dear Dean Myers:

I have followed with great interest the development of a program in surveying in the New England States. I have recently read your article "Survey Engineering Progress and Future U.S. Land Use" in *The Massachusetts Surveyor*. I am impressed with your program. I wish you the success in your endeavors. The surveying profession needs leadership from the Universities in the United States to regain its status as a true profession.

One tendency in the articles concerning the program at the University of Maine has bothered me. Surveying education has been neglected in the last 50 years, particularly in the last 25 years. Some schools have recognized the need for a four-year surveying degree program and have initiated such programs. Each of these programs have developed with a slightly different philosophy and a different approach. This is to be expected since these programs were designed independently. In my opinion this is good, for we in the surveying profession probably will eventually discover in these different programs, in general, an ideal program. I doubt that an exact program will be developed for all schools, however. In any event we should share our experiences and develop programs which will advance the surveying profession.

The articles written relative to the Maine program have strongly inferred in their discussion a rank of quality from two year programs, through the programs which have been developed at other schools such as Ohio State, Purdue, and the University of Florida to the program which best serves present needs, namely, the one at the University of Maine. I feel that the programs which have been developed, including the one at the University of Maine,

Civil Engineering Building  
West Lafayette, Indiana 47907

Dr. Basil R. Myers  
September 13, 1977  
Page 2

are excellent programs. They are different in approach. I must state, however, I do not feel that any of them should be classified as the program which best satisfies the needs of the present or as one which overlooks concepts which are necessary in surveying programs.

I suggest that each of us write positively concerning the goals of our programs. I suggest, at present, there is no basis for the comparison of programs. I do not feel that we have advanced far enough to evaluate programs. I suggest that we exchange ideas and experiences.

I further feel that the articles concerning the Maine program are excellent. I have recommended and supported the fact that your letter in *The Massachusetts Surveyor* (September, 1977) to be reprinted in *The Hoosier Surveyor* in Indiana. Your article "Surveying Engineering Progress and Future U.S. Land Use" was an excellent article and I desire that the professional land surveyors in Indiana read it. I do suggest, however, that it would be most appropriate to delete a few sentences in this article so that it reads as a positive article as to the program at the University of Maine. I am enclosing a xerox copy of the recent article and am marking in red the portion which I feel should be deleted and should not be contained in future papers.

I do hope that the content of this letter are taken in the spirit which they are given. Again best wishes for outstanding success in your endeavors in surveying education.

Sincerely yours,

John G. McEntyre, L.S., P.E.  
Professor of Land Surveying

JGM:rc

cc: R.B. Buckner  
D.W. Gibson  
E.F. Kulhan

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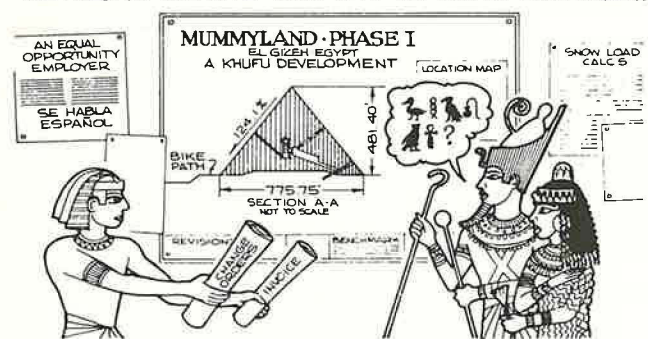


# Backsights on Surveying

## THE "ROPESTRETCHERS" OF ANCIENT EGYPT AND THE GREAT PYRAMID OF KHUFU AT EL GIZEH

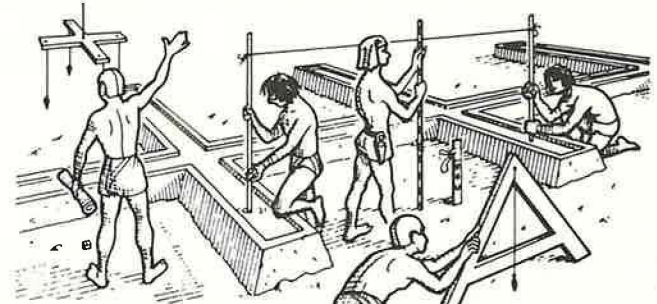
THIS MASSIVE EDIFICE - THE OLDEST AND LARGEST OF THE THREE PYRAMIDS AT EL GIZEH ON THE WEST BANK OF THE RIVER NILE NEAR CAIRO - IS THE LARGEST STONE STRUCTURE ON EARTH. IT WAS BUILT ABOUT 2600 B.C. BY THE SECOND KING OF THE FOURTH DYNASTY, CHEOPS (DBA: KHUFU, PHAROAH OF EGYPT) FOR HIS TOMB. THE PYRAMIDS OF ANCIENT EGYPT, OLDEST AND ONLY EXTANT WONDER OF THE SEVEN WONDERS OF THE ANCIENT WORLD, STAND TODAY AS EVIDENCE OF THE KNOWLEDGE, SKILL AND INGENUITY OF THOSE REMARKABLE SURVEYORS AND ENGINEERS WHO CREATED THEM FORTY-FIVE LONG CENTURIES AGO.

ACCORDING TO THE GREEK HISTORIAN HERODOTUS, THE ROAD FOR THE CONVEYANCE OF BUILDING MATERIALS FROM THE NILE TO THE SITE TOOK TEN YEARS TO CONSTRUCT.



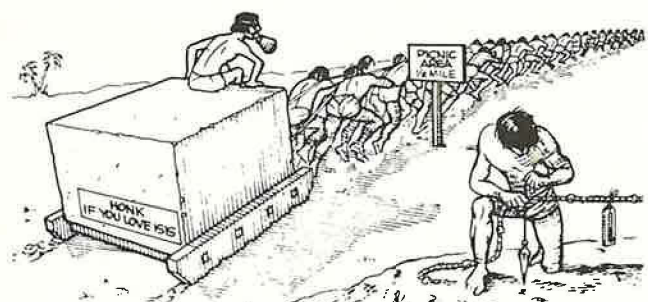
AFTER THE CLIENT, KHUFU, HAD TWICE INCREASED THE SIZE OF THE PROPOSED PYRAMID - AND THE DESIGN OF THE INTERIOR, WITH ITS VANDAL-PROOF CORRIDORS, ITS PASSAGEWAYS, AIRSHAFTS, GRAND GALLERY AND KING'S CHAMBER, HAD BEEN REVISED ACCORDINGLY - THE PLANS WERE APPROVED, THE E.I.S. PREPARED, THE FEES AND DEPOSITS PAID, THE PARCEL MAP RECORDED, THE PERMITS ISSUED, THE FINANCING ARRANGED AND THE CONTRACTS LET, THE CONSTRUCTION ON THE PYRAMID ITSELF BEGAN.

THE 13 ACRE BASE, AN ALMOST PERFECT SQUARE WHOSE SIDES ARE ACCURATELY ORIENTED TO THE CARDINAL POINTS, WAS FORMED OF STEP-LIKE TERRACES HAND-HEWN FROM A ROCKY PLATEAU AND LEVELED SO EXPERTLY BY A SERIES OF WATER TRENCHES THAT THE SOUTHEAST CORNER OF THE PYRAMID STANDS BUT 0.04 FT HIGHER THAN THE NORTHWEST CORNER EVEN AFTER 4½ MILLENNIA.



THE EGYPTIAN SURVEYOR WAS THE ORIGINATOR OF GEOMETRY, THE GRADUATED MEASURING ROPE, THE "A" LEVEL, THE "GROMA" FOR TURNING RIGHT ANGLES, PROCEDURES FOR RESETTING BOUNDARY STONES LOST BY FLOOD AND THE COFFEE BREAK.

THE GREAT PYRAMID WAS BUILT OF SOME 2,300,000 PRECISELY-CUT BLOCKS OF LIMESTONE AND GRANITE WEIGHING AN AVERAGE OF 2½ TONS EACH AND AS MUCH AS 16 TONS WHICH WERE CUT IN DISTANT QUARRIES, HAULED TO THE SITE AND SET INTO PLACE WITHOUT THE USE OF THE WHEEL, TACKLE AND PULLEYS, DRAFT ANIMALS OR EVEN O.S.H.A.



BECAUSE THE SIERRA CLUB, COASTAL COMMISSIONS, ENVIRONMENTAL AND PLANNING AGENCIES, ETC., DID NOT YET EXIST, IT WAS POSSIBLE FOR ONLY ABOUT 4,000 CONSTRUCTION WORKERS AT A TIME TO COMPLETE THE PYRAMID IN BUT TWENTY YEARS.

AFTER THE LAST MASSIVE STONE HAD BEEN SET IN PLACE, MASONS - BEGINNING AT THE APEX OF THE PYRAMID - CUT DOWN THE BLOCKS TO FORM THE SMOOTH SLOPING SIDES, AND IT WAS FINISHED



IN THE CENTURIES FOLLOWING THE COMPLETION OF THE PYRAMIDS, CHINA WAS TO GIVE US THE COMPASS; MESOPOTAMIA, ASTRONOMY AND ALGEBRA; GREECE, TRIGONOMETRY AND GEODESY; ROME, THE PLANE TABLE; ARABIA, THE ASTROLABE; HOLLAND, THE TELESCOPE, AND INDIA, THE INK, BUT IT WAS THOSE "ROPESTRETCHERS", PRACTICING THEIR ART IN THE VALLEY OF THE NILE, WHO GAVE US... SURVEYING.

LAND SURVEYORS-IN-TRAINING (SIT)  
(since previous publication in Summer 1976 issue of the Newsletter)

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S76012 Marks, William Robert, II  
S76013 Smith, Roderick Gary  
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S76015 Copp, Bruce Allen  
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S.I.T. \_\_\_\_\_ ACTIVELY PURSUING REG. (J) \_\_\_\_\_

R.L.S. \_\_\_\_\_ ONLY AFFILIATED WITH PROF. (A) \_\_\_\_\_

R.P.E. \_\_\_\_\_

Member of American Congress on Surveying and Mapping \_\_\_\_\_ Yes \_\_\_\_\_ No

Member of a local chapter of ISPLS Inc. ? \_\_\_\_\_ Yes Which Chapter? \_\_\_\_\_ No

Recommended By: \* \_\_\_\_\_

\*(Must be signed by ISPLS Member)

Board of Directors

Application Approved \_\_\_\_\_



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_____	Manual No. 2 - <u>The Indiana State Plane Coordinate System</u> by Kenneth S. Curtis (June 1974), 196 pages.	\$ 5.25	\$ 7.50
_____	Manual No. 3 - <u>Law and Surveying</u> (including Surveyor's Guide to the use of a Law Library and Indiana Statutes related to Land Surveying), by Darrell R. Dean & John G. McEntyre, (April, 1975), 120 pages.	\$ 5.25	\$ 7.50
_____	Manual No. 4 - <u>Meridian Determination by Solar and Polaris Observation</u> , by Kenneth S. Curtis, (June, 1975), 194 pages.	\$ 5.25	\$ 7.50
_____	Manual No. 5 - <u>Computer Programs (HP-65 Documentation)</u> by Charles C. Campbell (February 1976), 219 pages and contains 50 surveying programs.	\$30.00	\$45.00
_____	Manual No. 6 - <u>Establishment of Boundaries by Unwritten Methods</u> by John G. McEntyre (June 1976), 171 pages.	\$ 5.25	\$ 7.50
_____	Manual No. 7 - <u>Optical Distance Measurement</u> by Kenneth S. Curtis (June 1976), 169 pages.	\$ 5.25	\$ 7.50

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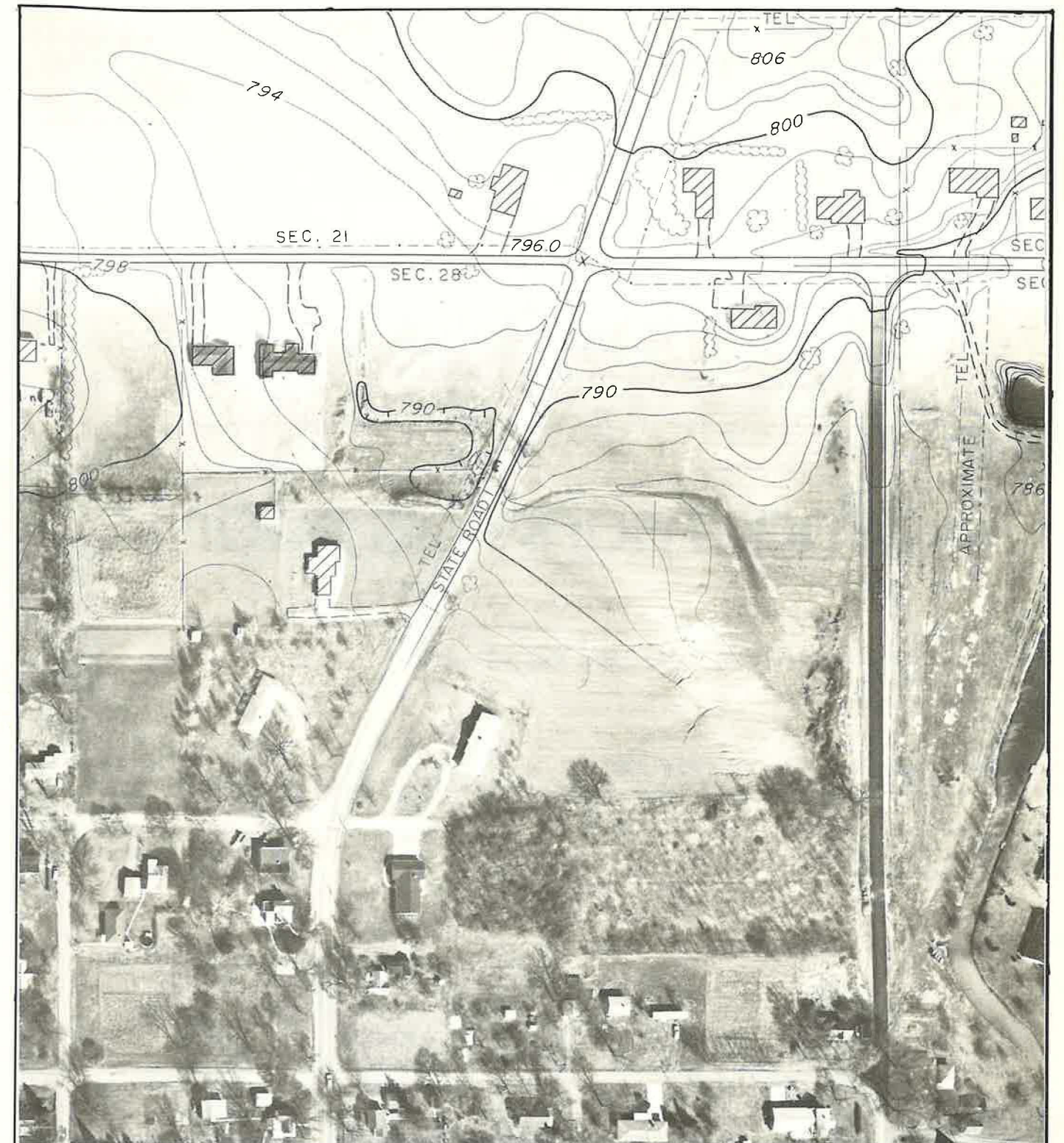
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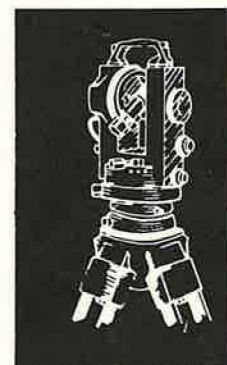
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