

HOOSIER SURVEYOR

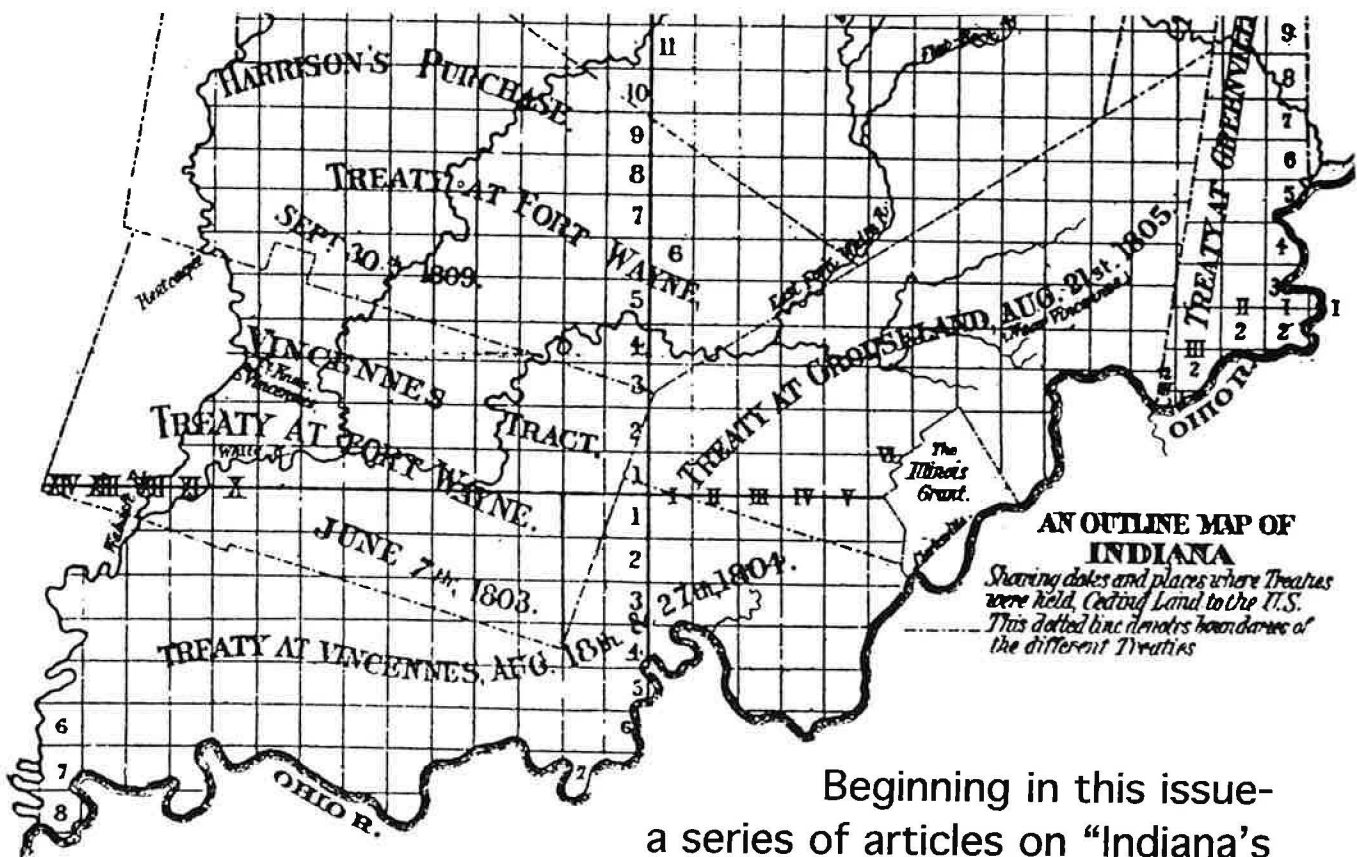


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PROFESSIONAL LAND SURVEYORS, INC.

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WINTER 2003



AFFILIATED WITH THE
AMERICAN CONGRESS ON
SURVEYING & MAPPING



FROM "PUBLIC DOMAIN."

Beginning in this issue—
a series of articles on "Indiana's
Initial Point" by Ken Anderson, PLS

PRESIDENT'S THOUGHTS

by Greg Garrison, PLS, Boggstown, Indiana



As difficult as it is to believe, another convention has come and gone. I would like to thank the Northwest Chapter for all of their hard work. The sessions were excellent. The speakers were well prepared and very informative. The exhibits were also excellent, and appeared to be well received. It takes an incredible amount of work to organize the convention, and I think the Northwest Chapter performed admirably.

I would also like to thank Doug Herendeen for all of his hard work each year in arranging the convention space and coordinating everything with the hotel staff. Every year I am amazed at the apparent ease with which everything occurs. Thanks, Doug!

Dianne and Valerie also put in countless hours preparing hand-out information, collecting the registrations, making sure classes are filled and that the registrants get into their preferred classes, printing certificates, making sure speakers are paid. The list seems endless, and sometimes I think we take them for granted. Thanks, again.

As 2003 unfolds, I would like to encourage each and every member to become active in their local chapter, and if possible, with the state society. ISPLS exists to promote the growth and development of the surveying profession in the State of Indiana. To that end, I encourage any and all members to let us know your ideas or suggestions as to how we can achieve that goal. You can send your suggestions to me through headquarters, or through our web site.

Listed below are the meeting dates for the Board of Directors for 2003.

March 8, April 26, June 14, July 19, August 23, September 20, and November 22.

All meetings will be at 10 o'clock unless further notified. The July meeting will be held at Vincennes University, it will be our annual V.U. Review. All other meetings will be at headquarters.

Please mark your calendars, and plan to attend if you would like, or make sure one of the board members knows of any of your ideas or suggestions before the meetings.

This year's officers are:

President, Greg Garrison; Vice-President, Frank Ballintyn; Secretary, Brad Ott; and Treasurer, Ed Sweetland.

I would like to ask the chapter presidents to send me a list of their meeting dates for 2003, as I would like to attend at least one meeting of each chapter this year.

I am looking forward to a good year. I desire your help and comments. I look forward to hearing from you.

"THE NEW ACSM"

Evolution of an Organization Drafted October 22, 2002

The American Congress on Surveying and Mapping (ACSM) was formed in 1941 to advance the Sciences of Surveying and Mapping in their several branches. Over the years, the organization grew in number and stature. The goal of the advancement of Surveying and Mapping has remained consistent. ACSM members have been leaders in the development of geospatial information and surveying sciences, however over the last fifteen years, the organization has suffered a steady decline in membership. Many programs have been initiated over that period to stem the decline, but the drop in membership continues. Numerous contacts have been made with past and prospective members to gain insight into their lack of interest in membership. Their input has been very consistent. While the majority supports the goals of ACSM, our current organizational structure has left many confused and unwilling to support ACSM.

Current ACSM President Sam Best convened a task force made up of representatives of all current member organizations (MOs) to determine what could be done to turn the decline around. This group, led by Past ACSM President Gary Kent, spent a great deal of time exploring the various options and, after a tremendous amount of evaluation, came to the conclusion that ACSM needs to change. In order to serve the existing and potential membership, the structure of the organization needs to evolve into a true Congress of Surveying and Mapping. It has been termed "The New ACSM". While our goals remain steadfast, the organization is proposed to evolve into a more flexible and responsive entity.

Under the proposal, individual members will belong directly to their respective MOs. These MOs will be totally self-governing, and able to establish and manage their own programs and services for the benefit of their members without oversight by any other board. The New ACSM will not have individual members, but will exist as a Congress of MOs to serve as a forum for common issues, an integration of activities to provide programs of mutual benefit. Under this new direction, the MOs will be in the forefront and ACSM will take on a role as advocate for the MOs to promote their common interest. This new organization is structured to meet the expectations of our current, as well as prospective members, by providing flexibility to the individual MOs for their programs while relying on the Congress to continue to promote activities and positions that cut across the entire Surveying and Mapping community. This new structure enables existing organizations not currently affiliated with ACSM to become part of the Congress for specific and ongoing issues.

This issue requires approval from the current ACSM membership through a written ballot proposal. Further details and discussion can be found on the ACSM website located at www.ACSM.net. **The leadership of all current MOs as well as the ACSM leadership has endorsed this proposal of evolution.** The leaders of ACSM and its MOs have joined together to encourage all ACSM members to review the information developed and join in support of this effort.

ISPLS BOARD OF DIRECTORS MEETING HIGHLIGHTS

by Dianne Bennett, Executive Director

October 26, 2002

The ISPLS Board of Directors held a meeting on Saturday, October 26, 2002 at ISPLS headquarters. President Clark called the meeting to order at 9:33 a.m. The minutes and treasurers reports were reviewed and approved with revisions. Also reviewed was the Capin & Crouse fiscal year financial statement.

Staff Activity Report - a written report was submitted for board review. The report is stated under individual topic listed below.

Adjustment to the Agenda - Purdue Scholarship - Mark Isaacs discussed the status of the John McEntyre scholarship. It was reported that the Financial Aid office at Purdue has held up this year's award due to a lack of financial need. A letter was received from Steve Johnson regarding the McEntyre scholarship asking if financial need was a requirement. Mark replied that to his knowledge financial need was not a requirement, only a factor to be considered. They cite an agreement between ISPLS and PU. Dr. Johnson suggests that ISPLS work with Purdue University's Don Fry to resolve this issue.

Dr. Johnson will draft an addendum to ISPLS/PU agreement to be prepared by Don Fry, which will clarify this issue. A motion was made and passed that the committee work with the university on acceptable wording re: (a) financial need, (b) ISPLS committee members, not mandatory alumni, then e-mail the BOD ASAP in order to award this scholarship immediately.

It was noted that the committee is conducting interviews in November for the next Purdue Scholarship, instead of holding them at headquarters, noting the current situation, they will be held at Purdue this year.

LS/SIT Review - Ed Sweetland presented the licensing exam review committee report. The second LS/SIT review seminar on October 11/12 was held. There were 14 participants on Friday and 21 on Saturday. Plans are to hold the next LS/SIT review at Hammond or Fort Wayne on a campus with no room charge. Plans are to present both spring and fall. A motion was made and passed to have the education committee budget a minimum of \$5000 per year for the LS/SIT exam review.

Convention 2004 - Doug Herendeen is looking for a facility for the 2004 convention. Currently looking at Marriott and Adams Mark. The Adams Mark floor plan was passed around and reviewed. There was concern that the Adams Mark would be too small. A motion was made and passed to have it at the Marriott.

Communication - Membership - The following membership applications were reviewed and approved: Professional Member - Kevin Westerkamp, Paul E. Breeze, Jerry Wiggins; Associate - Luther Cline; Affiliate - Robert Foster; Student - Clayton Baylor, Alexander Fabian, Edward Bukovac, David Barich, Adam Berry, Jennifer Hanigosky, Lee Powers, Travis Gaither, Bryant Hottell, Joseph Crouch, Bradley Eckerle, Patrick Williams, Martin Jones, Gregg Germann, Michelle Baumgartner, Alan Smaka, Amanda Askren, Luke Jahn, Adam Gruelich, James Foster, Clem Kuns; Firm - Projects Plus. Currently 801 total members.

Intersociety Relations - It was noted that these relationships are going to be crucial to government affairs issues.

Foundation - A motion was made and passed to deposit \$6,000 to the Central Indiana Community Foundation immediately.

Publications - Manual 3 Update - Tom Dinwiddie's office will be finishing the corrections/additions this week and will forward a copy to Dennis Grumpp. Plans are to present to the board a draft copy at the board meeting December 7th.

Hoosier Surveyor - Currently working on the fall issue. The next issue will be the education issue featuring schools, Trig Star, etc.

Professional Development - Education - The Indiana Board of Registration approved the convention seminar "A Case Study in Theory of Location & Boundary Resolution with Rule 12" (6M)

It was reported that the convention program for 2003 was in place.

Trig-Star - A check for the Trig Star state license has been sent. We will receive 20 packets. Trig Star is catching on nationwide.

Government Affairs - Legislation - It was noted the upcoming election with uncertainties and potential power shift in the House of Representatives.

Board of Registration - The 2003/2004 efforts to empower the BOR to pursue non-licensed practitioners or firms.

John Schneider retired from the BOR after fourteen years of service. Randy Miller was appointed to the BOR by the Governor.

The certificate presentation will be Friday, November 8, 2002.

The licensing agency has sent out continuing education audit letters. There are about 767 active licenses and 104 names were pulled for audit.

HARN/GIS/ Monumentation - The committee has met twice. The next meeting is November 7 at 3:00 PM at Woolpert. The committee is also working with standards committee for datum adjustment on horizontal control standards.

County Surveyors - The County Surveyors Association had prepared a report in 2000, which addresses the initial \$500 portion of Randy Miller's grant application request. Bill Clark noted a model in Missouri with a state office-clearing house for section corners.

NSPS Governor/Great Lakes Council - A meeting was held last week. Richard Ward, Brad Rayl, and Dan Pusey were in attendance related to setting stone #75 on Mason-Dixon line ceremony.

ACSM has a new membership structure.

Standards - The committee is considering an addition to Rule 12 to require land surveyors to file section corner ties with the County Surveyor when corners are recovered or re-established and no record ties exist. The committee also met and discussed BOR draft legislation to pursue non-licensed surveyors, firms, corner perpetuation documentation, legal definition for "Theory of Location". The ISPLS BOD reviewed the draft revisions for DNR's "Indiana Forest Classification Act". A motion was made and passed to approve this draft. The BOD was informed of a new DNR rule regarding construction within 100 feet of cemeteries. This administrative rule will have an affect on land development and land surveyors need to be made aware of it. The committee will prepare an article for a future issue of the Hoosier Surveyor. Their next meeting is Dec. 5 at ISPLS headquarters.

Internal Affairs - Bylaws - The committee has held a couple

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MINUTES

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of meetings. Don Bengel passed out an article regarding proposed ISPLS by-laws changes regarding local chapters. Much discussion followed. A motion was made and passed to strike the proposed ARTICLE 1, Section 3, Item 9. Also striking last sentence of last paragraph. Effective July 1, 2003.

Don passed out another proposal regarding Section 5, Expulsion. Much discussion followed. It was suggested that we review this for a future meeting.

Budget & Finance - The Wallington quarterly report was presented and reviewed.

Nominations - The 2003 President-elect results. A motion was made and passed to accept the election results. John Stephens was winner for President-Elect.

Chapters - Northwest - A civil war reenactor was present at their last meeting. The next meeting is second Thursday in November.

Northeast - Their next meeting is first week in December.

Central - The annual golf outing had 28 foursomes, profit of \$1,400 to scholarships. The next meeting is Monday, November 11. CIC donated \$1,000 towards the Michigan Museum of Surveying compass.

Initial Point - They are asking for help to pay the picnic mailings. Frank Ballintyn indicated that this will be his last year to organize the picnic. The chapter donated \$1,000 towards the compass.

Southwest - The chapter will meet second Tuesday of November. Donated \$500 towards the compass.

Purdue Student Chapter - The next meeting is Halloween. Old Business

We need to write a check to Illinois for the statue to support our pledge this year.

Nominations for BOD are due November 20.

New Business

Bill Clark noted that in his President's Thoughts he asked for feedback and got only two phone calls. They were regarding monumenting lots in new subdivisions.

December 12, 2002

The ISPLS Board of Directors held a meeting on Saturday, December 12, 2002 at ISPLS headquarters. President Clark called the meeting to order at 9:59 a.m. The minutes and treasurer's report were reviewed and approved with corrections.

Staff Activity Report - A written report was submitted for board review. The report is stated under individual topics listed below.

Officers' Activity Reports - Rick Miller attended a legislative luncheon with Indiana Chamber of Commerce with Dan Woo and was able to have conversation with legislators.

Communication - Membership - The following applications were reviewed and approved. Professional Member - Daniel DeRolf, Martin Vondra; Associate - Anthony Toscani, Darin Dant, Shane Haller, Todd Freund, Gordon Perry, Brady Kuhn, John Major; Firm - Congdon Engineering Associates, Inc. Currently 836 members.

Foundation - Check for CICF written.

Publications - Dennis Grumpp reported on Manual #3. It will be 2-sided plastic binding. A single sided copy was presented for BOD review. The goal is to have it available for sale at 2003 convention. It is 99% updated on the law portion. Added some

section of Indiana Boundary history, and Tiffins's Instruction. It was proposed that we offer for \$75 hard copy form and CD for \$40, with some sort of copywrite protection to protect the time and money spent so far and for the future as well. The committee will present a maintenance plan for future updates. A motion was made and passed to charge \$75 for paper manual, \$40 for CD, and reduced fee of \$100 for both together, for all registered attendees at the convention.

Hoosier Surveyor - The fall issue should be in the mail Monday.

Professional Development

Education - The income/expense report was submitted for the October 11, October 25, and November 8-9, 2002 seminars.

A motion was made and passed to approve the following seminars:

- R/W Engineering (3E)
- Soils & Septics Systems, Part 1 (2 E)
- Soils & Septics Systems, Part 2 (2 E)
- Roadway Safety for Surveyors (2 E)
- Woods, Field and Water Safety (2 E)
- Safety Program & Risk Management (2 E)

Scholarship - A revised draft PU endowment agreement was presented. A motion was made and passed to include striking "It is the desire and intent of ISPLS that members of the Scholarship Committee be Purdue University alumni, when possible" from page two paragraph three, and other changes recommended by several members of the board. The application should state "can this application be used for other scholarship applications?" and noted that all future interviews will be held at ISPLS headquarters.

Honors & Awards - Plans are to have a 40-year lapel pin.

Technicians - Al McConahay has put together a program for the technicians at the convention.

Trig - Star - The test is ready.

Government Affairs

Board of Registration - Their next meeting will be December 13, 2002. We plan to continue to address the question of carry over of continuing education hours.

HARN/GIS/Monumentation - Their next meeting is December 19, 2002. Dr. van Gelder has asked for a booth at the convention.

County Surveyors - John Stephens reported that the stormwater utility legislation to be implemented by county government is in the works again this year. They are still looking for a sponsor.

They are working on 368 review process for county regulated drains and permit process with IDNR and IDEM. On-site meeting with all agencies up front with one application.

NSPS Governor/Great Lakes Council - ACSM Government Affairs report will be in the convention packet.

Standards - Thursday's meeting was postponed. The agenda was to give BOR authority to deal with un-licensed practice, defining 'theory of location', section corner monumentation and other issues.

Internal Affairs

Nominations - The ballots for board of directors went out Thursday, December 5, 2002.

Chapters - Northwest - Their holiday celebration meeting is December 12, 2002. South Bend Drafting did a presentation at the November meeting.

Northeast - The chapter had a meeting on December 5, 2002.

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Minutes

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John Updike gave highlights of BOD actions this last year. Their only concerns were regarding proposed by-laws changes. 2003 President is Aaron Spring, Secretary/Treasurer Troy Smith and Vice President is Bill Boyer.

Wabash Valley -The chapter held a seminar with speaker Gary Kent on Case Law. 40 were in attendance. Dan Minor is still President for Wabash Valley Chapter.

Tecumseh - Held officer elections.

Central - Chapter met in November at Field Works. Dennis Grumpp was elected President; Ed Sweetland, Vice President; Don West, Secretary; Vince Barr, Treasurer; Rick Rayback, new director.

Hoosier Hills - Met November and elected officers. Plans are to have a seminar in April.

Initial Point - Held a meeting November 20 for Christmas. They are planning for Lewis and Clark bicentennial coming up.

Southwest - Held a meeting in November and had 30 in attendance. They held their officer elections.

Old Business

ISPLS picnic was dismal this year.

CIC's golf outing was a success.

There was discussion regarding the complaint process.

The BOR welcomes any and all complaints. Then along with the Attorney General (AG)'s office a BOR rep decides where the complaint belongs; either solely with the AG's office, or at BOR hearing. BOR cannot act as a peer mentor or provide guidance for improvement according to legislation. They would like ISPLS to help in this regard.

John Updike commented that the Northeast Chapter addressed this well enough as a chapter in the past.

There was long discussion on the complaint process, ethics and the mentoring program.

New Business - A letter from Nic Wonnell with a petition and signatures to request the BOD begin a Southeaster Chapter of ISPLS. Recommended non-exclusive boundary includes the following counties: Switzerland, Ripley, Ohio, Dearborn, Franklin, and Decatur. A motion was made and passed to grant permission to form this chapter.

30th Annual Purdue Student

Recognition Banquet

April 5, 2003 12:00pm

The Trails Banquet Facility,

West Lafayette

Keynote Speaker: Al Oak, President of
Paul I. Cripe Inc.

For more information contact:

Adam Beery

Email: beery@purdue.edu

Or By Phone: 765-743-7023

Purdue University Student Chapter of ACSM/ISPLS Service Projects

EPICs

Engineering Projects in the Community, EPIC, a unique curriculum course, is currently working on a Constructive Wetlands Project north of campus near the Purdue Agriculture Center. The Constructive Wetlands/Elliot Ditch group is mapping the vegetation in the wetlands area, which consists of approximately four ponds 400-feet long by 40-feet wide of thick vegetation. One of the EPICs team's goals in the near future is to provide a topographic map of the ponds and surrounding area. One of their tasks in this is to accurately map the pond bottom to check the elevation for flow design. Professor Steven Johnson and two ACSM student members, Tony Domelle and Luke Jahn, assisted with the layout of the survey, demonstrated, and explained the types of surveying techniques in approaching the topographic mapping. In the spring semester, 2003 these two students will be enrolled in the class, and will provide updates on this project.

Cross Country Starting Line

Purdue hosted both the Big Ten Championships and NCAA District Meet in 2002. Purdue University cross country head coach Mike Poehlein wanted to be certain that every team on the starting line had a fair start. He gave us a point that he felt every team would converge to, which was approximately a quarter mile from the starting line. We set-up a total station and noticed there was about a 30 feet disadvantage on one side of the starting line. We painted and staked a few equal distance spots from the total station, and then he was able to construct the new starting line. Members involved with this project were Nick Charnas, Luke Jahn, and Professor Johnson.

Purdue University Chapter ACSM/ISPLS

Purdue University Land Surveying and Geomatics Engineering

Short School

March 13, 14, and 15, 2003

Stewart Center

West Lafayette, Indiana

A three-day short school covering surveying fundamentals, land surveying, and advanced topics in geomatics. Further information on schedule, cost, lodging, and continuing education units will be available at:

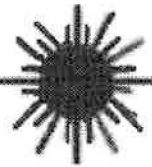
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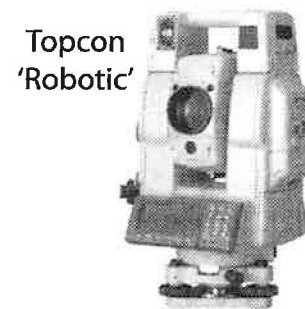
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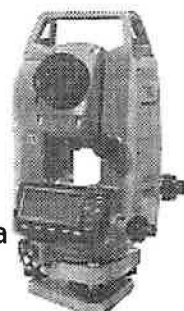
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INDIANA'S INITIAL POINT

by Kenneth W. Anderson, PLS, Bedford, Indiana

With the 200th Anniversary of The Initial Point rapidly approaching, perhaps it is time for us to consider what this well known landmark has meant in the past and what it means to us today.

The Initial Point is at the intersection of the Base Line and the Second Principal Meridian. It was in 1805 that Ebenezer Buckingham Jr., a contract surveyor working for the United States, set a wood post at the site of the Initial Point. Once it was located at a known position it allowed the original government surveyors to proceed in a orderly progression with the surveys for most of Indiana. Our initial point here in southern Indiana was important at the time and still is today, at least to most of us in the land survey profession. The experience gained by the surveyors here in Indiana allowed them to make adjustments to earlier methods, many of which became standard procedures as the surveyors moved west across the country. A local colloquialism for the point is Pivot Point.

The corner stone which marks the point is about six miles south of Paoli, the Orange County seat, and the point is approximately one-half mile southwesterly of a road intersection at Pine Valley. State Highway #37 passes one-third mile east of the point, and from Highway #37, there is a access road that allows one to drive to within a few hundred feet of it. The point itself sits in a wooded drainage among the rolling hills that are so common to this part of southern Indiana. A stream, which is a side branch of Hogs Defeat Creek, passes within a few feet of the stone. The land on all four sides is owned by the United States and is a part of the Hoosier National Forest. A permanent roadside marker out by the highway gives a brief paragraph of information about the point.

If you look at the original field notes for Township 1 North, Range 1 West, you will see that Buckingham set a Wood Post and noted two Bearing Trees. The date was September 1, 1805, and there is nothing to indicate that this was anything special. Today, when you take the short walk from the access road down to the point, you see a small triangular wood fence, and looking down into the center of it, you see the top of the stone with S 31 carved on it. Presumably the stone occupies the same position that the wood post was set at nearly two hundred years ago but that is not a proven fact.

THE QUESTIONS:

When I came to Indiana twenty-five years ago and people found out that I was working in the land surveying field, some of them would ask about the Initial Point or make other comments about it. I have heard things like, "Is that the beginning point for all the surveys?" or "Do you have to measure from that point every time?" Then the obvious one: "People have told me that the stone has been moved several times." Others have said, "I understand that the meridian line runs right through the Soldiers and Sailors Monument on Meridian Street in Indianapolis." Some people think the point has some magical powers, and noise was made a few years ago that it should be part of the statewide HARN system. I have a more legitimate question of my own: Did the county

surveyor, Lindsey, who set the stone in 1866, know what he was doing and get it right?

The answers can vary from very simple to complex ones that raise more questions:

Is it the beginning point for all the Indiana surveys? Sorry, but no, most of the Vincennes Tract, the land east of the Greenville Treaty line and places like the Clarks Grant, were all surveyed earlier.

Must we as surveyors always start there? Thank goodness not, or those of you in the north end of the state would be very busy.

Has the point been moved? How can we tell? I can say this: the stone is in relationship with other monuments, particularly to the north and west. The calls to the stream in the original notes indicate that it was near the stream at that time and it's roughly supported by that today. My personal feeling is that the stone is at or near (five feet or less) the position it was set in 1866. What I do not know, and probably no one else does either, is if the stone is where the original wood post was.

Are Meridian Street and the 2nd Principal Meridian, one and the same? A quick look at a state road map should indicate to most people that this is a false assumption. Neither does it divide the state. There are about ten ranges to the west and fifteen to the east.

As for the magical powers and use as part of the HARN system, Harry Potter has not been seen here and there are way too many trees to allow the survey grade GPS units to work very well right at the point.

Did the County Surveyor in 1866 get it right? There is not enough information to tell. J.H. Lindsey set monuments during his survey of Section Thirty One, mostly in the north half of the section. He noted "Gov Trees" at the northwest and southeast section corners. At the initial point he simply says, "Stone marked S 31 Town Corner." That could be interpreted two or three different ways. In addition, there are some other factors that I will comment on later.

WHY IS THE POINT AT THIS PLACE?

It has to do with the Vincennes Tract and Jared Mansfield, Surveyor General. The Vincennes Tract boundaries were run by Thomas Freeman in 1802-03, and his work bounded the area that was agreed to in the Indian Treaty. With the land legally available the white settlers started to come, and the federal government was pushing the surveyors to get some of the work done. Mansfield had a office in Cincinnati, and he personally came to the Vincennes area to start the work on the Second Principal Meridian and the Base Line.

Buckingham started the Base Line over in Illinois at or near the southwest corner of the Vincennes Tract. From there he ran east 67 1/2 miles and set points, but not section or quarter corners.

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Then he went to the southeast corner of the Vincennes Tract (in westerly Perry County) and ran north until he intersected the Base Line. The 67 ½ mile point was 3.60 chains short of the line he ran north, therefore making the westerly distance 67 miles 43.60 chains in length. From this point of intersection Buckingham ran east, setting section and quarter corners as he went until he hit the east line of the Vincennes Tract where he stopped. Then he went back to the intersection point and reran the line west and set the section and quarter corners along the previously run line. This was in 1804, and other contract surveyors started subdividing the townships in the Vincennes Tract immediately.

By the summer of 1805, a Indian Treaty had been signed for land east and south of the Vincennes Tract. Buckingham ran the Second Principal Meridian up to the vicinity of the Initial Point and set a temporary point there. He then picked up at the Base Line on the east line of the Vincennes Tract and ran east the four and one-half miles or so and intersected his line with the temporary point on the 2nd P.M. The point of intersection was 30 links south of the temporary point and he set “Post corner to Townships 1N & 1S and Ranges 1E & 1W from which a Beech 16” bears N37W 35 links dist and a Beech 15” S25E 31 links dist.” There is the usual comment about soil and timber and then his name and date. “September 1, 1805 Ebenezer Buckingham, Deputy Surveyor.” The call to the stream is 1.60 chains to the west and 1.20 chains to the south. There is nothing in the notes we see today to indicate that the point was a real milestone for that job. Since the “Original Notes” we have available to read are often times second or third generation hand copies, it would be interesting to know if his original field tablet had any comments or notes about the point.

So, in reality the point was set at the intersection of the two lines, the Base Line being pushed east and the Second Principal Meridian being pushed north. Was this intended to be a point that Mansfield had calculated out beforehand? Nothing I have read actually states that directly, but it seems logical that Mansfield made those decisions while he was in the Vincennes Tract area. It has been noted in some writings that Mansfield considered using the 1st P.M. to lay out the Townships and Ranges in the Vincennes Tract. When he arrived at the area and figured out that Freeman had run his lines on a magnetic bearing, Mansfield decided that trying to lay out the surveys in the Vincennes area and making them a part of the First Principal Meridian was not a good solution. The land between the 1st P.M. and Vincennes Tract was still under Indian control, and he could not survey across it. He was also hampered in that he did not have the proper instruments for astronomic observations. His decision then was to establish a Base Line and the 2nd P.M. in the Vincennes Tract area. The point is not in the Vincennes Tract, but it is in a tract that lays south and east of it. As I stated previously, this land was opened for surveys by treaty with the Indians the next year.

ORIGINAL FIELD NOTES:

Once Buckingham had set the point he turned north and continued along the Second Principal Meridian. He ran forty

chains, set the ¼ corner post with two bearing trees, continued along the section line, and at eighty chains established a section corner for Sections 25 and 36, T1N, R1W. He marked the section corner with a wood post and two bearing trees. He then ran north another 27 chains and 58 links whereupon he hit another Indian Boundary and again set a wood post and noted two bearing trees. This was the terminus of the line for that year. It is interesting to note that of the five corners on the south and east side of Section 36 and the Indian Boundary corner on the east side of Section 25, ten of the twelve bearing trees were Beech and the other two were Sugartrees. (Today the Sugartree is known as Sugar Maple and Beech are common but not that prevalent). There is also a note that the 2nd P.M. crossed the Buffalo Trace, or Vincennes Trace, at 77 chains north of the initial point. I have looked on the ground at this point, but could find nothing discernable to indicate the use of the land in that site two hundred years ago.

After setting the Initial Point and running the mile and one-quarter up the east side of T1N R1W, Buckingham subdivided the southeast part of that township. It was the land east of Freemans line and south of the Indian boundary line that runs diagonally from Section 21 to Section 25. This township is unique in that three original government surveyors worked in it, and as you can imagine, the lines do not mesh very well so there are some strange situations. In addition, Buckingham did the subdivision of all the Range 1 West townships south to the Ohio River that same year. Most of us would have difficulty walking from the point to the river, much less doing any work.

I looked at four separate sets of Original Notes for the Initial Point lines. The information for the corner is consistent in all four, in that they all call for the wood post and the same bearing tree information. The wording does vary somewhat and there are changes in the abbreviations used. On the south line of section thirty-six the calls for line trees, steams and other corners are not treated the same. The numerical distance is consistent, but information at the particular point varies or is left out. For instance, at the section corner for Sections 1 and 2, T1S R1W, which is 1.74 chains east of the corner for Sections 35 and 36, one set reads,

“intersected the line between sec 1 & 2, T1S R 1W 144 lks south of temp post set,” and no mention is made of the post or bearing trees.

Another set reads,

“intersect the N&S line 145 links south of the temp post set for the cor to sec 1 & 2.”

Then it goes on to recite the corner and bearing tree information.

In this case Buckingham had subdivided T1S R1W before he ran the Base line, so when he did run the Base Line, he was intersecting the temporary lines/posts that he had set for the sections to the south. I believe that the latter set of notes was more correct, as he most likely set the wood posts and did his bearing trees for the sections to the south at the same time as he set the ones for the north sections. That fact is not at all clear when you read the various sets of notes.

A rather unusual item in these notes is the fact that Buckingham

...continued Page 11

was setting one-quarter corners on the north tier of sections, that is north quarter of Sec 1, north quarter of Sec 2, etc. Again this is treated differently in the various notes, with varying amounts of information. This fact confused the County Surveyors in the 1800’s, as they may not of had all the information or knew how to treat it. As a result there is a hodgepodge of corner stones that do not match the original survey notes or intent.

To us, the sensible thing would have been for Buckingham to continue running east with the Base Line. But no, the job went to another surveyor, and about a month later that person chose to back his line into the Initial Point. That is he picked up on the Indian Boundary about four miles east of the point and then ran west back to the point. As might be expected, he did not hit right on the point, and he put a kink in the line that exists to this day. We may like to think that these lines are straight and true, but there are a few bumps along the way.

With little or no evidence of the original surveys remaining at this date and no direct evidence at the Initial Point itself, we can only gather the information that is written by others in the past or noted in subsequent surveys of the area. The important thing is that we have a stone which has survived the last 136 years and, hopefully will for many years in the future. The stone has probably had its share of hard knocks as I would suspect that more than one horse or cow has trod over the top of it. We are indebted to one particular family that has protected the site for well over a hundred years, which I will point out in my next installment of this article.

(To Be Continued)

FOOTNOTES:

Magnetic bearing – It is hard to believe that there is as much change in the magnetic bearing from 1800 to the present day. Mansfield found it to be more than six degrees, where as today I use one degree or less. A six degree difference in one mile puts you more than 500 feet off to the side, or in error. When you compound that with the six miles along a standard township, you can see that it significantly affects the end result. That was the problem that Mansfield faced when he found that Freeman's lines were on the magnetic versus true bearing.

Buffalo Trace – The trace was created by the Woodland Buffalo who went back and forth between their winter areas in Kentucky and summer areas on the Illinois prairies. At the time it was a major travel route for the animals and the Indian tribes. When the white settlers came they made use of it and later on portions of it became actual roads. There is much written information about this route in the early historical accounts for southern Indiana.

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White, C. Albert. A History of the Rectangular Survey System. United States Department of the Interior. Washington D.C. 1980

COMPLETED CAREER

C. David Helton, 52, PLS
ISPLS Member

C. David Helton, Greencastle, passed away February 3, 2003 at the Indiana University Medical Center at the age of 52 losing a long battle with cancer which he fought with grace and dignity to the very end.

A 1969 Pendleton High School graduate, he was active on the track team at Ball State University, from which he graduated in 1973. He is survived by his wife, Marla, and two sons, Brian and Christopher.

He worked mainly in the Putnam County area and was a member of Big Walnut Sports Park Board of Directors and also coached soccer. Services were conducted at Bittles and Hurt Funeral Home, Greencastle, Rev. Richard Doughty officiating. Burial was in Forest Hill Cemetery. Memorial contributions may be made to the American Cancer Society, 1 Hilltop Court, Greencastle, IN 46135.

ISPLS 40 Year
Member Pin Awarded

At the ISPLS Convention during Thursday's evening banquet, a new 40 Year Member Award was presented to individuals that had been a member of ISPLS for 40 years.

They were presented with a 40-year member lapel pin and also will receive a copy of the video "Surveying the Past, Mapping the Future".

These individuals have laid the foundation for what has grown to a society of over 850 members.

The following have been a member for 40 or more years.

NAME	CITY	MBR CLASS
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Kenneth Curtis	W. Lafayette, IN	Life
Chester Ziemniak	Highland, IN	Life
Joseph Smrt	Knox, IN	Life
James Dankert	Noblesville, IN	Life
Robert Krull	Hobart, IN	Pro. Mbr
Steve Manich	Highland, IN	Pro. Mbr
Rex Bowman	Lafayette, IN	Life
Nelson Prall	Bedford, IN	Life
Alan Stanley	Greencastle, IN	Life
Eugene O'Brien	Madison, IN	Life
Stanley Shartle	Avon, IN	Life
Mayer Goloubow	South Bend, IN	Life
Harold Jarvis	Indianapolis, IN	Life
John Manship, Jr.	Anderson, IN	Pro. Mbr
Jose LaFrossa	Argentina	Life

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THE BILBY STEEL TOWER FOR TRIANGULATION

by Roger Woodfill, PLS, Lawrenceburg, IN

The year 1927 will probably always be known for Charles Lindbergh's famous New York to Paris solo flight. Lindbergh's "can do" attitude mixed with a little engineering knowledge, and a little navigation experience caught the attention of the media; and his story is well known. This year also marks the seventy-fifth anniversary of another, but less publicized, accomplishment that required the same kind of "can do" attitude, mixed with a little engineering knowledge, and a little navigation background; but only a few recognize the name of Jasper Sherman Bilby. J.S. Bilby was older, not quite as handsome, nor not as tall as C.A. Lindbergh; and his contribution had to do with civil engineering not aviation. It was 1927 when the United States Coast and Geodetic Survey (USC&GS) officially adopted the use of Bilby's portable, steel tower for precise triangulation work, a practical invention that changed control surveying and mapping production for sixty years.

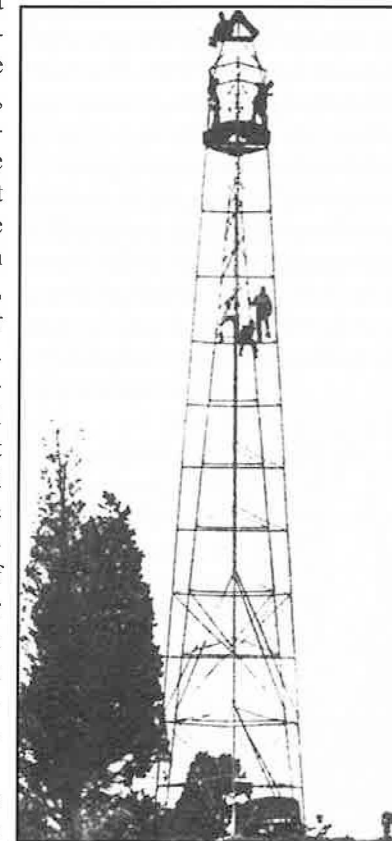
The USC&GS can trace its history back to 1795 when the Third Congress of the United States recognized the need for precise surveying and charting of its harbors. That Congress authorized the President to cause a survey to be made of the new nation's coastline between the Chesapeake Bay and the St. Mary's River. That charge was expanded by a subsequent Congress in 1807 to include the mapping of the entire coastline; and it was President Thomas Jefferson who approved the creation of the bureau that has returned to us a wealth of precise measurements, maps, and charts. The story of the United States Coast and Geodetic Survey (organized by Ferdinand Hassler, Swiss engineer turned West Point professor) can be told better by others. Let me mention here only a few dates to set the stage for Bilby's contribution.

The first fieldwork attempted by the bureau in 1816 were geodetic baselines—one at Gravesend Village on Long Island, and the second near English Creek, New Jersey. USC&GS was transferred from the Department of Treasury to the Navy Department about 1832, and the influx of knowledgeable Army and Navy officers allowed the Corps to advance more rapidly with its control surveying and charting. As the nation expanded so did its need for

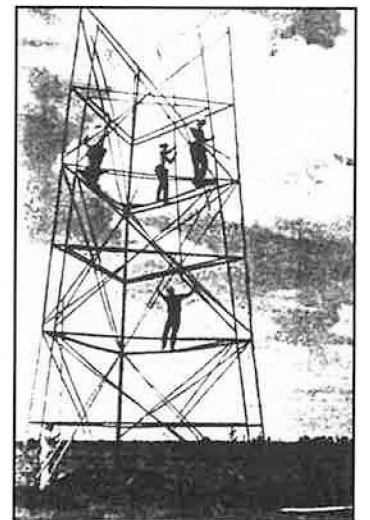
accurate maps and in 1871 another act by Congress increased the bureau's domain throughout the interior of North America. In a 1965 booklet the make-up of the Coast and Geodetic Survey (as it was called after being transferred to the Department of Commerce) was listed as 217 commissioned officers and 2855 civil service employees. From the beginning Hassler had determined that "triangulation" was the best (most precise and cost effective) method to acquire reliable data and establish survey monumentation. A network of intervisible points, approximately five to seven miles apart, and preferably in quadrilaterals so they could be checked, was designed to tie their various projects together. This control network emerged as a priority, and it still is used everyday by many surveyors and engineers.

The keyword describing the network was "intervisible" since there were no artificial satellites nor G.P.S. in the early days. Quoting Bilby from a subsequent booklet "In many regions it is not possible to select stations (sites) for a scheme of triangulation and have the stations intervisible from the ground, as trees, buildings, and other objects obstruct the line of vision between adjacent points." This is where Jasper S. Bilby, a Coast and Geodetic signalman, made his contribution to the surveying profession. Before this time wooden observation towers had been erected over triangulation stations at great cost of materials and backbreaking labor. The largest may have been built in 1916 and rose 235 feet about the terrain. The officer in charge, named Damson, recorded that it took five officers and eighteen men 19 days to erect that tower. Another example about the expense of a wooden tower was told to me by a surveyor from Illinois. Once he was searching for a control point, and asked a local of its whereabouts. The farmer pointed to a nearby barn and relayed the story of how it was made from the lumber his grandfather obtained for dismantling the old wooden tower. It sounds like a "tall" tale to me, but maybe not totally inconceivable.

According to the 1940 edition of "Bilby Steel Tower for Triangulation", a Department of Commerce publication written by Jasper S. Bilby, "A wooden tower 75 feet in height would cost about \$120 for wood alone and take of crew of six men at least three days to erect". This quote originated in the 1929 edition of the same manual, which has been reprinted with only minor changes many times. I have seen the same bulletin printed by the U.S. Army Corps of Engineers; and I suspect, it may be in languages other than English since the use of the Bilby towers was worldwide. Anyway, the operations manual goes on to compare that Bilby's portable, reusable, steel tower of 77



BILBY TRIANGULATION TOWER.
Portable steel triangulation tower designed and built for the Coast and Geodetic Survey.



The 64-ft. section.
Erecting the diagonals.

...Continued Page 14

Bilby Tower
...Continued from Page 13

feet could be erected in five hours by five men. Another comparison cited is that “a 156 foot Bilby Tower could be erected in a day; but if made of wood, would take at least a week with usually building crews”. I cannot offer a factor to update lumber prices.

In the 1920’s the following three criteria were created by USC&GS for their observation platforms:

1. The tower must be rigid and stable against vibrations and twists;
2. The tower must be reusable; and
3. The total weight must be transported on a single, medium sized truck.

Jasper Bilby prepared some preliminary plans and headed for the Aermotor Co. plant near Chicago in the winter of 1926. The first test of his design showed that his plan met those three requirements; and in fact only minor changes were made during the next six decades. I am told Bilby immediately donated his patent to the government.

“A complete (Bilby) triangulation tower is a combination of an inner and an outer structure mutually independent; that is, two structures must not touch at any point.” The outer structure supported the observer and a tent-like affair to protect the instruments and personnel from the sun, wind, and other elements. The inner structure, centered over the geodetic station by a collimator supported the instrument with a high degree of stability, unaffected by the observer’s movements. Structural members of the outer tower were color-coded blue, and parts to the inner tower were painted red to reduce confusion during construction.

Tower heights were always referred to by the inner (or instrument) tower height. The outer (or personnel) tower was a standard ten feet higher for the protective tent and welded cap installation. The very top contained the lightplate where signal lights (targets) were attached so that other distant occupied towers could sight each other. The upper portion also contained a lightkeeper’s platform. Most observations were made at dusk and after dark. Both towers were three-legged with the cross-sections of an equilateral triangle—except that the personnel tower changed to a hexagonal shape about twelve feet from the top. This provided the observer a 7’4” x 7’4” workspace if you measure across opposite points of the platform placed there, or a 6’6” x 6’6” workspace if you measure from side to opposite side.

Standard Bilby Towers came in 37, 50, 64, 77, 90, 103, and 116 foot size, and they were basically, predrilled and precut angle irons bolted together. There were standard feet for the

bottom section that were usually anchored about four feet into the ground. Those foundation lengths would be adjusted when the towers reached a certain height. In the photographs that I have seen, there seems to have been a welded template laid on the ground to assure that the six foundation holes were dug (always by hand) at this correct locations. The center of the template would be, coincident with the existing, or a proposed, triangulation station.

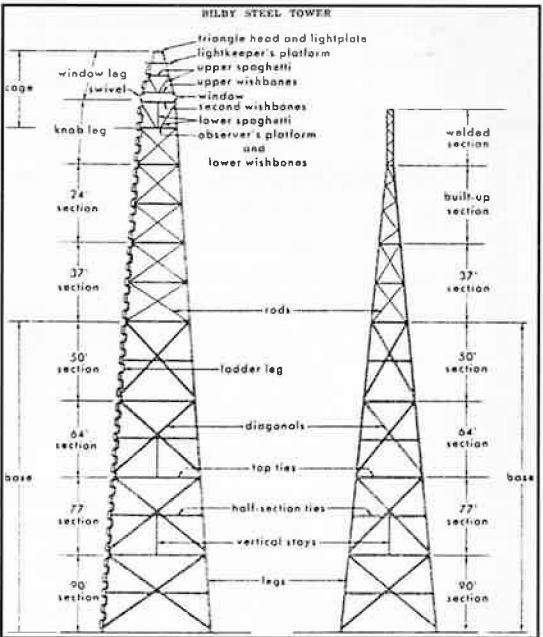
To over simplify the construction procedure, suffice it to say that each of three men climbed a leg securing the braces to it as the tower rose. Each structural member (vertical, horizontal, diagonal and stiffening rods) had a sequence in which it was to be added. The “take off man’s” job was to take the steel off the truck and feed it to the three “leg-men”. When the leg-men reached a certain height, it became necessary to “hoist” the materials to them. In all the manuals that I reviewed, power for the “hoisting” of the higher and heavier members, came from an apparatus connected to the drive wheels of the haul truck. Guy wires generally were not used, but there were places for them to be attached to the tower if the footing could not be dug deep enough, if ten foot extension sections were added, or if there was a prevailing wind.

The efficiency of the Bilby Tower was not all in the pre-cut and drilled angle irons—part of it came from the detailed manual giving the precise listing of the work crews needs and the order with which they would proceed. Everything—the lineal feet and diameter of the hoisting ropes; needs for the first aid kit; recommended heights of employees; number and size of tools; design for the bed of a haul truck; number of sand bags necessary; “tear-down” instructions, etc., etc., etc., could be found in the manual. However, there was one note that did not seem to fit the detailed manuals that I reviewed. After listing the bolts as “high tensile” and sized as (3/8”x3/4”; 3/8”x1”; 3/8” x 1 1/4” and 3/8” x 1 1/2”), it merely says “Adequate supply for tower”, but gives no quantity. The 1965 version of the manual had an Appendix I, entitled “hoisting Apparatus for the Geodimeter” indicating that maybe physics was beginning to assume a larger part of surveying and mapping with mechanical

tasks a smaller part.

Actually Jasper Sherman Bilby (1864-1949) retired in 1937 after fifty-three years of service with the U.S. Coast and Geodetic Survey, and his towers have also been retired from use for about two decades. The Surveyors Historical Society plans to construct a Bilby Tower at one of its Surveyors Rendezvous (tentatively 2004 near Independence, Missouri). Some people have suggested a permanent display be erected at USC&GS headquarters in Washington D.C.; or in Minnesota where the first 18 towers were first used; or in Osgood, Indiana where Bilby was born, etc., but I know of no concrete plans for this type of honor.

I understand remembering C.A. Lindbergh’s 1927 flight by hanging the “Spirit of St. Louis” in the Space and Science Museum, but it seems harder to recognize the seventy-fifth anni-



Tower nomenclature

versary of J.S. Bilby’s contribution to our profession. Maybe he would have preferred, it this way—to appear all of a sudden, grow with strength and efficiency to do the job, then to move on to a different task in a different place. That is what he designed his tower to do.

ABOUT THE AUTHOR:

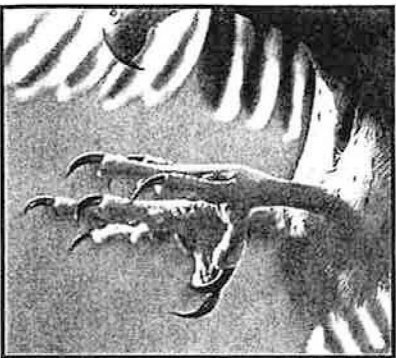
Roger Woodfill is a Professional Land Surveyor registered to practice in Indiana, Ohio and Kentucky. He began his private practice in 1972 d/b/a District 9 Land Survey Co., which he still operates specializing in small boundary surveying around his hometown of Lawrenceburg, Indiana. (Lawrenceburg is located on the beltway around Cincinnati, Ohio; and it is the birthplace of James Buchanan Eads see CE News June 2001, page 74). Woodfill has contributed many hours to the surveying profession—being elected president of the Indiana Society of Professional Land Surveyors in 1978 and 1990; and he has held several offices in the National Society of Professional Surveyors—the highest being vice president in 1985. In recent years he has served as the Administrator for the Surveyors Historical Society, a national, not-for-profit organization, working to preserve the history of surveying. Three years ago Woodfill began minting a series of one ounce, 39 mm silver coins that honor the surveying profession. His 2002 annual coin (same size and quality as the U.S. Mint American Eagle coin) depicts a Bilby Tower on the obverse.

Editor’s Note: This article by Roger Woodfill brought back memories of the mid-1900s when arc and area triangulation was the predominant method to extend control over large areas instead of utilizing precise traverse methods. For a period of time before the Bilby tower, precise traverse methods were used because of the high cost and time-consuming problems associated with wooden towers. It wasn’t until the development of EDM traversing was again feasible and re-adopted.

During the 1950s, I spent several summers attempting to gain practical experience in several surveying and mapping activities in order to augment my teaching. During the summer of 1955, I worked with the C. & G.S. and spent two months attached to a steel-tower area triangulation party based at Hartford City, Indiana. During that time, I had to climb a number of Bilby towers in order to record directions (angles) with the precise Wild T-3 theodolite. I know I must have left my finger prints on many of those steel tower ladder legs!

In June 1984, after spending some time on the NOAA hydrographic survey ship, Mt. Mitchell, doing sounding at Penobscot Bay, Maine, I visited an NGS area triangulation party in northern Connecticut. As it turned out, this project was the last one where the Bilby steel towers were to be used for geodetic control. Such acronyms as EDM, GPS, and HARN were marking the end to an interesting era in surveying and mapping. Ken Curtis

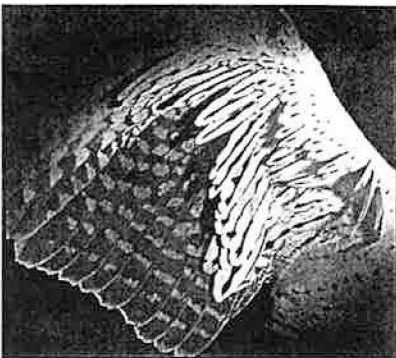
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Surveyors are the "G" in GIS.

by George Armstrong, P.E., P.S. Cincinnati, Ohio

I attended a state wide GIS conference in Northern Kentucky recently. A large number of GIS experts were in attendance, and of course, presenting. I was very impressed with the state of the art of GIS software and hardware. I was equally impressed with the wide range of uses GIS is found in. It's everywhere! Most disappointing though, was the lack of Professional Surveyors in attendance. I noticed only two practicing surveyors' names on the list, and two surveyors from academics (Jim Decker, P.S. and myself, both from Cincinnati State Technical and Community College).

I must admit that as a teacher and part-time practitioner I wasn't overly enthused about going. I fought feelings of being awkward and out of place. I didn't think I would learn much, and was so behind on GIS that the conference would be of no interest, or over my head. I certainly do not fancy myself a GIS practitioner! I could not in my mind relate how the data I collect-particularly concerning boundaries and topography- gets put into use in a GIS format.

At the very first session I attended the group was shown a chart of data about certain features (addresses of homes I believe). The data was compiled for location in Longitude and Latitude coordinates (I didn't see any "elevation" column). I asked the questions that had 'bothered' me most about GIS - How accurate is the data? Where did it come from? What quality is it?

I was given an answer that seemed to impress (or at least satisfy) those in attendance: 'Digitized three decimal degree accurate'. I am not much of a geodesist, but I think that's about 365 feet! That may be accurate enough if I'm trying to find a house that's on fire, but for topography, or boundary work it's useless (I actually believe they are working much closer than that).

It was at that point I realized that I am to blame for that answer! That's right-me. I'm the college level surveying instructor. I'm the one being paid by the State of Ohio to educate the citizens about matters relating to surveying. This is certainly an important matter! I'm the Professional Surveyor who should be attending professional organizations, and state conferences and lobbying for our (Professional Surveyor's) rights.

I have come to realize that Surveyors are the 'G' in GIS. The quality of the data ought to be 'owned', or 'controlled' and specified and verified by competent Professional Surveyors. It could be we are not interested. It could be that we are not concerned. It could be that we are arguing the trivial and overlooking the obvious. Whatever the case, I know that the presenter who gave the answer would not care if the data was three decimal places or ten, but as a USER of the data who needs that accuracy WE Surveyors should be fighting for it. WE should be calling and contacting local Government agencies (who typically own the data) and demand layers of boundary and control point data that is accurate. As a profession we should be demanding, through legislation and other efforts, that "positioning and mapping" are a surveyor's job.

It does make a difference if the public views a map and it shows the boundary lines cutting through a garage corner. It does matter if the underground fiber-optic cable is located 3 feet off where the map indicates it is. It does matter if the power lines are not in the easement.

Professional Surveyors need to understand GIS. We must be instrumental in the development, maintenance, and densification of

all maps, paper or electronic, that determine features. That is why the state governments have registered us to do it. I challenge you to read your state's definition of surveying in the Registration laws. (In Ohio it is 4733-31).

**Surveyors must
be the 'G' in
Geographic
Information
Systems!**

Surveyors must be the 'G' in Geographic Information Systems!

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 513-569-1745
 George.Armstrong@CincinnatiState.edu

Bilby Tower

...Continued from Page 15

JASPER BILBY - A HOOSIER FROM OSGOOD, INDIANA

Jasper (J.S.) Bilby, inventor of the Bilby triangulation tower, was born and raised in rural Rush County, Indiana. Never having attended college, he was self-taught in methods of land surveying. Bilby moved to Osgood, Ripley County, Indiana as a young man and spent the rest of his life there.

Bilby, his wife, and four children lived in a large Victorian home - located on South Buckeye Street, U.S. Highway 421, in Osgood. The home is located across the street from the Ripley County-Integra Bank. He and his family were active in local church and community activities although work kept him away from home a large amount of the time.

Bilby began his work with the U.S. Coast and Geodetic Survey in 1884 and devoted his service to them until his retirement in 1938. Two of his sons, William and Walter, along with a grandson-Jim Humphrey, also had careers in the U.S.C. & G.S.

Humphrey recalls that his grandfather's work took him away from home throughout most of his life. He would typically work in the field from April through October then return home to calculate field data during the winter months. Mercy Humphrey, Bilby's daughter, traveled with her father as a note taker for the U.S.C.&G.S. in 1914. Humphrey also recalls working with his grandfather while setting a triangulation monument along U.S. Highway 421, south of Versailles, at the population center of the United States in 1929.

During the 1930's and 1940's there were 27 people from the Osgood area who were employed by the U.S.C.&G.S. Osgood, population 1600, had one of the largest number of U.S.C.&G.S. employees per capita in the country. Humphrey believes that his grandfather's influence in the community may have prompted those individuals to work on the project.

Jasper Bilby died in 1949 and is buried in Washington Memorial Park Cemetery in Indianapolis. The Ripley County Surveyor's Office, Ripley County Fair Board, and Osgood-Reynolds Foundation are currently working to obtain a Bilby tower to erect in the Ripley County Fairgrounds. The tower will be dedicated as a monument in honor of Bilby.

Submitted by Jeffery P. French, R.L.S., Ripley County Surveyor,
Versailles, IN

ISPLS -LS / SIT Review Seminar Committee

Presents:

Registered Land Surveyor (LS) & Surveyor in Training (SIT)

Review Seminar

Date: Friday (April 4) & Saturday (April 5)

Location: I.U.P.U.F.W., Engineering Technology Building, Room ET 131, Fort Wayne, Indiana

(Parking available in Lot B)

Time: 9:00 AM – 5:00 PM (each day)

Schedule: SIT Review on Friday
LS Review on Saturday

SIT Topics:

- Photogrammetry
- State Plane Coordinate Calculations
- Astronomic Observation Computations
- GIS & Computer Terms
- Matrix Algebra & Higher Math
- Basic Survey Computations
- Boundary Survey Computations

LS Topics

- GLO / USPLS & Tiffins Instructions
- Early Indiana Trails and Surveys
- Rule 12 & Ethics
- ALTA Surveys
- Indiana Law
- Unwritten Rights
- Ten State Standards
- HERPIC Drainage Manuals
- Sequential & Simultaneous Conveyance

Refreshments

Breakfast: Coffee and donuts will be supplied
Lunch: Will be provided

For more information contact: (Check the ISPLS web site after March 14th for more details) or contact

Ed Sweetland @ 317-547-5580

or

Dianne Bennett, ISPLS @ 317-687-8859

The BLM to Update Manual of Instructions for the Survey of the Public Lands of the United States

The Bureau of Land Management (BLM) has announced that the agency is developing the latest edition of the Manual of Instructions for the Survey of the Public Lands of the United States. The Manual describes how cadastral surveys of the public lands are completed in conformance to statutory law. The earliest rules governing the survey of the public lands were issued in manuscript and in printed circulars in 1785.

Additionally, the Manual is intended to balance the printed instructions with current legislation, judicial and administrative decisions, and current surveying practice. Outside the BLM, the primary interest of the Manual is county and local surveyors, attorneys, title-insurance-company personnel, and real estate agents; accordingly, this new edition will include a discussion of the law and policies of surveying and boundaries as they have developed since the last edition in 1973.

“Land surveyors are the first line of protection for private property rights,” said Don Buhler, Chief Cadastral Surveyor for the BLM. “Surveys must be legally correct, therefore the Manual is issued to guide land surveyors who exercise a technical responsibility in the execution of cadastral surveys or resurveys.”

For more information visit: www.blm.gov/cadastral/Manual/nextedition.htm

The BLM, an agency of the U.S. Department of the Interior, manages more land—262 million surface acres—than any other Federal agency. Most of the country’s BLM managed public land is located in 12 western states, including Alaska. The Bureau, which has a budget of \$1.8 billion and a workforce of 10,000 employees, also administers 700 million acres of sub-surface mineral estate throughout the Nation. The BLM’s “multiple use” mission is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. The BLM accomplishes this by managing for such resources as outdoor recreation, livestock grazing, and energy and mineral development that helps meet the nation’s energy needs, and by conserving natural, historical, cultural, and other resources on the public lands. Additionally, the BLM is responsible for and manages the survey and title records of the public domain, private land claims, and Indian lands.



BLM Cadastral Surveyor Karen Schank, and a neighbor of the public lands confer about boundaries. Notice, in the foreground, a survey monument under the total station. A utility right-of-way, a roadway, and fence lines also are visible. The BLM receives thousands upon thousands of inquiries each year about the intricacies of surveys and the location of ownership boundaries and interests in land. The instructions contained in the Manual of Surveying Instructions are to be observed by every surveyor engaged in the execution of the public land surveys.



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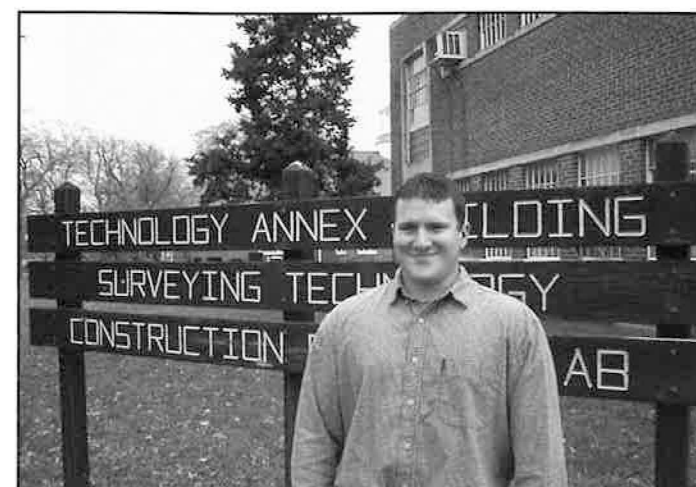


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VINCENNES UNIVERSITY SCHOLARSHIPS



Dear Members of the Southwest Chapter of ISPLS,

I am writing this letter to thank you for the time and consideration you put forth in choosing the recipient of this scholarship. The money was put toward the cost of my schooling at Vincennes University. This scholarship will help to offset the cost as I continue my education at I.U.P.U.I.

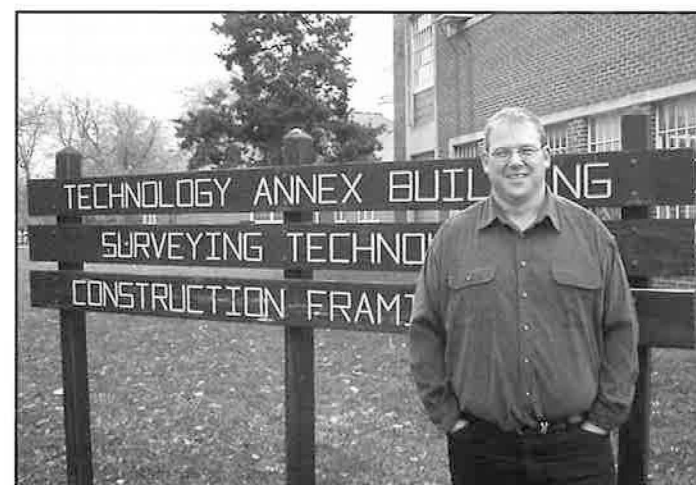
Sincerely,
Brad Kleaving



Dear Members of the Southwest Chapter of ISPLS,

I would like to take the time to thank the members of the Southwest Chapter of ISPLS for selecting me as a recipient for the scholarship. I will try my best to excel in surveying and stand as a good representative for the Surveying Technology program at Vincennes University.

Sincerely,
Andrea J. Hildenbrand



Dear Members of the Southwest Chapter of ISPLS,

I would like to take this opportunity to thank the I.S.P.L.S. for granting me the local chapter scholarship as well as the Peggy Archer Memorial scholarship. These scholarships will fund the rest of my curriculum at Vincennes University. I am forever indebted to their generous contributions to my education and pursuit of my degree. Again, I am truly grateful.

Sincerely,
Eric T. Rider

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Retracement

Knud E. Hermansen, PLS, PE, PhD, Esq., University of Maine

Introduction

Much has been written about applying GPS to surveying. At relatively low cost, GPS provides a reliable means to get both relative and absolute positional information. The low cost of the technology has lead to a proliferation of GPS receivers, making this technology common not only among scientists and surveyors but also hunters, hikers, campers, fishermen, and landowners. Unfortunately, the proliferation of receivers has often resulted in the misuse of the technology in locating boundaries. This article will discuss some of the problems that occur and advantages gained in applying this technology to boundary retracement.

Historical Surveys

To understand the problems with using GPS in boundary retracement, knowledge of past survey practice is necessary. The early surveyors used the compass and chain and later the transit and tape in establishing many of today's boundaries. Land was inexpensive. Training was haphazard. Obstacles in the path of the survey were many. Virgin forests, wild animals, hostile Indians, and swarms of insects, to name a few, all took their toll of the surveyor's attention to his work. The chain and tape were unwieldy and inexpertly employed. Slope measurements were sometimes the norm. Correcting the chain and tape for sag, temperature differences, and stretching was seldom done. Magnetic readings were often erratic or failed to account for local attractions and diurnal variations. As a consequence, inconsistencies and errors in measurements were so common in early surveys that measurements were not held in high regard.

The science of geometry and mathematics is exact. The infinite depths of stellar space are measured with such exact nicety that the position of stars and planets can be calculated to the fraction of a second of time...How can it be that in the ascertainment of one line of so small an area, bounded by four lines only, a difference of from 8 to 24 feet arises? It is evident that the methods pursued, and not a defective science, have brought about the different results, different maps [from *Warren vs. Boggs*, 90 W.Va 329, 332, 111 S.E. 331 (1922)].

The science of mathematics is exact, but the different results reached in its application by different surveyors, is sometimes startling to the layman, when applied to what appears to be an ordinary survey [from *Zirkle vs. Three Forks Coal Company*, 103 W.Va. 614, 626, 138 S.E. 371 (1927)].

Rules of Construction

To resolve ambiguities between what was marked and what was measured, the courts adopted rules, known as principles or rules of construction, that are meant to be applied in a consistent manner where there is conflicting information. One rule that is a fundamental principle in retracing a boundary is that the retracing surveyor is charged with following in the footsteps of the original surveyor. The original boundary fixed by the original surveyor, as imperfectly as the boundary may have been measured and documented, remains the boundary.

Measurements and Limitations

In adherence to this fundamental principle, the courts have held that original monuments or the former location of the monuments are superior to measurements in determining the location of boundaries. Research and field reconnaissance are often more important than the precision of measurements in locating the position of the original

monuments. Put in other words, the gathering and reduction of measurements, while important, is seldom a persuasive factor or a critical aspect of boundary retracement. Lines of occupation, witness marks, and memories of the elderly are more compelling than the measurements. It is often disconcerting to the non-surveyor to be told that in fixing old boundaries, the law favors the old hedge that meanders several meters off a straight line rather than sophisticated equipment that can measure to the nearest centimeter. These concepts are well stated by the Ohio court in *Sellman vs. Schaaf*:

The primary function of the second surveyor is to find first where the boundaries were established by the first surveyor... The essential rule governing the resurvey is to follow the steps of the first surveyor... Conveyances are presumed to be made according to a prior actual survey. It is said that the primary purpose of construction is to follow the footsteps of the surveyor on the ground... A survey is the locating and marking on the ground of the land described in a grant. Once a tract has been located by survey, and its boundaries have been marked, those boundaries cannot be altered by a subsequent survey. In making a resurvey, the duty of the surveyor is merely to locate the monuments placed by the original surveyor, or, where such monuments no longer exist, the places where they originally stood... All lands are supposed to be actually surveyed, and the intention of the grant is to convey the land according to the actual survey. It is therefore said that the real purpose of a boundary inquiry is to follow the steps of the surveyor on the ground, and all calls will be construed with this in mind... It has been declared that all the rules of law adopted for guidance in locating boundary lines have been to the end that the steps of the surveyor who originally projected the lines on the ground may be retraced as nearly as possible; further, that in determining the location of a survey, the fundamental principle is that it is to be located where the surveyor ran it. Any call, it has been said, may be disregarded, in order to ascertain the footsteps of the surveyor in establishing the boundary of the tract attempted to be marked on the land; and the conditions and circumstances surrounding the location should be taken into consideration to determine the surveyor's intent... The original survey must govern if it can be retraced. It must not be disregarded. So, too, the places where the corners were located, right or wrong, govern, if they can be found. In that case a hedge planted on the line established by original survey stakes was better evidence of the true line than that shown by a recent survey. In making a resurvey it is the surveyor's duty to relocate the original lines and corners at the places actually established and not to run independent new lines, even through the original lines were full of errors [from *Sellman vs. Schaaf*, 26 Ohio.App.2d 35, 41-43, 269 N.E. 2d 60, 65-66 (1971)].

As the precision of measurements increase, the accuracy decreases. (In the context of this article, precision refers to the repeatability of the measurements while accuracy refers to the correlation with the original boundary.) In many boundary retracement surveys, there is an indirect correlation between precise measurements and accurate measurements. Precise measurements become less useful in finding the position of original corners than more imprecise measurements that better replicate the original measurements. Measurements that replicate the deficiencies of the original

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RETRACEMENT

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equipment are more accurate in locating the original bounds than precise measurements that remove or are not influenced by local magnetic anomalies and terrain conditions between two points on the earth's surface.

With these articulations in mind, a person probably has a better chance of successfully retracing the original location of an ancient boundary using a compass and chain rather than a GPS receiver-if the chain and compass were used to establish the original boundary. The reason is that a compass and chain will likely incorporate all the local attractions and imprecision inherent in the work of the original surveyor. Using the compass and chain, the retracement surveyor will be closer to the lines marked by the original surveyor (i.e., the original surveyor's footsteps).

Consider an example to illustrate these concepts. Two people attempt to locate the same property boundary. The first uses a plastic tape and compass to locate approximate corner locations, wanders about, and finds the old remains of stakes set by the original surveyor. In subsequent measurement, the first person makes a series of imprecise and even faulty measurements between the stakes. The first person subsequently documents these faulty measurements on a plan depicting the boundary. A second person using GPS equipment makes a series of precise measurements to reestablish the boundaries according to the measurements found in the deed. Not realizing that old measurements found in deeds often contained errors in feet and sometimes hundreds of feet, the second person goes about marking off the deed measurements with a precision unknown in the past. Unable to find the original stakes or thinking them set in error, the second person marks corners according to the precise measurements they have obtained with the GPS receiver. The second person produces a plan showing precise measurements between the corners set. As between the two, the courts would find that the first person has performed a more accurate survey according to the legal rules applicable to boundary retracement.

It follows that the ability to replicate with great precision the nominal measurements in the deed and project them upon the ground with GPS technology is seldom the best way to retrace old boundaries. Accordingly, the proliferation of the GPS receivers in the hands of laypersons lacking a knowledge of the legal rules of construction does not make the layperson any more qualified to locate the boundary than placing an X-ray in the hands of a layperson makes a layperson qualified to give a medical opinion on the condition of a patient.

Geodetic vs. Plane Surveying

Another problem that GPS appears to thrust upon both layperson and surveyor alike is what can be termed the "geodesy" factor. The ancient boundary measurements were more times than not slope distances measured by laying the chain on ground or roughly elevating the chain to avoid the natural debris and litter found upon the ground surface. More recent boundary measurements use distances merely corrected to local horizontal. GPS measurement, on the other hand, produce vectors between co-observing stations lending a natural preference to a three-dimensional mathematical approach. The length of the vectors could be reduced to the ellipsoid or the conformal mapping plane. In some areas, the differences between these derived GPS measurements and local horizontal distances could be considerable.

Missing Evidence

GPS technology in the hands of surveyors often causes the surveyor to forsake a thorough search for evidence along the boundary. When a surveyor employs a compass and tape or has to traverse along or near a boundary, the surveyor often discovers a great deal of evidence that helps locate the position of the original boundary. Old stone walls, ancient blazes on trees, rusted remains of wire fence, support stones for the split rail fence, cut lines, etc. are often discovered in surveying along a boundary using traditional methods of surveying. With GPS technology, many surveyors forego the difficult and time consuming walk along the boundary, preferring instead to set up near one corner location, obtain measurement, then drive to a location near the next corner location. As a result, evidence that could help re-establish the position of the original boundary remains undiscovered and ignored. Encroachments along the boundary remain undetected and unresolved. The new technology may increase the speed and efficiency of the survey work but does so at the sake of decreasing the information used and the reliability of the surveyor's opinion.

Problems Undetected

Even in the hands of a surveyor knowledgeable about the rules of construction and geodesy, GPS causes problems-although ethics no doubt requires the problems be revealed rather than put aside. Consider the diagram showing a small lot that was meant to be bounded on a municipal boundary. In the past, a surveyor creating the lot or retracing the lot should have established the lot's easterly boundary by locating the two ends of the municipal boundary and fixing the lot boundary to coincide with the municipal boundary. However, economics and the errors resulting from traversing long distances often precluded or forced the surveyor to make certain assumptions regarding the position of the municipal boundary (e.g., the existing fence line was on the municipal boundary). The surveyor then located the lot boundary based on these assumptions. Even with the knowledge that such assumptions were often tenuous at best, the surveyor took great comfort from knowing that a subsequent surveyor was no more likely or able to retrace the municipal boundary than the earlier surveyor so any problems would likely remain undetected and undiscovered. With the advent and proliferation of GPS, the situation changes drastically. Previously it would have taken days to traverse between the stones and locate the municipal boundary. Now, the municipal boundary can be located relatively precisely in a matter of hours by occupying the stone corners with GPS receivers. Surveyors that were relatively secure in the knowledge that any errors would likely remain undetected until long after their demise are suddenly faced with the possibility that their errors will be revealed during the next survey of the area-either by their own subsequent work using GPS technology or the work of a competitor using GPS technology.

Advantages of GPS

The results of the discussion so far beg the question why use GPS in boundary retracement? GPS appears to pose problems in the hands of the layperson and the surveyor alike in retracing boundaries. The fact is that GPS can be used to great advantage in boundary retracement by knowledgeable surveyors. It provides an efficient means of locating the position of evidence within a relative or absolute geometric framework-especially if the evidence is separated by long distances or terrain difficult to traverse. Without question, it can provide precise coordinates of properly re-established

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Safety Training

by Ronald E. Koons, RoSaKo Enterprises
Safety Consultant, Middletown, Indiana

We want to thank those who participated in our sessions during the 2003 ISPLS Convention. The convention was a great success. Quite often a lot comes out of the sessions within a session. I am talking about the breaks, lunches, and other side conversations. During one of our presentations this year several of us became engaged in a conversation about OSHA and what kind of citations they are passing out. In this article I will cover a few of the surveyor citations that have been issued by OSHA in the past few years. We used these during day long presentations in both California and Massachusetts last year and those attending said they learned a lot from them. None of these were taken from accidents within the State of Indiana or companies from the state.

The first citation involves a crew of 2 working at a construction project. Excavation activities were being performed. As a result of an accident that involved the trenching operation an employee was fatally injured. The surveying company received a number of citations. The first item was for a lack of keeping a safe worksite under the General Safety and Health provision of the construction regulations. The second was for not obeying the Construction Safety Training and Education regulations. We continue with a violation of the employees not wearing Head Protection. Duty to have Fall Protection was next. (I don't have the exact details, but I assume the fall exposure was for a trench excavation.) Next to last is a citation on the Excavation General Requirements. They end with a violation of the requirements for protective systems. The initial total amount of the visit by OSHA was \$ 25,550.00. After much hard work on the part of the company the citation was reduced to \$ 15,000.00. Remember though, this is just the monetary loss to the company for the OSHA violations. They still had to deal with the trauma of losing an employee. In speaking with management from this company he indicated that even quite some time later it still has an impact on employees on a daily basis.

Our next citation started at \$ 4,950.00 and was settled with OSHA for \$ 4,400.00. In this case there were two employees surveying in an area with overhead power lines. Fours sections of a rod were extended to about 6.4 meters. The rod was placed between two phases of a 23Kv overhead power line. The prism touched one of the power lines and the rodman was fatally electrocuted. The other crew member received second and third degree burns on their hands, legs and feet. There were 7 separate items cited by OSHA including general jobsite safety training, electrical safety, and failure to report a fatality as required in the regulations. These first two cases both resulted in fatalities, but as you can see the citations from OSHA were quite different.

Our next case visits another electrocution incident. Two field crew employees needed to obtain the distance from a power line to the ground. To accomplish the task they threw a weight attached to a nylon string over the power line. They then tied the string to a 200' long measuring tape and pulled it up to the power line. Unfortunately for them, the tape was steel and both employees were fatally electrocuted when the steel tape touched the power line. One employee was 38 and the other was 19. The OSHA citation in this case was originally \$2,875.00 and it was eventually reduced after formal proceedings started to \$ 1,437.00.

Our final case visits 2 field crew members surveying in a swampy area. They were using a 12 foot jon boat powered by a 15 HP engine. It seems like a fairly simple job, but one fact was overlooked. The jon boat was only rated by the Coast Guard for use with a maximum 6 HP engine. The 2 1/2 times rated capacity of the engine caused the craft

to be overpowered and subjected the employees to the hazard of falling off the boat and drowning. There were 8 items overall cited in this case. The original citation was \$ 15,500.00 with a settlement to \$ 12,000.00. I am still trying to find out the extent of injuries to the two or if any fatalities were involved. Sometimes accessing some of this information from OSHA can be a little difficult since 9/11 and the resulting changes in OSHA's website.

Use these examples with your employees. Have a safety meeting and discuss the issues. Obviously, the dangers of using a steel tape to measure a power line needs to be explained to some field crew members. Don't think that anything is too simple to discuss. That might be the very thing that adds one of your employees to this list.

RETRACEMENT

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lished corners or in fixing the position of new corners in a subdivision. The publication of precise coordinate values (with datum) will provide the future surveyor with a credible piece of evidence to locate the former position of a corner long after the original monument or its replacement have disappeared. Consequently, while a compass and chain may be the best tools to locate the original boundaries, the GPS receiver may be the best tool to tie boundary evidence into a geometric framework and memorialize the location of corners for future recovery. The acceptability and credibility of GPS measurements in boundary retracement will increase as more boundaries are set by the use of precise GPS measurements or memorialized by GPS measurements. Put in other words, when the tool of the original surveyor is a GPS receiver, the GPS receiver in the hands of the retracement surveyor will be accorded great weight in re-establishing the boundary set by the GPS technology.

Conclusion

In conclusion, the proliferation of GPS technology, if not used properly, can cause problems and errors in retracing boundaries. The technology must be combined in conjunction with a thorough knowledge of the limitations of earlier surveys and the rules of construction. The ease of GPS should not detract from the surveyor's responsibility to search for and retrace the original surveyor's footsteps.

GPS has many advantages for the retracing surveyor. GPS technology allows measurements to be gathered relatively quickly in a short time. Consequently, evidence can be tied into a geometric framework with much less effort. Old boundaries (once properly reestablished) and new boundaries can be defined more precisely and faster by using GPS technology.

This article appeared in the Benchmark (New Hampshire) Summer 2002

Knud E. Hermansen is a licensed land surveyor, civil engineer, and attorney at law. He teaches at the University of Maine and specializes in boundaries, title, and land development.

CALENDAR

February 19-22, 2003

IPLSA Annual Conference, Crowne Plaza - Springfield, Illinois

March 8, 2003

ISPLS Board of Directors meeting, Indianapolis, Headquarters

March 13, 14, 15, 2003

Purdue Short School on Land Surveying and Geomatics Engineering, Stewart Center, West Lafayette Campus. Contact e-mail: steven@purdue.edu

March 29 - April 2, 2003

ACSM Conference, Phoenix Civic Plaza, Phoenix, Arizona

April 3, 2003

Annual Meeting, Indiana Section, ASCE, University Inn and Conference Center, West Lafayette, IN

April 4, 2003

ISPLS Seminar - "Indiana Survey Law Theory of Location in Indiana Case Law", (6 Mandatory); Speaker: Gary Kent, Location: French Lick Springs Resort, French Lick, IN

April 4 & 5, 2003

LS/SIT Review Seminar, IUPUFW, Engineering Technology Building, Room ET 131, Fort Wayne, IN; Time: 9-5 each day, For more information contact Ed Sweetland (317) 547-5580 or Dianne Bennett, ISPLS (317) 687-8859

April 5, 2003

30th Annual Purdue Student Recognition Banquet, The Trails Banquet Facility, West Lafayette. Contact e-mail: berry@purdue.edu

April 11, 2003

ISPLS Seminar - "Case Study in Theory of Location & Boundary Resolution with Rule 12 (6 Mandatory); Speaker Tony Gregory, Ramada Inn Conference Center, Indianapolis, IN

April 25, 2003

ISPLS Seminar - "Case Study in Theory of Location & Boundary Resolution with Rule 12 (6 Mandatory); Speaker Tony Gregory, Ramada Inn, Plymouth, IN

May 5-9, 2003

Annual Conference, American Society for Photogrammetry and Remote Sensing, Anchorage, Alaska

September 5-9, 2003

Rendezvous 2003, Surveyors Historical Society, Lansing, Michigan. Theme: History of Surveying Education

September 12, 2003

ISPLS Seminar, Abe Martin Lodge, Brown County State Park, Nashville, Indiana

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Michelle Baumgartner - Student
Clayton Baylor - Student
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