Missouri Surveyor

A Quarterly Publication of the
Missouri Society of Professional Surveyors

Jefferson City, Missouri — December 2008

MISSOURI SURVEYOR

CALENDAR OF EVENTS

2009-2010

February 4, 2009
Board Meeting and Capitol Visits
Capitol Plaza Hotel
Jefferson City, MO

May 7-9, 2009
Spring Workshop
Lodge of Four Seasons
Lake Ozark, MO

July 10-11, 2009
Board of Directors Meeting and
Minimum Standards Workshop
Lodge of Four Seasons
Lake Ozark, MO

October 8-10, 2009
52nd Annual Conference
St. Louis Airport Marriott
St. Louis, MO

December 5, 2009
Board of Directors Meeting
MSPS Office
Jefferson City, MO

May 7-8, 2010
Spring Workshop
Lodge of Four Seasons
Lake Ozark, MO

October 7-9, 2010
53rd Annual Meeting and
Convention
Tan-Tar-A Resort
Osage Beach, MO

John Alan Holleck, Editor

Notes from the Editor's Desk

by John Alan Holleck

It is the middle of November and Sandy is lying on a beach in Hawaii while I toil away on the *Missouri Surveyor.* Fortunately, no one ever promised me that life would be fair. Some people are just luckier than others are,—it can't be because she works harder than I do? Now that my whine is out of the way, I can turn to the project at hand—the Editor's Notes. I hope this message finds everyone well and not suffering too much in our economic downturn. It is my hope that this issue has something for everyone, especially those surveyors who only receive this issue. It you like the December offering then please join us at MSPS, as we are a lot of fun.

As usual, this issue opens with a few words from me followed by a message the Society's President, Darrell Pratte. The first article involves early surveying history in Iowa. Next is "Two Types of Boundary Surveys—Original Surveys and Retracements" by Kansas surveyor Norman Bowers. A favorite of mine, Joel Leininger, tries to determine "Can Retracements be Confidential." In the second of three articles submitted to me by Wilhelm Schmidt, the author tries to explain the term "Courtesy" as it applies to surveyors. Andrew Kellie of Kentucky and Murray State University discusses "Written Footsteps," a topic well within his expertise. The final article of the first of the December edition is "Risky Business" by a fellow named John P. Bachrer.

The second half of the *Missouri Surveyor* is "Ramblings by Chuck" by Charles Ghilani who has written the definitive text on adjustments of survey measurements. Next comes "It's All in the Meridian" by Gaby M. Neunzert and followed by "What did he say?" by Arden T. Sandsnes. Knud Hermansen follows writing on "Professional Responsibility," a subject that tends to start arguments. Next is a look at "Control Points" by Warren Andrews. Last but by no means last is our own Dr. Richard Elgin who asks the very weighty question "Where Have All the Trig Skills Good?" They probably went with programmable calculators. Happy reading and please have a safe and prosperous Holiday season. Go Mizzou.

Cover: Participants brave enough to take part in the "Mandatory Recording Debate" panel included (left to right starting on back page) Chris Ferguson, Chris Wickern, Referee Mike Flowers, Bill Kankolenski, Moderator Dick Elgin, Don Bormann, Stan Emerick and Jerry Anderson.

THE MISSOURI SURVEYOR

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President's Message

by Darrell D. Pratte

It is difficult, for me, to know what is appropriate to say in this, my first, address to MSPS. To get some perspective I grabbed my December issues of *Missouri Surveyor* dating back to 1987 and carefully read each *Presidents Message*. The first thing I noticed was the size of the font. It seems there is a certain amount of space that needs filled and the number of words determines the font size. Then I began to notice several themes being repeated.

Most Presidents mention the Annual Meeting and thank those who work so hard to make this event an annual success. This year is no different, Annual Meeting Co-chairs Dan Govero and Kevin Lambeth did an outstanding job. Our debt to Sandy Boeckman grows larger each passing year.

Without a doubt each year the Immediate Past President is honored with a statement. A special tribute to Don Martin whose abilities as a leader I can only hope to aspire. Don, you are required to fulfill one more year of service to this Society, though I know this will not be your last year.

Awards are handed out and the recipients are mentioned. This year, as Chair of the Awards Committee, I had the honor and privilege of announcing Charley Kutz the recipient of the *R.E. Myers Service Award* and presenting Shane Terhune with the *Surveyor of the Year* statue.

Another common theme is the naming of the committee chairs. It pleases me to make these announcements and it is my sincere hope these men and women will find the help and inspiration needed to guide them through the coming year(s) as they strive for the betterment of our society and profession. Annual Meeting, Dan Govero continues and adds Chris Ferguson as Co-chair; Awards, Don Martin accepts; County Surveyors, Paul DoPuch accepts; CST, Bob Myers continues; Education, Dan Govero continues; GIS/Vision 21, John Teale and Joe Clayton continue as Co-chairs; Golf Tournaments, Jeff Means continues; Handbook, Stephan Nelson accepts; History, Stan Emrick continues; Legislative, Mike Flowers accepts; Membership, John Stevens accepts; Newsletter, if you've received this message John Holleck continues as Editor and Sandy Boeckman, Publisher; Nominating, Don Martin, is Chairman by virtue of his office as Immediate Past President; PAC, Rich Barr and Charley Kutz continue; Public Relations, Sharon Herman adds Rich Howard as Co-chair; Scholarship, Betty Sheil continues; Standards, Bill Kankolenski accepts; and Trig*Star, Tim Morgan accepts. If these people should give you a call asking for some help, please find the time, or better yet give one of them a call and volunteer.

Many times the New President will challenge certain committees, let's say Education. The Education Committee has a College sub-committee. This sub-committee needs to become active. We have to make sure Missouri's Professional Land Surveyors are professional in every sense of the word and education is the path that will achieve this goal. Standards, it is time to open Minimum Standards and at the very least do a little housekeeping. A Recorder of Deeds received a multi-colored Subdivision Plat and was told it did not have to be drawn using black ink. It seems that tidbit was left out of the Minimum Standards when changes were made allowing for digital documents. Legislative, I hope you will be receptive to a call from the State Land Surveyor asking for support in an effort to raise the one-dollar Land Survey fee for recording documents. Handbook, this important document is in serious need of a facelift.

Another common thread was the vision each New President held for the future. The vision was as varied as the office holder, but each President looked optimistically toward the future. Though the challenges we face may be multiplied by the economic downturn we are experiencing this could be the perfect time to reinvent ourselves. Opportunities in land information technologies could supplant construction staking. Building a better cadastral layer in our maps may yield areas for growth as the housing market slows to a crawl. MSPS has to be there to lead the way, to make sure these doors open for the Professional Land Surveyor.

Don Martin held the record for the smallest font and I just passed his word count – sorry.

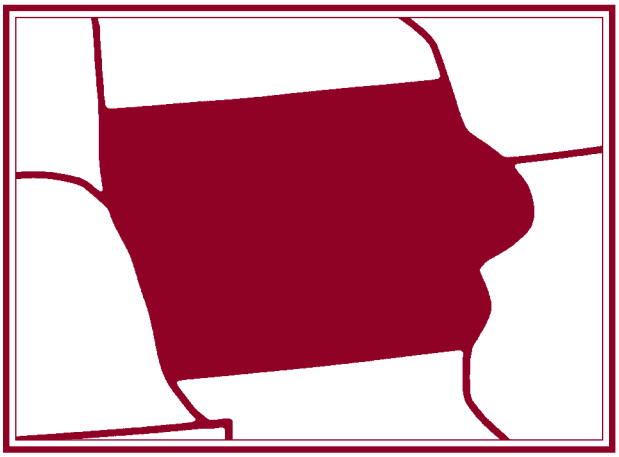
Government Surveying in Early Iowa

by Ira Cook

[Iowa Editor's Note: The following article was published in Annals of Iowa (January, 1897) Third Series, Vol. 2, No. 8, paged 603-613. the text has been transcribed exactly as printed in the original including any misspelling, capitalization, and emphasis italics in order to preserve the "flavor" of the writer and time.]

It has occurred to me that it would be well to preserve in THE ANNALS some facts and incidents connected with the Government surveys in our State, and with this end in view I propose to relate some of my own experiences.

Except immediately along the Mississippi and in a few localities on some of the larger streams, these surveys preceded the settlement of the country, so that the deputy surveyor who had a contract to survey a given district generally found himself beyond any settlement, and, as a consequence, must carry with him his house (tent) and his supplies of provisions and complete outfit for a trip extending, in some cases, over many months. It followed, of course, that he was obliged to restrict himself and his men to the simplest of necessities of food and clothing. A barrel or two of salt pork, flour in barrels, navy beans, with sugar, coffee, salt and pepper, made up the sum of our larder. For bedding we had rubber blankets, buffalo robes and heavy woolen blankets. With these we could keep both warm and dry.



A surveying party would consist of either six or eleven men, depending upon whether it was intended to use one or two instruments. First, the surveyor, then two chainmen and an axeman or mound-builder, made up the field party; a cook and teamster completed the party. This would allow us one extra man in case of sickness of any of the party, or we could use him as a flagman when needed.

My first experience was in the fall and winter of 1849 and 1850. By purchase I became the half owner of a contract to sub-divide ten townships, our district being within the present limits of Decatur and Ringgold counties, then a long way west of any settlements.

Myself and partner, Colonel John Evans, left Davenport early in September, 1849, going by way of Muscatine and thence to Fairfield, and so on west, crossing the Des Moines river in Van Buren county, and so by way of Bloomfield in Davis, where we tarried for a day to recruit our stock of provisions, as this was our last chance — for soon after leaving that town we left the settled portion of the country.

Not far from Bloomfield we struck what was called the "Old Dragoon trail," leading from Camp Des Moines, at the head of the lower rapids in Lee county, Fort Leavenworth. This was a help to us, as on it we found fords which enabled us to cross the numerous streams which abound in southern Iowa. On Grand river we found a Mormon town, called Mount Pisgah. I think this must have been in the southern part of what is now Clark county. There were about twenty families here. It was a sort of half-way place between Nauvoo and the Missouri river. They (the Mormons) had been driven out of Nauvoo and (many of them were too poor to go further) made this a resting place, built log cabins and wintered and summered here, raising a crop and then moving on toward the promised land, to be succeeded by others.

We were overtaken here by the "Equinoctial storm" and were detained some days on account of high water in the streams. We employed several of these men to go with us and thus completed our party of eleven men. After leaving Mount Pisgah we saw no more white men for many months.

In due time we reached our contract and commenced work, but we had consumed two weeks and more in getting there. I have gone into these details in order to show to the present generation what their early predecessors, as pioneers and employes of the Government, underwent in order to prepare this great State of Iowa to become what it is to-day. It took time and patience and sturdy manhood to do what was necessary to bring about subsequent results. Many times we were confronted by a broad, deep river, some of the numerous branches of the Grand or Missouri Platte, no bridge, no ford, and but very limited means at our command to overcome the obstacle. All the same the job was there and we must cross, with horses, wagon and camp equipage, provisions, etc. Sometimes we would look for two large cottonwood trees on opposite sides of the stream. These we would cut down, so that they would meet and overlap each other in mid-stream, thus forming a foot bridge. Over this we would transport our movables; then we would swim the horses over; then with chains and ropes so fasten the axles and wheels of our wagon to the box that they would float; then when that was floated to the other shore hitch the horses to the end of the wagon tongue and, with the aid of the strong arms of the men, land the same on the bank, load up and go on our way rejoicing.

I remember one occasion of this kind where we had hardly accomplished the crossing when night settled down upon us. Too tired to put up our tent, we ate a cold bite, maybe had a cup of coffee with it, and then every man seized his blanket and, picking out the softest spot that he could find, lay down for the night. My own bed was at the foot of an oak tree, using the root for a pillow. As this was my first experience of

Government Surveying in Early Iowa (continued)

this kind, I remember i thought it rather tough, but I soon got used to that sort of thing.

The time covered by my service as a government surveyor was from 1849 to 1853, and of all the men then engaged as brother surveyors, with whom I was acquainted and more or less intimate, I can not now recall a half dozen that are living. Our work was hard, our days long; in winter or summer we were at work in the morning as soon as we could see, worked as long as we could see at night, and then tramped to camp by moonlight or starlight, often for many miles. We lived on bread, salt pork, beans and coffee. Occasionally we would vary it by the capture of wild game. On this trip I remember one of the boys shot a deer, and once we found a "bee-tree" containing several gallons of honey; and once, with the aid of a big dog, a jack staff and a convenient snow bank, we captured a two hundred and fifty pound wild hog. Incidents of this kind helped not only our larder, but also broke the monotony of our lives.

We completed our work in January, 1850, broke camp and started for home. In order to have the benefit of the settlements in Missouri we travelled directly south, and on the first night of our homeward journey occurred an incident which I will relate as showing what men can endure in the way of cold, when inured to it by long exposure. We reached Platte river at nightfall, but found no timber in which to camp, only some scattering trees for firewood, and the ground frozen so hard that we could not put up our tent. We built a good, big fire, got supper, drew the wagon up so as to form a wind-break and camped down between it and the fire. We were painfully aware that it was cold, very cold, but just how cold we could not tell. Next day before noon we reached a settlement in Gentry county, Missouri, and, making inquiry as to the temperature that morning, were informed that the thermometer registered 31 degrees below zero!

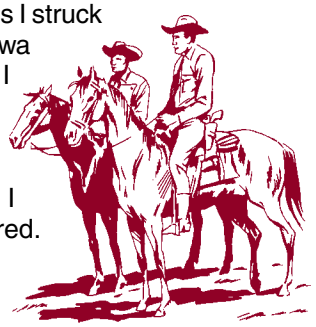
I spent seven months of 1851, and January, 1852, in Wisconsin. For some months I worked in the heavy timber and swamps between Wisconsin river and Wolf river. This was really on the divide between the waters of the Mississippi and the Great Lakes, as the Wisconsin runs to the Mississippi and the Wolf river into Green Bay. The timber, both on the high lands and in the swamp, was so dense that a good square look at the face of the sun was a rare sight. As we progressed with our work the country become impassable for a wagon. We left that, and being provided with pack-saddles, loaded our camp equipage on the horses, but not for long, and soon we left the horses and only carried what we could on our backs. Necessarily our rations shrank more and more, until on one occasion I remember we were reduced for a day and a half to salt pork and coffee. During this time there happened one of the saddest incidents in my experience in this work.

In the district adjoining mine on the east, a brother of the late Hon. Platt Smith, of Dubuque, was at work. One night we had a terrible thunder storm and hurricane. Mr. Smith had been over to my camp the Sunday before and I knew about where he was at work. The second day after the storm I found his camp, or, rather, where it had been the night of the storm, and right across the spot where his tent stood lay an immense basswood tree, uprooted by the storm. In looking around for some evidence of what had happened, we found a large beech tree, on the smooth bark of which the men had cut with a marking iron a brief history of what had happened. The particulars I learned afterward. They had camped early, got their supper and the men had all lain down for the night but Mr. Smith. He was tying his cravat to the tent pole when the storm struck them, blowing the large tree directly across their tent, killing instantly Mr. Smith and one of his men and crippling another for life. My party were so shocked and overcome by the tragedy that I doubt if a laugh was heard in my camp for a week afterwards.

Later that year I was at work further south on Fox River in the vicinity of the town of Berlin. We were now in a settled country and had more of a variety for our table. In January, 1852, I closed my work there and started home by the way of Dubuque. From Buffalo Lake, the head of Fox River, where we closed our work, to Dubuque was a good three hundred miles. People who know me now would hardly give me credit as a "sprinter;" still I walked every mile of that three hundred except six.

Early in 1852 the United Stated commenced the location of the boundary line between Iowa and Minnesota. As soon as the commission was well under way, I was sent up there to close up and sub-divide Township 100. I think my district included five ranges in Allamakee and Winneshiek Counties. My work was partly in that portion of those counties which a writer in a recent number of the "Midland Monthly" calls the "Switzerland of Iowa." Here among swiftly running streams, deep canons, mountainous hills and rocky precipices, I worked for two months and really here I had the most pleasant and enjoyable time of all my different trips. I found that the brooks and creeks were pretty well stocked with speckled trout. I had not seen one since a boy of ten years, and I could not resist the temptation to go after them. And go I did. For one whole week a cousin and myself whipped the streams, large and small. How may we captured I do not say, as I am not writing "Fish Stories," but it is enough to say that we were satisfied.

One incident that happened on this survey I must relate as a curiosity. The most of the land that was available had been taken up by squatters, and so there were a good many settlers in my district. This township 100 consists of five full sections north and south, but the sixth section was only about two or three chains wide, say eight to twelve rods. One day in running up one of my range lines I struck a man's farm. It was partly in Iowa and partly in Minnesota. When I was through with running my lines, his cultivated land was situated in two States, four townships and six sections! I thought he was pretty well scattered.



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Government Surveying in Early Iowa (continued)

My work completed, we came down to Lansing, expecting soon to get a steamboat for Dubuque. We were, however, informed that there would not be a boat down for five days. This was a good while to wait, with the wages and board of five or six men going steadily onward; so I decided to build a boat of my own. I bought two Indian canoes about twelve feet long, some two-by-fours and enough lumber to deck my craft. We lashed the canoes firmly side by side, decked them over, loaded our traps, and we seven men stepped on board. When we were all on board, we had not more than four inches between the surface of the water and the top of the canoes, but the craft was as steady as a seventy-four gun ship and we pulled out and made the trip to Davenport in safety.

In September, 1852, the Surveyor General, Hon. George B. Sargent, sent me to sub-divide a district comprising ten townships, pretty well up on the head waters of the Raccoon river, now comprised in the counties of Carroll and Sac. At that time this district was many miles beyond the limits of white settlements and was the home of the elk, the deer and the wolf. My home was then in Davenport, and, with my company of ten men, I made the trip to Des Moines on foot, my one pair of horses being sufficiently loaded with our supplies, camp equipage, etc. Here at Des Moines we spent a day replenishing our stock of provisions and necessaries for the long months we expected to spend on the prairies. Down on Second street, well toward the lower end, I found B. F. Allen with a general stock of merchandise, of whom I made my purchases.

Having now more "plunder" than my team could haul, I procured the services of our genial fellow-citizen, Ed. R. Clapp, to aid me in getting my "traps," including corn for my horses, up to my district. Ed. was not the millionaire then that he is now, but he was the same whole-hearted, good fellow that the citizens of Des Moines have known all these years. At the crossing of Walnut Creek, he suggested that a farmer at that point was famous for the "watermelons" he raised, and, of course, we all wanted some. We could find no one about the premises, but Ed. said we must have the melons, and, as he knew the way to the "patch," we soon increased the weight of our wagon-load. Ed. said something about stopping on his return and settling the bill, but I guess it is pretty safe to say that he came back by the other road.

About two miles beyond the present town of Panora, which had then just been surveyed and platted, there lived a squatter by the name of Van Order. His cabin of rough logs was occupied by himself, wife and a half-grown son. I mention this man and his little cabin because we had to do with them later. Here we left a barrel of pork and a barrel of flour, to be sent for when needed. From this point we would have no traveled roads, portions of the way were rough, and it became necessary to lighten our loads. On the third day after leaving Des Moines we reached our destination and found on the prairie a "Township Corner" that marked the beginning of my district. Here we camped, unloaded Clapp's wagon and the next morning, bright and early, he started on his lonely ride home.

For the next three or four months we worked early and late, in sunshine and storm; amid rain, sleet and snow we toiled on, but we had glorious appetites and our rations of bread, beans, salt pork and coffee never went begging, but were eaten with a hearty relish; and although we slept in a tent without other fire than that out of doors, and with the mercury often down below zero, yet we did sleep, and sleep well.

I will here relate a discovery we made, and to us it was wonderful as showing the instinct, sagacity and almost human intelligence of an animal. This was a beaver dam across the main branch of the Raccoon river. This dam was by measurement one and one-half chains (six rods) in length. Built with the skill of an engineer, diagonally across the stream from one high point to another, the breast of this dam was four feet high, constructed of trees from two to five inches in diameter, built as children build cob houses, a course up and down the stream, then a course crosswise, and so on until the required height was reached. These were filled in with smaller limbs and with clay until it became sufficiently tight to retain the water. We used this dam as a bridge for a week and never crossed it, that we did not wonder at, and admire the almost human sagacity of this little animal.

After New Year's, 1853, the cold became too intense even for us, hardened to cold as we were. Then our provisions were getting very low, and only that we found a camp of beaver trappers in a large grove on the river, from whom we were able to purchase venison, we would have been out entirely. Then, I should not wonder if we were getting "homesick." Think of it. For four months we had not heard one word from the outside world. A presidential election had been held and we had no word of the result. We decided to break up camp, go home and come back in the spring and finish up. We were about two and a half day's fair travel from Van Order's cabin, and, taking an inventory of stock, found we had just three days' rations. The first day we made good progress, after packing up, fully one-third of the way. The second morning the weather looked threatening, but we made an early start, following down the "divide" between the middle and south forks of the 'Coon river. About nine o'clock it began to snow and in a very short time the air was so full that we could no longer see our course. As a matter of safety, we turned down into the timber and camped on "Middle 'Coon." This was on Saturday. It snowed all day, and the most of that night, and Sunday morning we awoke to find two feet of snow covering woodland and prairie. I saw trouble ahead and directed the cook to boil the remainder of our slender stock of beans, and make up what flour we had left into biscuits. When we had done this, I put the whole into the "camp chest," locked it and put the key in my pocket, gravely informing the boys that I was commissary-general for the rest of that campaign.

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Trig-Star Contest

by Tim Morgan, PLS2635

Trig-Star is an annual competition sponsored by the National Society of Professional Surveyors, the Missouri Society of Professional Surveyors and a local surveyor. The goal is to recognize the best students of mathematics from school districts across Missouri and the U.S. Scholarships are awarded for the Missouri and National winner. Many sponsor surveyors offer scholarships or cash prizes for their local winner.

The Trig-Star contest is a good way to introduce high school students to surveying as a profession. We all know how difficult it is to find young people who are interested in taking up surveying. This is one way to show them first hand that there is something they can use those "silly" math classes for in real life and actually make a living with it. Trig-Star can also be a great public relations tool for your business. Most schools have an awards ceremony near graduation time and would allow you to present the scholarship in person in front of all the seniors, their parents and the faculty. Showing them that you are interested in the local school could lead to surveying jobs down the road.

At Gainesville High School in Ozark County, Missouri, I have been presenting the Trig-Star program for the past 10 years or so. We have had three winners on the state level but no national winners. We have awarded $250 scholarships to all the local winners. All of the winners have gone on to college, with only one dropping out as far as I know. One of our state winners is now a professional engineer and another one is currently in engineering school. If we can produce a winner out of our little school district, anyone can. I have worked with three different math teachers and two high school principals. All of them have been very excited about having me come to their school. I set up a demonstration of some equipment and go over some of the sample problems in one class period. Then the next week I come back for a second class period to administer the test.

I know everyone is busy, but is really doesn't take that much time to do. It is a good program for the schools and a great way to promote your business. Contact me, Tim Morgan, PLS2635, at tmorgan@pontiaccove.com, or Sandy Boeckman at msps@missourisurveyor.org if you are interested in being a local sponsor this year. I will make the program materials available to you as soon as possible so you have plenty of time to work it into your schedule.

Government Surveying in Early Iowa (continued)

Monday morning we dug our way out of the snow, crossed the river on the ice, and started on our weary, weary way home. The men were formed in two lines and broke a path for the horses and wagon. When the leaders were exhausted, (remember the snow was knee-deep) they would step outside and the next two men take their places as "breakers," the former leaders falling in behind. And so for three days we worked steadily, but our progress was slow. The days were short and much time (nearly one-half) was consumed going back and forth to the timber for camping purposes. On the morning of the seventh day we decided to leave our wagon. The horses had nothing but hazel brush to eat and were getting weak. The seventh day was warm and pleasant and the sun melted the snow considerably. That night we camped at the mouth of Willow Creek, in Guthrie county. We had no tent or shelter, but at dark the weather was not cold, and with a good fire we were fairly comfortable. We made coffee, ate a biscuit apiece and congratulated each other that we were doing so well. However, about nine o'clock the wind shifted suddenly into the northwest and blew almost a gale, growing colder each minute, and for the rest of the night we were not very comfortable, but we had enough fire to keep us from freezing. At four o'clock next morning the cook made a pot of strong coffee and distributed the very last of our food, which consisted of one small biscuit (then five days old) and one very small spoonful of cold boiled beans to each, and long before daylight we were tramping over the prairie by moonlight, nine men in a string, breaking the frozen crust of the snow to make a path for the horses and the two other men, (one sick, the other the cook, a cripple) who rode the horses. In this way we traveled until about eleven o'clock, when, ascending a high divide, we saw, several miles to the south of us, a house on the prairie and knew that our troubles were nearly over. We stopped that night with the settler and the next day before noon were at the cabin of Van Order.

We opened that barrel of flour and that barrel of pork in a hurry and set Mrs. Van Order to work, and for six days, and I may say nights, that blessed woman worked incessantly trying to fill up eleven empty men! The old man was a "mighty hunger" and deer, turkey, prairie chickens and other game hung dangling from every ridgepole of his cabin. We were able very shortly to reduce the stock on hand, while our flour and pork were as greatly enjoyed by these good people, who had seen nothing but corn bread and wild game for months.

Here I hired a man with an ox team to go after my wagon, and when he returned, having pretty well recruited our horses, we started on our homeward journey and arrived safely, without any further incident of note.

This trip closed my career as a government surveyor.

Des Moines, November 1896.

Reprinted from Random Lines, April 2008

MO Colleges/Universities Where Land Surveying Coursework is Available

The following list will be updated quarterly as new information becomes available.

Longview Community College - Lee's Summit, Missouri
Contact: Dave Gann
Longview Community College
Science and Technology Bldg.
500 Longview Road
Lee's Summit, Missouri 64081
816-672-2510

Florissant Community College - St. Louis, Missouri
Contact: Ashok Agrawal
Florissant Community College
3400 Pershall Road
St. Louis, Missouri 63135
314-595-4535

Missouri State University - Springfield, Missouri
Contact: Thomas G. Plymate
Southwest Missouri State University
901 So. National
Springfield, Missouri 65804-0089
417-836-5800

Mineral Area College - Flat River, Missouri
Contact: Jim Hrouda
Mineral Area College
P.O. Box 1000
Park Hills, Missouri 63601
573-431-4593, ext. 309

Missouri Western State University - St. Joseph, Missouri
Contact: Department of Engineering Technology
Missouri Western State University
Wilson Hall 193
4525 Downs Drive
St. Joseph, MO 64507
816-271-5820
www.missouriwestern.edu/EngTech/

St. Louis Community College at Florissant Valley
Contact: Norman R. Brown
St. Louis Community College at Florissant Valley
3400 Pershall Road
St. Louis, Missouri 63135-1499
314-595-4306

Three Rivers Communitiy College - Poplar Bluff, Missouri
Contact: Larry Kimbrow, Associate Dean
Ron Rains, Faculty
Three Rivers Community College
2080 Three Rivers Blvd.
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Two Types of Boundary Surveys – Original Surveys and Retracements

by Norman Bowers, L.S. & P.E.

Authors Note: *Two basic principles that seem to confuse new surveyors is understanding whether they are doing an original survey or a retracement survey, and on a retracement survey how to handle the discrepancy between the current measurements, the old surveyor's plat and the deed. We have to know these basic principles or surveyors create chaos by setting double corners, and casting doubt on long established surveyed boundaries. This article deals with the two types of boundary surveys. The next article will explain the relationship between survey, plat, and deed. I have a feeling that a number of surveyors may not agree with statements in this article. However, I will back up these opinions with court cases and references, and my guess is that those that disagree with me will have no basis for the disagreement other than "That is not the way I was taught to do it." If anyone that disagrees with me can back up their opinion with credible written references or court cases, I will be happy to issue a retraction. Decisions need to be based on statutes, standards and court decisions. Hopefully, this article will provide you the legal basis for understanding your duty as a surveyor is different based on the type of survey you are doing.*

Two Types of Boundary Surveys

Basically there are two kinds of boundary surveys, original surveys that create new tracts, and retracement surveys that locate the boundary previously staked by a surveyor. You have to know which type of survey you are doing, because how the boundary is shown on the plat and the boundary staked in the field is dependent on the type of survey you are doing. Too often, way too often, double corners are set because a surveyor does an original survey when he should be doing a retracement.

When a surveyor is surveying for a new tract he is doing an original survey, his duty is to set the corner markers within accuracy requirements in the minimum standards. Since this is the first time the tract has been surveyed, it is the original survey, and it is easier than a retracement because there are no bars that do not agree, there are no deeds that don't match the survey, there are no lines of possession. After the field work is completed the surveyor writes the legal description and prepares the plat describing what he did. The minimum standards require that a plat be recorded at the Register of Deeds. It is good practice to state on the plat that it was an original survey to create a new tract. It is the usual practice for an attorney or title person to prepare and record a deed using the surveyor's legal description.

In a way a surveyor doing a original survey does not create a boundary line, he just stakes a line that may become a boundary line. A boundary line is created after the survey when the adjacent land owners accept the line staked , then occupy to the line, and if it is a new tract the land owner records a deed using the surveyor's legal description. If a surveyor stakes a line and the land owners do not accept the line a boundary line is not created, and the survey has no effect. Stating this another way, the surveyor stakes what he hopes will become the boundary, but it is the actions of the landowners accepting the survey that creates the boundary.

Once the land owners have accepted the survey and occupied to the survey line a boundary has been established which cannot be changed by a subsequent survey, or the action of one of the land owners. The subsequent surveyor's duty is to retrace the original survey. This is eloquently stated by Frank Clark in his book *Law of Surveying and Boundaries*: "Where a survey is once made and parties have acted on the strength of the surveyor's lines, property rights have arisen which cannot be taken away without the consent of the owners, regardless of the errors committed by the original surveyor. It is the extensive duty of the retracing surveyor to see what the first surveyor did, not what he should have done. No matter how inaccurate the original survey may have been, it will be conclusively presumed to be correct, and that there be error in the measurements or otherwise, such error is the error of the last surveyor. Hence, the surveyor will, at all times, keep in his mind this presumption and conform his acts thereto."

If a tract we are hired to survey has had a original survey, it is our duty to locate the boundary established by the original surveyor. The retracing surveyor will never exactly agree with the original surveyor's distance and bearings, and so the current measurements will never match the legal description on the deed. However, it is the retracing surveyor's job to stake the boundary set by the original surveyor, not to stake the deed. The Kansas Supreme Court said it this way in 74 K 557, *In re Richardson:* "The primary rules for locating city plats upon the ground or lots of a platted city are the same as those for locating deeds upon the ground. They are, in order of precedence in application, as follows: (1) Find the lines actually run and the corners and monuments actually established by the original survey. (2) Run lines from known, established or acknowledged corners and monuments of the original survey. (3) Run lines according to courses and distances marked on the plat."

The Supreme Court did not say it was the surveyor's job to stake the deed. A recent trend is some surveyors think it is their duty to point out all the errors in the original survey and hold the deed as correct, but this practice contradicts rules set by the Kansas Supreme Court as stated above. Some surveyors don't know how to show or explain the differences between recorded and measured distances and incorrectly call the deed locations the true corners and cast doubt on the original monuments. Skelton his book *Boundaries and Adjacent Properties* quoted the case of *Bullard v. Kempfff* 119 Cal 9: "No rule in real-estate law is more inflexible than that monuments control course and distance."

It is my feeling that title people and sometimes attorneys have intimidated surveyors to show the deed line as the true line. This might make the title people happy, but it is incorrect on a retracement. A boundary once property established is

Two Types of Boundary Surveys (continued)

permanent, and if the measured data does not match the deed, that does not change the boundary location, it is a title problem. Boundary issues are not usually insured by a title policy and are listed in the exceptions. The standard exception on title policies is similar to: "Rights or claims of parties in possession, boundary line disputes, overlaps, encroachments, and any other matters not shown by the public record." Surveyors should not be letting title people and attorneys force us to show deed lines as the boundary lines, by doing that the surveyor is not following established boundary law. The Kansas Supreme Court said it this way in the case 173 Kan 820, *In re Moore appeal:* "Before further discussing the trial court's ruling with respect to the surveys we pause to state an established rule. It is that surveys merely establish boundary lines. They do not determine title to land involved. The subject of title is no concern of the surveyor. *(Swarz v. Ramala*, 63 Kan. 633; *Wagner v. Thompson*, 163 Kan. 662)" The minimum standards for plats require that we show the record title boundary, they do not require that we show the deed line as the boundary. The difference between a deed surveyor and a retracing surveyor is which line is staked, and how the plat is drawn. The deed surveyor incorrectly sets monuments at the deed locations and shows the deed line as the boundary, and shows the original monuments as being in error. The retracing surveyor holds the original monuments and shows how far off the deed lines are from the original boundary lines.

The definition of an original survey is kind of elusive. I could not find any laws or court cases in Kansas defining the meaning of an original survey. Certainly all would agree that the survey made at the time a tract was created is an original survey. A new subdivision is an original survey, except perhaps on the exterior boundary. A survey made after a tract was created is a little more complicated, and may or may not be an original survey. Sometimes a surveyor is called in after the tract was created. Usually an attorney or title person wrote the original legal description and the land owner or other non-surveyor laid it out, and a deed has been recorded. In this case there may be possession lines, and there is a legal description, but there is no survey to retrace. In this case the surveyor's duty is to stake the deed and show the lines of possession. If the lines of possession do not match the lines staked many different things may happen, the four most common results are: 1) The land owners accept the survey and move their fences, if any, and occupy up to the staked line. 2) The surveyor writes a description to match the occupation lines and the land owners exchange quit claim deeds. 3) One of the land owners tries to get the occupied strip by adverse possession. 4) The land owners think the discrepancy isn't worth fighting over and so the land owners don't do anything. Although this was the first survey of the property it is not an original survey unless the land owners' solution is option 1 or 2. So here again, it is the action of the landowners after the survey is made that establish the boundary where the surveyor staked it. Some texts state that in option 1, if the surveyor made a blunder, the liens occupied by the land owners may not be binding as they were occupied under a mistaken belief of where the line should be. If an original survey, made at the time the tract was created, had a blunder, the lines staked are binding on the land owners.

There has been a misconception that the monuments of the survey have to be called for in the deed to be the controlling original survey. This principle is stated well by Walt Robilard, Don Wilson & Curtis Brown in the book *Boundary Controls and Legal principles:* "To be absolutely controlling in a resurvey or retracement a corner and its monument must be called for in the original legal description." I think we would all prefer to have the monuments called for in the deed, but it is not required to be an original survey. Some surveyors have twisted the principle and think it means "Unless the monuments are called for in the deed they are not controlling," which is almost the contrary, and is not true.

There are a number of ways to determine if a tract has been surveyed when it was created. First, we have to do our title work and see when the deed was recorded that created the tract. We may find a plat on file with the county or city of a survey that was made when the tract was created. If a plat cannot be found, most surveyors recognize a legal description written by a surveyor, it usually has bearings and forms, or almost forms, a closed traverse. During the course of the field work we will be looking for monuments of the same era of when the tract was recorded. If we find a capped bar, we can call the surveyor to get a copy of the plat (the requirement to record a plat for a new tract is not as old as the use of capped bars), and if the plat was dated when the tract was created it is an original survey. Well in all these cases we most likely have an original survey. But let's say we can't find a plat, but we do find bars of the right era that match the lines of possession. In this case the facts are not so certain, you don't know who surveyed the original tract, but you know it was surveyed as you found the bars and it was a surveyor's legal description. This is where you need to know the customs in the area at the time the tract was created, the possibility of records being lost, the normal accuracy standards of the time, whether the bars have been commonly accepted and used by other surveyors. There are probably many other considerations, but you are either going to have to accept the found bars or set new ones, and you need a good reason for your decision.

So now if you are asked by a title person or an attorney why you did not stake the line in accordance with the deed, you can say you found the boundary by following the rules set down by the Kansas Supreme Court; first, that title is of no concern to the surveyor, and second, that you found the corners and monuments actually established by the original surveyor.

Reprinted from "Sections Lines" The Kansas Surveyor, August 2008

Can Retracements be Confidential?

by Joel Leininger, LS, Principal of S.J. Martenet & Co., Baltimore, MD and Associate Editor, American Surveyor

Do your clients have a right to expect that the survey you conduct for them will be confidential? Let's assume for a moment that mandatory survey recording laws did not exist (and indeed, they do not exist in most areas) and that no other obligation to divulge the results of the investigation existed. Can clients restrict access to our work?

I've had several clients ask me not to place markers at property corners until I have pointed out to them where the corners fell. Although most would not admit their reasoning, it seemed clear to me that their delay was to deny their *neighbor* knowing where the line fell, unless they themselves liked the location. Of course, we have no jurisdiction over our clients' motives, and even if we did, clients are very capable of removing markers after we drive off. Nevertheless, those clients at least presumed a right of disclosure (or not).

Other professions clearly have confidentiality between client and provider as a core tenet of the profession's *ethos*. Attorney-client privilege is such an inviolable trust that the lawyer can lose his license for breaching it. Doctors, accountants, the clergy, financial planners, etc., all have a client's privacy as a paramount objective. But does it extend to us?

I think not, at least not automatically. Clearly we have the ability to enter into confidentiality agreements with clients (or others) who wish to ensure that their private affairs are not exposed merely by hiring a surveyor. And, in some instances, sensitive negotiations can be endangered by the premature disclosure of intentions. In litigation, disclosing the strategy to the other side is a surefire way to not get hired by that attorney again.

> ***How can our work be private when we often monument our results?***

The Ethics of Disclosure

Some surveyor codes of ethics dictate that the licensee must "hold the affairs of his client in confidence." Perhaps someone can write in and tell us where "affairs" stop and "property" starts. I see property as wholly within people's affairs. Most folks agree with me — just try and take some property without their permission. And if property is within that sphere, the retracement of the limits of that property must necessarily be a part of those affairs. So, that is to be held in confidence?

To assume that our dealings — with or on behalf of clients — are private is to impose several constraints on our future use of that survey. First, can we consider that data in a later survey in the vicinity? Can we separate the survey from its supporting data? Can the control be re-used in the future? Must we relocate all the evidence previously gathered? Second, who at the firm would be authorized to later view the survey? Only the surveyor who signed the finished work, or anyone employed by the firm? How about after the surveyor leaves for another firm? If clients own (and control) the survey, who owns it when they die? Who "owns" the data anyway? For what, exactly, did the client pay?

Sticky, sticky, sticky. The very thing that separates our business from that of other professions — our heavy reliance on records — is the thing that complicates privacy in years out. Think about it: doctors have no need of patient records to treat other patients. Obviously accountants do not need to consult the files of one client to assist another. But we do. What happens then?

Agreements

As for those confidentiality agreements, we would do well to examine them carefully before signing. In most instances, the need for privacy is a temporary one, just until an anticipated event takes place. Inserting time-limiting language in the agreement can mitigate most of the concerns outlined above (unless, of course, the time specified is measured in decades!). Our firm has threatened to refuse work because of overly-broad confidentiality language we felt would adversely impact our future operations in an area. Explaining to the client how the quality of their project will be enhanced by our consideration of previous work in an area usually convinces them of the perpetual utility of records.

Beyond all that, how can our work be presumed confidential when we often monument our results? The very nature of monumentation is to put others *on notice*; notice is repugnant to confidentiality. The recordation of our plats is another form of notice. On one hand we piously claim to safeguard our client's secrets, while on the other we document their holdings in the most accessible and permanent of repositories — the land records. Frankly, given the public nature of our results, it seems hard to assert privacy with a straight face.

But, some surveyors do. I have had surveyors balk at releasing information on former surveys because their clients had not authorized the release, even in instances when the surveys were decades old. In some cases, both the client and the original surveyor were dead. We know these are merely ploys to avoid releasing the data. A former boss of mine (now dead) routinely took that position. Looking back, I realize that no agreement ever existed between him and his clients curtailing access to the data. He just didn't want to give the records out, period. What goes around, comes around. Since our firm now has his records, they are available to all. Come and get 'em.

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Courtesy

by Wilhelm A. Schmidt, PLS

Editor's Note: *This the second of three articles given me by my friend Wilhelm Schmidt on what he refers to as the social virtues. "Courtesy" was first published in the First State Surveyor (Delaware) and is published with the author's permission.*

We usually think of courtesy as a matter of etiquette (French for "ticket" into high society), not ethics. But there it is in the statutory codes of several states (DE, MD, OR, SC, TX, VA): "Honesty, justice and courtesy form a moral philosophy..." (taken from an article by Bennis W. Meeks, "Ethics and Fair Practice", *Surveying and Mapping*, Dec. 1969, p. 631).

How does courtesy warrant inclusion in a code of ethics? According to Aristotle, courtesy is a moral virtue. It is one of the virtues of sociability, the others being honesty and ready wit. It is the disposition to act in a way that is neither subservient nor confrontational, but the mean - the so-called Golden Mean - between them. We call the disposition friendliness. But we also have other words for it: courtesy (courtliness), politeness and civility (derived, respectively, from the Greek and Latin words for city). Nowadays, we call those who are excessively courteous toadies, and those who are deficiently courteous grouches.

The fact that courtesy is called for in a code of ethics implies that it can't always be counted on. Indeed, surveyors tend to be gruff in speech and coarse in dress. The articulate man in a suit is often derided. But the need to use plain language and to wear field clothes does not give surveyors license to be ill-mannered.

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Obviously, success in the practice of a professional business requires courtesy. Nothing turns off a client faster than a fit of ill temper. On the other hand, a surveyor cannot simply do what the client wants, but must exercise independent judgment and be impartial. All too often, this entails telling a client things that are disagreeable, such as the cost of the survey and the client's mistaken assumptions about the location of a boundary line or about the feasibility of a development. A surveyor must say these things firmly, yet nicely.

With each other, surveyors tend to be civil, but not all too respectful. Perhaps I'm jaded from having heard too many disdainful remarks about other surveyors. But how many of us actually have another surveyor as a friend? We tend to shy away from each other, even though we have a common interest, the practice of the profession.

For the good of the profession, we should make every effort to extend professional courtesy to each other. We should pick up the phone when we come across something questionable, and tell the surveyor responsible for it. We may find out that he/she has pertinent information we do not have. We should resolve any differences between us, and present a solid front to clients and officials. We should be generous with plans in our possession. Surveyors have a public trust, the execution of which, to my way of thinking, requires that we share information for the public good, despite the implicit loss of profit or the possible discovery of an error. Finally, we should adhere to the strictures of codes of ethics concerning competition among surveyors and the surreptitious reviewing of their work. Although these strictures have been eliminated from most codes as a result of actions taken by federal agencies ("Ethics and Free Trade", *Professional Surveyor*), they are as pertinent today as they were when they were first promulgated.

While any lack of courtesy among surveyors is a pity, it is the downfall of professional societies. The vast majority of surveyors do not join because they see no benefit in associating with other professionals. Many of those that do join attend conferences, but are inactive otherwise. The failure to join and to be active may not seem to be a lack of courtesy, but how else can it be explained? But then, courtesy is no more prevalent in societies. One would expect their members to treat each other as equals, which professionally they are. But, in an organization, a hierarchy tends to develop. A few members equate the good of the society with their perception of it, and acting in concert, stifle fresh initiative. They sound off about being team players, but they want to call all the plays.

Courtesy is also in short supply among editors of professional magazines and society newsletters and among the writers for them. For example, some articles of mine have been printed without prior acknowledgement and reprinted in other newsletters without permission (see "Fair Use," *Professional Surveyor*). Some articles - worse yet, poems - have been reworked by editors without consulting me about them. As a result, they contain oddities and misstatements that are then attributable to me. Unfortunately, such incidents are not isolated. My complaint against other writers, as well as presenters of workshops, is that they are unresponsive to communication. They seem to want nothing to do with each other. Instead, they ought to have a sense of collegiality. Without it, they keep harping on the same themes without coming to any consensus.

Lastly, I must bring up the uneasy relationship between surveyors and educators. We surveyors are called upon to support academic programs, and we should. But in the eyes of university professors, we don't measure up (pardon the play on words). The difference between us is understandable. They must be ahead of the profession, while we must be

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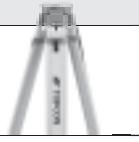

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Advancing technology is at the heart of my business plan. It allows me to compete directly on projects in ways that weren't possible 8 or 10 years ago. It takes a lot of effort to stay on the leading edge and it takes support as well. Hands down, Hayes has the best technical support that I have ever used. They know their equipment and they know their software.

When I need an answer, I need it now. I'm not real interested in excuses, and I don't appreciate the line: 'Johnny is busy right now and maybe he can call you back tomorrow.' If I tell my clients that maybe I can meet their schedule, I'm reasonably certain they will tell me that maybe they can get someone else. Hayes understands that and they have always given me strait answers to every question I've asked. Sometimes the answer is yes and sometimes the answer is no, but my clients get the truth from me and that's what I get from Hayes.

There will always be logistical issues in surveying. The one thing I haven't learned to do is to be in two places at once, but I am working very hard on learning how to do that. Hayes in Tennessee and me in Florida has never been an issue. The truth of the matter is that with overnight deliveries, the internet, email, FTP access and the telephone we can all do business with just about anyone we want.

I'm a Consulting Surveyor and I wouldn't have it any other way. Things change and my business will change right along with them. The keys are motivation, support and always remembering that the harder we work, the more luck we have."

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Courtesy (continued)

practical. We employ the knowledge and the technology that serves us best, not always the most advanced. In fact, we must often resort to the most basic means and methods to retrace boundary lines properly.

Despite these lapses in etiquette/ethics, I think that surveyors and their supporters on the whole are good people, and common courtesy compels me to give credit where it is due. Without mentioning names, I have had fruitful exchanges with educators from Maine to New Mexico, and with editors of newsletters from Maryland to Missouri. I have corresponded with individuals around the world, and worked closely with some in easy reach. I also know that I have some staunch readers. That is at least a good start.

Editor's Note: "Courtesy" first appeared in the First State Surveyor, Winter 2007, and is printed herein with the permission of the author.

Can Retracements be Confidential? (continued)

The Big Picture

Although it is not our place to decide what should be and what should not be important to our clients, we have a duty to the public in preserving (and making available) information on property boundaries. In our society's form of land ownership, that of an interconnected fabric of holdings, the very interconnectedness implies that others have an interest in knowing property limits. Sadly, because of the threats confronting on-the-ground evidence of those holdings, the preservation of those locations is a central task for us. We surveyors are stewards of that knowledge, holding it in trust for society at large. Few clients begin conversations with us with that in mind, but we must never forget it.

Confidentiality flies in the face of that. Just between you and me.

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Written Footsteps

by Andrew C. Kellie, Department of Industrial & Engineering Technology, Murray State University, Murray, KY

I was looking over some deeds the other day puzzling on how shabbily land has been treated by people who subsequently live their lives on it or make their living from it. Indeed, it's easy to see why Hallmark prints greeting cards instead of being in the surveying business. When it comes to describing land in such manner as to convey the same in a deed, there sometimes seems to be little concern about caring "enough to send the very best". However, my puzzlement did lead to come things that seem worth considering.

It all began a few months ago when a client stopped by with a deed for land acquired just a few years ago. Now, it is well accepted that the function of a boundary retracement is to "follow the footsteps of the original surveyor". Where the surveyor stepped is to be drawn from the writings that describe the property involved, and in this case the deed involved had been drawn in the late 1980's. The neatly printed legal form, the formal type font, and the signatures and seals all combined to give the deed an "official" appearance. The description set out the courses and distances on the lines and the monumentation at the corners in a typical, approved, metes-and-bounds, manner. This was encouraging. It appeared that the retracement would involve carefully described land based on a recent, carefully drawn deed.

The description was lengthy, and I had to read it several times in order to visualize the boundaries and to form a mental picture of the trace being described. The first reading disclosed that there was a ridge involved. The second reading resolved the confused bearings and distances into separate series of bearings and distances describing the east, north, west, and south lines of the land. By the third reading I was becoming familiar with the corner monuments (generally trees) and I had identified the names of the adjoiners.

> ***It was clear that the next footsteps by this surveyor needed to be in direction of the the county courthouse.***

The bearings were described to the nearest degree (North 49 degrees East, for example). The distances were stated to the nearest pole (17 poles, for example), and the species of each tree called as a corner was stated (white oak or poplar, for example). This seemed to suggest that the description might have been prepared from a field survey. This was encouraging. It implied that if I were to have to "follow the footsteps of the original surveyor" there might be footsteps to follow.

Despite the recent date of the deed, the bearings and distances given seemed to suggest that the description of the land was of somewhat earlier date. Bearings to the nearest degree implied the use of a magnetic compass, and distances to the nearest pole suggested work done early in the last century — or earlier. This was discouraging. Even if the description had been crafted in the early 1900's, it implied that in the roughly three generations that had elapsed since that time, no one had felt the land valuable enough to survey. But . . . maybe some of those trees called as corners were still there.

That thought raised another question. It was apparent that at least some of the numerous corners called for in the description were trees of species often described by foresters as valuable hardwoods. Local knowledge of the area, however, suggested that the land definitely was not the place for squirrel hunting. I put two and two together — no squirrels, no nuts, no trees old enough to grow nuts.

That knowledge, in turn, raised the specter of (gasp!) logging. Logging potentially would affect the recovery of those corners described as being a "white oak" or a "red gum". This was discouraging. It implied that some of the corners marking the land to be surveyed might have been converted to furniture. The footsteps of the original surveyor might even now be gracing living rooms throughout America. But . . . maybe the loggers left the poplars.

Reflecting still further, I couldn't help noticing a statement at the end of the deed that excepted from the conveyance mineral rights previously conveyed to a certain coal company. The exception raised the specter of (gasp!) surface mining. This was discouraging. It implied that if I were to have to "follow the footsteps of the original surveyor" there might not be footsteps to follow after all. I gave up on the poplars. But . . . maybe the miners left the ridge.

To visualize the land described, a deed plot seemed to be in order. This disclosed a massive misclosure. Having had experience on numerous occasions in tracking down the location of mistakes in field work done by tired or distracted field crews, I couldn't help noticing that the closing line was almost exactly parallel to one of the calls of the locus. A field mistake often can be found in the measurement of the distance of a line parallel to the closing line. I was encouraged. If there was a simple mathematical mistake in the deed, I might be able find it.

Reflecting further, however, I recalled that I wasn't checking my own field crew who might have made a single mistake in measurement. If there was a mistake in measurement (and that's a big IF) it would have been made a long time ago. The misclosure might not have been the result of a single mistake; mistakes might have been made on two lines, or there might be an omitted line, or an extra line might have been included

(continued on page 21)

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Risky Business

by John P. Bachner

I was leading an ASFE professional practice 101 seminar a few years ago and was waxing poetic about liability issues, in hopes of imbuing attendees with an appropriate amount of fear. The examples I was citing seemed to be doing the trick for all except one fellow sitting in the front row, who seemed utterly bored. At the first break, he smiled knowingly and said, "You're really scaring these guys."

"You're not scared?" I asked.

"No. All I do is subdivision layouts for developers."

"But what about your duty of care?" I asked, somewhat surprised. "You have a duty of care to everyone who buys a home in the subdivision."

I don't worry about duty of care," he said. "The developers are all my friends."

And with that, he left the seminar, secure in the false knowledge that, somehow, having a developer as a friend would shield him from a lawsuit filed five years later by a homeowner alleging that, because of faulty subdivision planning, water got into the plaintiff's home, causing a mold infestation that led to illness, lost work, diminution of the home's value, and any number of other costly problems. You need to know about duty of care because — when all is said and done — it can be even more important than the duty you owe to a client.

You need to know about duty of care . . .

As a professional engineer or land surveyor, you benefit from a government-sanctioned monopoly that forbids unlicensed people from performing your kind of engineering or surveying, which is a good thing. But there is a catch.

In return for their monopoly, licensed professionals are duty-bound to preserve and protect public health, safety, and welfare. Loosely translated, this means you owe a duty of care to anyone who foreseeably could be harmed by what you do.

Is it foreseeable that the developer would use the civil engineer's plans, and then build homes that people would buy? Of course. Is it foreseeable that, if the civil engineer committed an error or omission, one of the homeowners would be injured or damaged? Of course. As such, civil engineers need to consider the needs of homeowners and other third parties when developing and implementing a scope of service for a single-family residential subdivision.

Because you are duty-bound to preserve and protect the public health, safety and welfare, "the client made me do it" is not an excuse for failing to implement your duty of care. Why? As often is the case, the question answers itself when you ask, "what should a physician do?" For example, let's say you are about to undergo open-heart surgery and, to keep expenses down, you instruct the physician, "just close the wound with some super glue." The physician fulfills your request and, predictably, you die. How would the courts react to the defense, "all I did was what the patient asked"?

One of the cases I use in explaining duty of care involves an older couple who decided to use their savings to build a quadplex. They would occupy one unit for the rest of their lives, they told their architect, and use the income from renting the other three units to pay all the bills. Their budget was limited, so they told the architect that, above all, they needed low first cost. The architect obliged. He also made it a point to document everything, which was a good thing, because about five years after the quadplex was first occupied, the owners condominiumized the place and left for warmer climes.

It didn't take long for the new unit owners to experience buyer's remorse. Because of cheap materials and workmanship, the roof began to leak, the paint began to peel, banisters fell off railings, and so on. The homeowners filed a claim against the architect on the grounds that it was foreseeable that the couple would condominiumize the building and, as a consequence, the architect owed the potential unit owners a duty of care, and that he ignored that duty by agreeing to satisfy the "developer's" low-first-cost request.

The architect countered with documents showing that the couple clearly intended to live in the quadplex for the rest of their lives, and, as a consequence, condominium conversation was not foreseeable. That being the case, the only party to whom the architect was liable for quality issues was the client. And the court agreed.

However, foreseeability is established on a case-by-case basis. Consider the case of the young man who was taken to jail and committed suicide by hanging. He fashioned a noose from his athletic shoe laces, tying one end to a coat hook in the cell. The young man's family sued, alleging that the architect failed to meet his duty of care because it was foreseeable that someone who is arrested may be depressed enough to commit suicide and, as a result, specifying a coat hook for a jail cell was negligent. Foreseeable? Yes, said a judge.

So there you have it — yet another issue you didn't know anything about before you decided to become a licensed professional. But did your teachers owe you a duty of care?

John P. Bachner is the executive vice president of ASFE, a not-for-profit association that provides programs, services and materials to help geoprofessional, environmental, and civil engineering firms prosper through professionalism. Visit ASFE's website at www.asfe.org.

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Charles Kutz Receives Service Award

The 2008 Robert Myers Service Award was presented to Charles Kutz at the annual meeting banquet on October 17 at the University Plaza Hotel in Springfield, Missouri.

Charley most recently served and the Missouri Governor to the National Society of Professional Surveyors (NSPS) and is being considered to replace Rich Barr as the Area 6 Director to NSPS. He is a Board Member of the Kansas City Metro Surveyors Association and a past president and board member of MSPS.

Charley is owner and president of R.L. Buford and Associates, a survey company in Parkville that was founded in 1951. He is licensed in Missouri and Kansas. He is a former Platte County Commissioner, former Mayor of Parkville and former County Surveyor of Platte County Missouri. He has 40 years of surveying experience and has served on numerous MSPS committees including chair of the Legislative Committee.

The Robert Myers Service award has been given since 1990. This award is given to an MSPS member who, over an extended period of time (ten years minimum) has given exemplary service and dedication to the surveying profession and in particular to the Society. Nobody deserves this honor more than Mr. Kutz! Thanks for your many years of service to the surveying profession.

Written Footsteps (continued)

in the description. This was discouraging. It was clear that the next footsteps by this surveyor needed to be in direction of the the county courthouse.

Work at the courthouse showed that a previous deed to the locus, drawn in 1903, appeared to be the source of the description used in subsequent conveyances. The 1903 description, however, included some additional calls that were somehow omitted from the later deed. It also appeared that the distance in another call had been transposed. Additional trees (yes, valuable hardwoods) were identified at some of the corners. Even more important, however, was that the calls for the part of the south line described that line as "running along the slough". I was encouraged. There was another monument with which to work.

As I noted at the beginning of this article, some of the calls in the deed were for adjoiners. Such calls may simply describe the name of the neighbor next door, or they may imply the existence of a senior right. A call for an adjoiner may even constitute a call for a survey — as in a survey-for-a-patent. Investigating the senior rights involved means more work at the courthouse. But there is little alternative; a grantor can't sell to another land already conveyed, and obviously the junior grantee can only purchase whatever land is left to the grantor after earlier conveyances. So, if the adjoiner and the client are from a common grantor, who bought first (actually, who made it to the courthouse first!) must be determined. I was encouraged. I have always respected the manner in which an attorney makes precise use of English, and the term remainderman is particularly evocative.

Finally, it seemed appropriate to investigate the question of a patent. To determine the original patentee always seems to put one in touch with history. Also, you get to work with the state land office. That feels very official and important. I was encouraged. It was finally getting to the point where it would be possible to make footsteps to the field to "follow the footsteps of the original surveyor" — to the extent that such was possible, anyhow.

So, after all of this, just where are we, and what are the things worth considering that were mentioned at the beginning of this article? Very simply put, if a surveyor is to "follow the footsteps of the original surveyor" it is necessary to know where the first surveyor measured. Is the deed description on which the client relies correct, or has the description been passed down over the generations with gratuitous mistakes, transpositions, and omissions? Do previous deeds in the chain of ownership to the property describe the locus differently? Are there outsales from the locus not shown (oops!) in the client's deed? Is the adjoiner called for in the description senior or junior to the client, and which is the infamous remainderman? If lines were run with a magnetic compass, when was the work done? If a patent or patents are involved, how did those writings describe the line(s)? Field measurements are fascinating, and data collectors can record hundreds (nay, thousands!) of measurements in a day. Computers can process our data and yield a map. And all of our measurements are meaningless unless made where the first surveyor made his — as described in the writings.

Reprint from the Interior Angle, 2008

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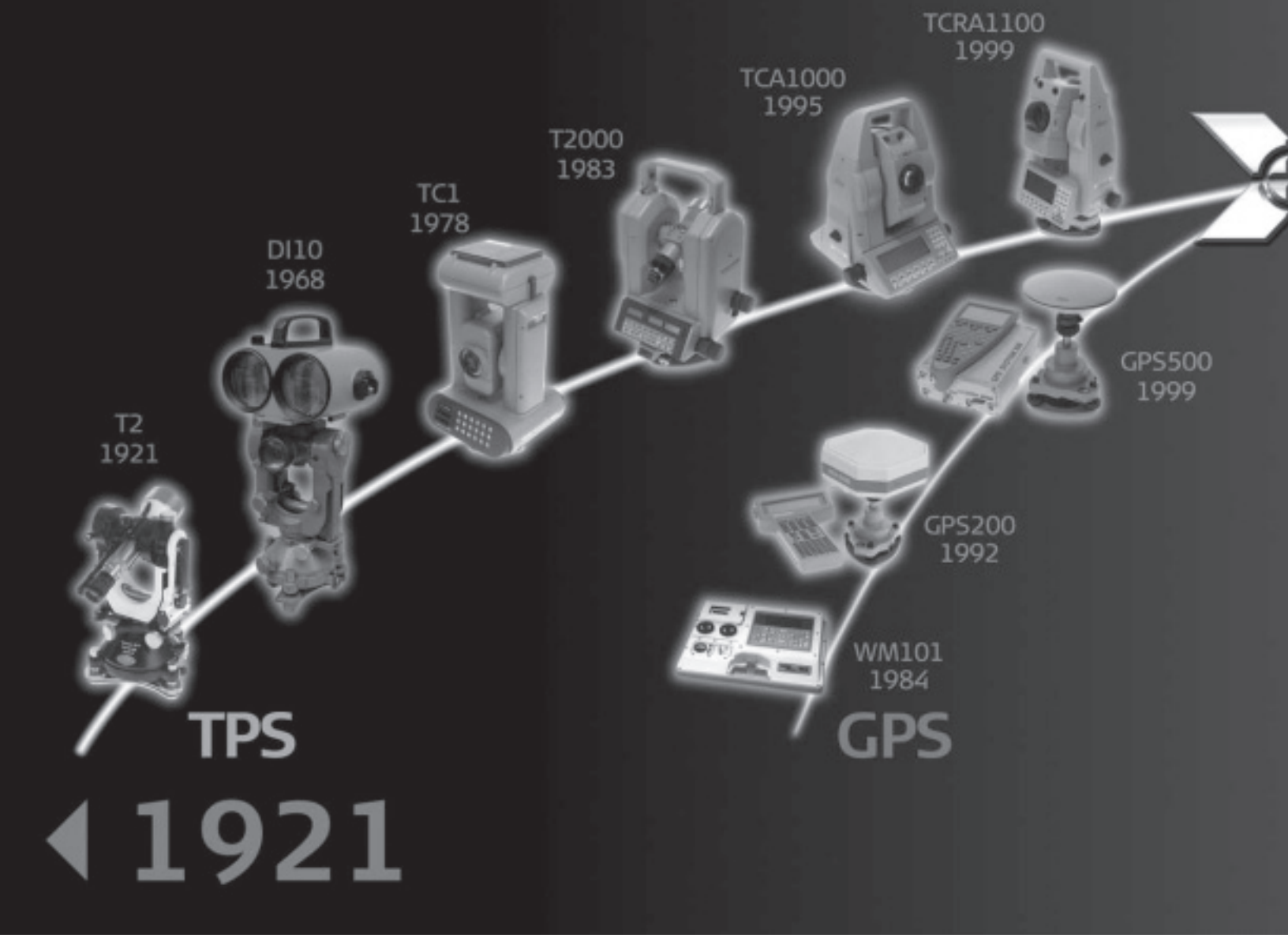

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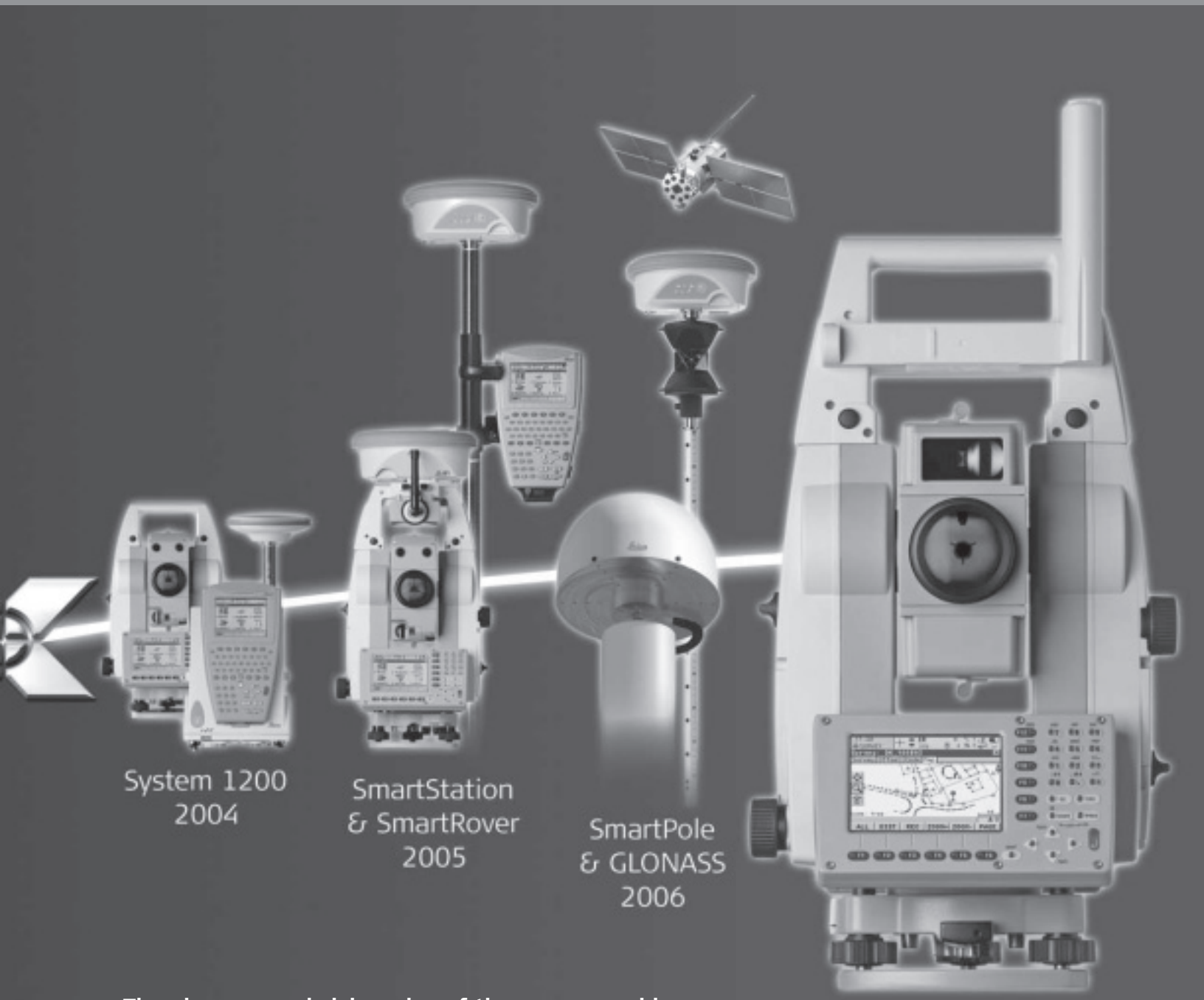

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Ramblings by Chuck: Reduction of Observations in State Plane Coordinate Systems

by Charles Ghilani, PhD, Penn State Wilkes-Barre

At times there is a need to change the coordinates from one state plane coordinate system zone to another. For example, converting PA South Zone coordinates to PA North, NJ, NY, OH or some other neighboring state's state plane coordinate system. There is often confusion on how to do this properly. Actually, it is really a simple matter. To understand why this is the case we need to understand some basic principles about map projections.

Map projections provide a 1-to-1 mathematical relationship between points on the ellipsoid having geodetic coordinate values with those on the map projection surface (also called a *developable surface*) having map coordinate values. State plane coordinate systems use either a cone or a cylinder for their developable surfaces. The Lambert conformal *conic* map projection system is used for the two state plane coordinate system zones in Pennsylvania. Many surveyors believe that the zones stop at their limits. This is equivalent to people believing they would sail off the edge of the Earth before Columbus proved otherwise. While these developable surfaces have their limitations, it is important to realize that the map projections themselves span nearly the entire Earth, and thus do not have the physical boundaries as defined by the state plane coordinate systems. In essence, the SPCS zone limits are not defined by the map projection system, but rather by the desire to limit the scaling differences between distances on the ellipsoid and their equivalent distances on the developable surface.

The fact that the map project surface does not stop at some political boundary becomes the basis for converting between zones. For example, the PA North zone actually circles the Earth. So what happens if you use the PA North zone parameters to compute a point in Europe? Quite simply, you would get rather large SPCS coordinate values and a huge convergence angle. Still if proper reduction techniques are followed, the computed coordinates will be correctly located in the map projection system. Figure 1 depicts the entire conterminous U.S. (CONUS) projected using the PA North zone state plane coordinate system. Notice that our North zone projection system does not stop at its well-known political boundaries. Thus, it would be entirely possible for the U.S. to adopt the PA North Zone map projection system for the entire U.S. However if we did this, the distortion between the ellipsoid distances and their equivalent mapping lengths would be considerably less, and the difference between a geodetic azimuth and its equivalent mapping azimuth would be large, on the order of 27˚ near the west coast.

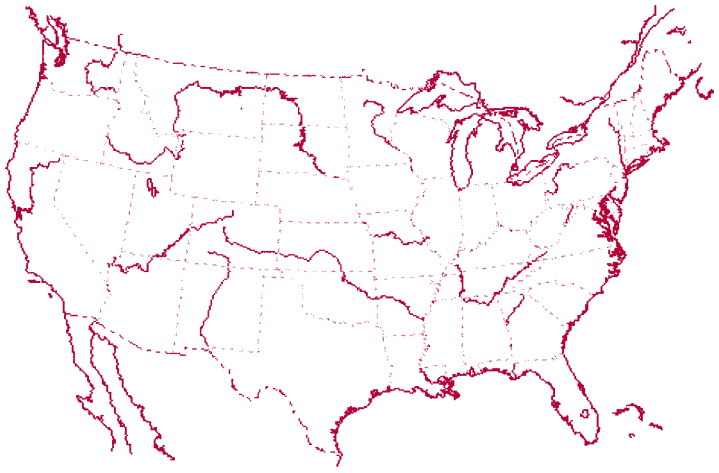

Figure 1. The conterminous U.S. mapped using the PA North Zone SPCS.

Still, the above example demonstrates one possible solution to conversions between zones. Recalling that geodetic coordinates for a point are only datum specific and that there is a mathematical 1-to-1 link between map projection coordinates and their geodetic coordinate equivalents provide us with a zone conversion procedure. First compute and adjust all the coordinates in a survey using one zone. Following this, the SPCS coordinates can be converted to their geodetic coordinate values. Finally, the geodetic coordinates can be computed in a second state plane coordinate system. Itemizing, the procedure is as follows:

Compute all coordinates for the survey in one zone no matter where the survey ends. For example, if a survey started in the PA South zone and then crossed over in the NJ state plane coordinate system; compute the entire survey's coordinates in the PA South zone.

Perform inverse computations on all points that need to be in the NJ system to derive their equivalent geodetic coordinate values.

Finally using the geodetic coordinates, compute the NJ state plane coordinates for these points. You have now determined SPCS coordinates in another system from your original survey with no loss of accuracy to the survey. If you adjusted your original survey, the NJ coordinates will also be adjusted and their inverses will provide adjusted distances and directions.

A second method that is sometimes used is to:

Determine the geodetic coordinates between two consecutive traverse stations that are in the overlap region between the two SPC

(continued on page 26)

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Shane Terhune Recognized as Surveyor of the Year

The Surveyor of the Year award has been given since 1987. This award is given to an MSPS member who has given freely of his time and efforts to the organization and toward the betterment of the surveying profession. This year's recipient was F. Shane Terhune of Savannah, Missouri.

Mr. Terhune began his surveying career with Williamson Engineering & Surveying working on a survey crew in 1978. He was employed as a Crew chief for Crowley, Wade, & Milstead from 1987 until 1991 when he switched to serve as Land Surveyor and Survey manager for Bartlett & West Inc. He has been employed with Bartlett & West since that time. He attended Surveying Courses at Longview Community College, Johnson County Community College, the University of Missouri at Kansas City, and the University of Missouri at Rolla.

He was licensed as a Missouri Land Surveyor in 1991. He has served as the Andrew County Surveyor since 1996, and is a member of the Missouri Association of County Surveyors. He was an evening instructor of Surveying Classes at Missouri Western State College from 1994 until 1996. He is a board member of the Kansas City Community College Land Surveying Advisory Board. Shane was President of MSPS in 2007 and served on the Board of Directors for eight years. He has served on various committees including Legislative and was past chair of the Nominating and History committees.

He is a recipient of the Roy Chard Award from Savannah High School and past Savannah R-3 School board committee member. He is also a past member of the Saint Rose of Lima Parrish Council and Youth Group Director as well as a member of the Trojanettes Softball Hall of Fame.

Congratulations Shane!

Ramblings by Chuck (continued)

systems. It should be noted that two consecutive traverse stations are required in order to transfer the azimuth of the course from one zone to another.

Using these geodetic coordinates; compute their SPCS coordinate values in the new zone. Using these values, continue your survey in the new state plane coordinate system.

The second method inhibits one's ability to perform standard traverse closure checks and adjustments on the survey. Thus, the author prefers the first method since standard computational practices can be easily followed. After adjusting the survey, the final adjusted coordinates can be computed in the new system, which was the stated goal in the first place.

The first method has one important concept that must be followed. That is, all observation reductions and coordinate values must be made in a single zone. For example, if the coordinates of the closing station are in a second zone, then these values must be converted to their primary zone equivalent values. For example, if the survey is performed in the PA south zone, but the closing coordinates are in the NJ state plane coordinate system, the coordinates of the closing station(s) will need to be converted into their equivalent PA south zone values. In essence, all observations and control coordinates must be in a single state plane zone before any misclosures or adjustments are computed in Step 1. After the coordinates are adjusted in the primary zone, the adjusted coordinate values can be converted to the second zone using Steps 2 and 3.

If all the appropriate reductions on the observations are made, the quality of the final NJ coordinate values will match that of the survey. The process is straightforward. Since most of today's software can convert coordinates between geodetic and state plane coordinate system zones, the process is really quite simple. Simply perform all reductions and computations in one zone and then convert the final adjusted coordinates to the second zone.

For more from Dr. Ghilani, attend the 2009 PSLS Annual Surveyors Conference in Hershey, PA beginning on January 25, 2009. Chuck will once again share with us his expertise on "State Plane Coordinates"

Reprinted from "The Pennsylvania Surveyor", Summer 2008

It's All in the Meridian

by Gaby M. Neunzert, PLS

One of the more noticeable visual effects of a United States and Canada political map are some of the "straight line" boundaries of the western states or provinces. Usually boundaries follow natural features such as rivers, shore lines or watersheds, but, for example, Colorado and Wyoming are bound by east-west and north-south lines artificially drawn on a white paper and physically anchored in a featureless landscape. Both states would show up as rectangles on a Mercator map, even though on the ground the north-south boundaries as meridians converge on the North Pole and the east-west lines are parallel, small circle routes. Most of these states or provinces were created on paper during the 1840 to 1870 time period, with their boundaries physically surveyed on the ground some time later. Drawing these boundaries on a map, especially on a Mercator projection, is very easy, i.e., draw a rectangle; surveying the same boundaries on the ground before GPS and portable time, was considerably more difficult. With a transit and without calculations, establishing true north for the meridian involved mechanically splitting sightings of Polaris or a circumpolar star at eastern and western elongation. But since flashlights had not been invented, a lantern with a candle had to be used to illuminate the cross hairs and make field notes. At lower latitudes sighting Polaris was easy since the star was only 35˚ to 40˚ above the horizon and prolonging a straight line towards it produced good results; weather and remote location aside, running the border between Alaska and Canada could not have been easy with the pole star further and further overhead.

Compared to physically running a meridian, establishing a predetermined longitude to any degree of accuracy was almost impossible. Since the determination of longitude involves time, a portable chronometer, sufficiently rugged to survive the "wild west" and good ephemeris tables were needed. An error of one second in time produced an error of very roughly 1200 ft on the ground. Sighting stars with a 1m transit and poorly illuminated spider web cross hairs, probably yielded location accuracies of several minutes of arc or very roughly a mile. Getting a meridian initially located even near its intended position and later locating that same meridian further north or south to continue the line, speaks very highly of the original surveyors and their skills. Thus considering for example the 72nd meridian as shown in the illustration, which runs from the U.S.-Mexican border, through the Four corners area to the southern border of Wyoming and is, including a slight dogleg on Colorado's western boundary, about 743 miles long.

In addition to controlling Canada's provincial boundaries, meridians also are used to define the Principal Points of the Dominion Land Survey; conceptually similar to the US Land Survey System. Starting with the First Meridian (97˚27'28.41"W) and then the Second through Seventh Meridian (102˚, 106˚, 110˚, 114˚, 118˚ and 122˚ W), Principal Points are located at about 24 miles intervals north or south, at the intersection of the respective Meridian and an east-west small circle route called "Base Line". Many Canadian Sections, just like in the U.S. about 1 mile x 1 miles, are surrounded on the outside by a "road allowance" either 1.5 chains or 1 chain wide. A word of caution: in a Township, Canadian Sections are numbered differently than American Sections!

Given the nature of cartographers, surveyors and maybe even politicians, laying out a meridian at random values, unless dictated by topography, is not "neat". As shown on the map ***(see illustration map, page 30),*** seven boundary meridians (25˚, 27˚, 32˚, 34˚, 37˚, 39˚ and 40˚) were laid out as integer values west of Washington, DC and yet another four (100˚, 103˚, 120˚, and 141˚) were reckoned from Greenwich, Washington, or more specifically the old Naval Observatory, was the official reference for the prime U.S. meridian from September 28, 1850 until August 22, 1912 for astronomical observations only, i.e. mapping on land, etc. During all this time Greenwich was used for navigation and it possibly would be of some interest to see how a harbor map of this time period referenced land by one meridian and water by another meridian. As chair of the International Geographic (or Meridian) Conference in 1884, the U.S. led the affirmative drive to make Greenwich the internationally accepted 0˚ or prime meridian through the Royal Greenwich Observatory on the outskirts of London. Without additional research, it appears that by Congressional action the Washington meridian was rescinded in 1912, but the Greenwich meridian has been adopted since 1884 by consensual usage only — just like the metric system — since April 5, 1893.

The 141st meridian as the boundary between Alaska and Canada is worth dwelling on a little longer. Alaska, or "Steward's folly", was purchased from Russia in 1867 for $7,200,000 in gold. Included in the purchase was an 1825 boundary treaty between Russia and Great Britain for the 141st meridian boundary, which the U.S. accepted without anybody ever seeing any physical evidence. It was not until 1913 that the survey was finally completed and intervisible monuments were set and a 20 ft side right-of-way (also called vista) was clear cut for most of its 647 mile length. Monument #1 is on the shore, near the hamlet of Gordon and Demarcation Point on the Beaufort Sea, the last monument. #181, was set on the south bank of the White River at elevation 3549 ft. From there the meridian line steadily climbs and probably is unmarked by monuments, mostly above the timber line and over glaciers, for about 98 miles to the southern terminus. According to modern maps, this point is on a glacier at roughly 12,800 ft elevation and it is located about 2.6 miles to the NW of Mt. Saint Elias, the "official" southern end referred to by Van Zandt. At a salary of a few dollars a day, some very thorough surveyors probably reflected on (or maybe cursed)

(continued on page 30)

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It's All in the Meridian (continued)

"Steward's folly" considering that there were no human settlements within hundreds of miles, no snowmobiles, no helicopters and maybe not even dog sleds to move supplies and equipment. Yet a straight line from "nowhere to nowhere", crossing two mountain ranges and at least three major rivers, had to be surveyed and clear cut. Now, fast forward to the present: Taking the border crossing as a reference point for indexing Google Earth®, the "clear cut" made roughly 100 years ago shows up on the satellite photography for most of its many miles. Google would however place the 141˚ meridian several seconds of arc to the east! Even though referenced for the last 183 years, the 141˚ meridian is now a hot topic of discussion between the US (State Department) and their equivalent Canadian lawyers. All this because of actual and perceived vast deposits of oil and gas in the Arctic Wildlife preserve and out into the Beaufort Sea towards the North Pole, for yet another about 1,221 nautical or about 1,405 statute miles. Stay tuned!

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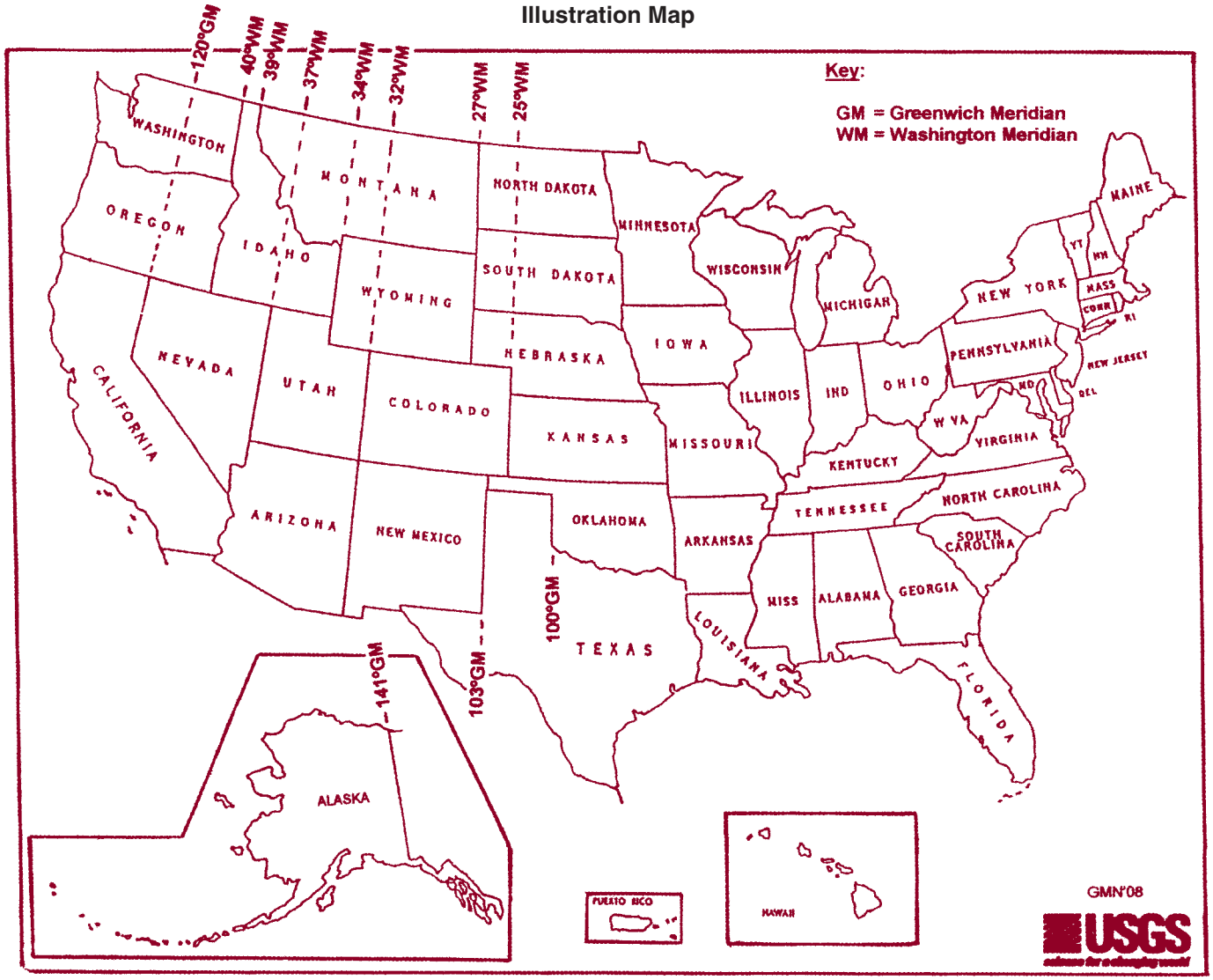
Illustration Map



What did he say?

by Arden T. Sandsnes

Every once in a while when we are talking shop something really funny comes up and a story is retold once again. Here is one that taught me a lesson about using survey jargon when I was not among fellow surveyors.

In the 1930's the National Geodetic Survey (NGS) was working west of Madison establishing a network of benchmarks. As was the usual practice the route followed a stream or a railroad. Often times it was both because the railroad followed the stream surmising that the grade of the stream would not exceed three percent.

In a small town west of Madison there is a red brick building that was a local bank. The walls were good and sturdy and so the NGS decided to drill a hole in the side wall of the bank, insert a brass monument, and establish an elevation.

Our firm had a contract to provide cross sections of the stream that went through town. It was a trout stream and had a reputation of going over its banks during a spring thaw. The study was to be done and the study needed horizontal and vertical data.

We arrived at the bank not really knowing all of the details of the benchmark. The brick building had an outside staircase leading to the rooms above the bank and to a meeting room in the basement. At some point in time the bank had decided that it would be better for all concerned if the staircases were to be enclosed. This addition made the use of the stairs a great deal safer during the winter months. However the benchmark that used to be outside was now just inside the entrance to the stairway.

Naturally we were dressed for the field not for banking. That is to say no white shirt, no tie and shiny shoes. One of the crew was in bib overalls and in total we were not dressed for bank business.

We walked in the front door of the bank and I inquired of the first teller whether or not the bank manager was available. She said he was and that he was standing in the rear of the bank. I walked to the gate near the back of the main floor. There was an older woman standing, to my right, at the counter operating a coin counting machine. If I were to guess I would place her in her mid to late seventies. Rather thin of build, snow white hair, heavy glasses and a nice print dress. Standing near her in a business suit was the manager.

I explained why we were there and that we needed access to the monument just inside of the locked door to the staircase. The manager said it would be best if he and I went down to the basement and opened the door from the inside

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Comments on Professional Responsibility

by Knud E. Hermansen, P.L.S., P.E., Ph.D., J.D.

An ongoing debate among professional surveyors focuses on the responsibility of the surveyor toward the client. Part of this debate focuses on where the surveyor's responsibility ends and where the attorney's begins. In other words, at what point does the surveyor stop practicing surveying and begin practicing law? Unfortunately, where the two seem to meet there are no fixed rules or bright lines of professional conduct to guide the surveyor between the practice of law and practice of surveying.

As a result, the concept of proper professional behavior varies between surveyors, attorneys, and clients. For example, some surveyors, attorneys, and clients feel the surveyor's professional responsibility should take the form of a "factgatherer", that is, someone who gets information but does not give an opinion. At the other end (some would say extreme end) are the surveyors, attorneys, and clients who feel the surveyor should be the client's "hired gun". This takes the form of a surveyor who feels it is their professional obligation to zealously advocate their client's position, right or wrong. There are, of course, shades of these and others with every surveyor having a slightly different opinion.

In order to begin and understand, let's start where most surveyors agree. Most surveyors agree that the surveyor's responsibility in regard to a boundary retracement survey is to "follow in the footsteps of the original surveyor". This maxim can be expanded by saying the surveyor's professional responsibility is to "identify the location of boundaries, verify the location of boundaries, or help resolve conflict among conflicting boundary locations (i.e., gather data for litigation)". Applying this definition to the three recognized boundary categories, the surveyor's responsibility is to identify, verify, or help resolve conflicting locations among or between record, possession, and ownership boundaries. To further help determine where the practice of surveying stops and the practice of law begins, the following maxims are useful and worth considering.

Surveyors Are Trained to Deal With Questions of Fact, not Questions of Law:

Surveyors are trained to gather and analyze facts and apply them to a situation using as guides legal principles and rules of law. Therefore, any decision the surveyor makes should be founded on questions of fact (guided by principles of law), not questions of law. An example to show this dichotomy is where one surveyor shows the location of a fence and calls it a possession boundary while another surveyor shows the location of a fence and calls it the client's ownership boundary (based on the surveyor's understanding of adverse possession). The first is an opinion based on the facts, the second involves a factual opinion coupled with a legal assumption the client has marketable, fee-simple title (adverse possession generally requires an action to quiet title in order to give marketable title). The courts have held that boundary location generally involves the application of facts while adverse possession involves a question of law. As one early survey practitioner said in the 1800's: "Old fences must generally be accepted by right of possession; though such questions belong to the lawyer [rather] than to the surveyor".[1]

Be Knowledgeable But Prudent:

Surveyors should not be reluctant to give an informed opinion to their client — that is why the client has hired a professional. (Most jurisdictions allow the surveyor to give his or her professional opinion on the location of the boundary even if the opinion appears to answer the ultimate question in dispute.[2]) However, the surveyor should refrain from opinions or action in areas where the surveyor lacks the training, knowledge, or experience. As a general rule to avoid undue liability and problems, surveyors should avoid acting on or giving unrestricted opinions when: (1) the matter is outside the scope of the contract with the client; (2) the surveyor is made aware of a potential problem that is outside of the scope of the surveyor's training or experience, and [(3)] the surveyor suspects a problem but may not be sure, does not have, cannot obtain, or refuses to get additional facts.

Start From the Proper Assumptions:

Surveyors frequently find themselves working or having to come to a decision in a situation beyond the scope of their professional knowledge because they incorrectly diagnosed the client's problem at the outset. This situation frequently occurs where the surveyor has assumed the client's problem is a boundary dispute rather than a title dispute or vice versa. A title dispute involves an area that is encompassed (or thought to be encompassed) in two or more deeds. Where there should be one common boundary between the parcels, there are, instead, two separate and recognizable boundaries, each, when properly located, reside on land that appears to belong to the other landowner. (In fact, one party has title to the area and the other party has "color-of-title".) Title disputes are normally resolved in favor of the landowner with senior title, although adverse possession and estoppel may provide for a different outcome. On the other hand, a boundary dispute is where there is only one boundary but each party feels the boundary should reside in a different location. This problem is generally resolved by gathering the facts, applying principles of law, and coming to a decision based on the preponderance of evidence.

Keep Your Client Informed:

Lack of poor communication between the client and surveyor is the common basis for most complaints to surveyor registration boards. Therefore, one important maxim is to keep the client informed. Professionals should and are generally

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Control Points

by Warren Andrews, PLS

Unfortunately, in the previous article on Gunter's Chain, the editor changed the word *metre* to *meter*. A *meter* is the English word meaning a dial gauge, usually measuring water, gas, or electricity; a *metre* is the unit of length in the *Systeme d' Internationale (SI)* or international system of weights and measures. (Two point five four (2.54) centimeters exactly equals one inch; the conversion factor between the American and the SI system).

This article is intended to mention another mathematical concept that is a real sleeper and that is the concept of zero. Have you ever thought how difficult it would be if you didn't have a zero in your calculations? Well there is one system of numbers still rarely used today that does not have a zero and that is Roman numerals. If you think our decimal system is difficult try calculating using Roman numbers; you essentially have to know the answer before you can do the problem, either counting forward or backward.

There is one remnant in a system we still use for measuring time that causes trouble, for example, in when did the millennium end or begin. There is no zero in the Christian calendar. But where did this all start from? There is a fascinating little paperback book entitled *Zero, The Biography of a Dangerous Idea* by Charles Seife. In Chapter Zero Seife states, "Zero is powerful because it is infinity's twin". "The biggest questions in science and religion are about nothingness and eternity, the void and the infinite, zero and infinity. The clashes over zero were the battles that shook the foundations of philosophy, of science, of mathematics, and of religion." Did you know that the Christian Church banned the use of zero for many centuries saying it was the work of the Devil?

The Greek philosopher — mathematician Phythagoras couldn't conceive of zero because he said it was nothing, or in philosophy it was the same as chaos or non-existence and that was intolerable. He used the counting numbers (and *cardinal* numbers of 1, 2, 3, etc.) but he couldn't cope with the *ordinal* numbers, 0, 1, 2, 3, etc. Zeno's Paradox of Achilles racing the tortoise but never passing it could not be solved without the concept of zero that the Greeks and Romans did not have.

Zero as a place marker comes from the Babylonian so they could distinguish between, say 61, 601, 6001, etc. In our positional notation system, which comes from that, zero is absolutely indispensable. But zero as a number comes

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Comments on Professional Responsibility (continued)

required to keep their client informed. In some cases, professionals are required to obtain their client's consent before taking certain actions that may be detrimental to their health or their property (Doctrine of Informed Consent). This doctrine in no way suggests that the surveyor act as a hired gun or an advocate for the client's position if it runs counter to the surveyor's professional opinion. On the contrary, the surveyor is expected to perform services in a competent manner, arrive at a professional opinion based on his or her knowledge, training, and experience; and communicate the favorable or unfavorable opinion to the client. As a general rule, the surveyor should inform the client any time the surveyor's opinion, recommendations, or actions: (1) could initiate or increase the possibility of litigation, (2) conflict with or depart from another plausible boundary location, or (3) run counter to another professional surveyor's opinion.

Practice as a Professional:

The last maxim is to remember surveying is a profession and the surveyor should act as a licensed professional. A professional is someone who possess some particular knowledge and skill that is beyond the ken of the average member of the public. Licensing of professionals is done to compensate for the public's lack of knowledge and thereby protect the public by insuring that any person offering his or her professional services has the requisite minimum knowledge and skill to provide professional services in a competent manner. In theory, licensing should eliminate the concept of caveat emptor that is generally paramount when members of the public deal with peers and tradesmen.[3]

With these comments in mind, hopefully it should be easier to determine the surveyor's professional responsibility and define where the practice of surveying ends and the legal practice begins. In all cases of doubt or where legal problems could be involved it is always good practice to recommend (in writing) that the client consult with an attorney.

References:

1. Gillespie, A Treatise on Land-Surveying at page 155 (Appleton & Company, New York, NY: 1881)
2. See e.g., Koenig v. Skaggs, Missouri, 400 S.W.2d 63, 67 (1966) also see King v. Browning, 246 Ga. 46, 268 S.E.2d 653, 644 (1980)
3. Rona, The Rise and Fall of the Learned Professions, at page 6 (College of Engineering, West Virginia University, Morgantown: 1977)

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Acquisition Creates One of the Largest Surveying and Mapping Operations in U.S.

by Erin Casey

Wilson & Company Purchases Western Air Maps Resulting in 50 Additional Staff Members and 3 New Office Locations

Wilson & Company, Inc., Engineers & Architects announced today that it had completed its acquisition of Western Air Maps, Inc. of Overland Park, Kansas. Western Air Maps is a successful photogrammetric and geospatial mapping firm, and has been in business since 1960.

The acquisition expands the services of Wilson & Company's Survey, Geospatial, and Remote Sensing Division with three new office locations and 50 additional staff members. A total staff of 125 surveying and mapping professionals are now available to serve clients from 17 office locations across the U.S. The acquisition brings Wilson & Company's total staff count to 520 firm-wide.

James Gibbs, CEO and President of Wilson & Company said, "Western Air Maps' reputation and superior staff prompted the acquisition. We are proud and excited about this move. It will enhance our services and strengthen our capabilities. This is a great opportunity for both firms and our clients."

Western Air Maps CEO and President Don Wigger stated, "We have enjoyed a great working relationship with Wilson & Company. Joining their firm will allow us to become one team with the same vision. I'm thrilled at this new prospect and look forward to what the future holds."

Wilson & Company and Western Air Maps have a long working relationship collaborating on several projects such as Corps of Engineers Boundary Surveys in Kansas and Missouri; transmission corridor surveying and mapping in Kansas, Oklahoma, and Texas; railroad and highway transportation corridor mapping throughout the Midwest; and floodplain mapping in the Southwest.

Western Air Maps' Eric Cenovich and Scott R. Perkins have been named Associate Vice Presidents with Wilson & Company. Cenovich will manage the geospatial services of the Survey, Geospatial, and Remote Sensing Division and Perkins will manage the Division's Sales and Marketing tasks. Wilson & Company's Vice President Ryan Branfort will transition into the role of Manager for the entire Division, replacing Ronald Drake upon his retirement at the close of 2009.

Photogrammetry is the art, science, and technology of obtaining reliable information about physical objects and the environment through the processes of recording, measuring, and interpreting photographic images and patterns of electromagnetic radiant energy and other phenomena. The data gathered are used to produce a variety of mapping products that are used in engineering design and planning processes, and monitoring changes in physical attributes. Celebrating 76 years of service, Wilson & Company's International Headquarters are located in Albuquerque, New Mexico.

The firm was founded in 1932 and is a multi-disciplinary engineering, architecture, surveying, mapping, and planning firm employing staff throughout its 17 office locations. The firm provides services to a diverse client base including federal and municipal governments, public transportation agencies, railroad companies, industrial and commercial corporations, private developers, and renewable energy companies.

Control Points (continued)

from India, uncontaminated with Greek philosophy, through the Arabic mathematicians. In our present base 10 numbering system you have 1, 2, 3, 4, 5, 6, 7, 8 and 9 but you have to have another number to start with and that is zero so the system really goes 0,1, 2, 3, etc. If you notice even the keyboard on your computer is badly confused because it has zero after the 9, not before the 1 where it should be. Try counting with a stopwatch without using zero; it doesn't work. Or try calculating coordinates on an x, y, z axis without a zero point; you can't do it. Even Descartes and his colleagues realizes this when he invented the Cartesian Coordinate System (so vital to surveyors).

Newton and Leibniz used zero and infinity in developing the calculus; it's a powerful tool. In fact we could not have modern science at all as we know it without that not-so-simple little zero.

Where Have all the Trig Skills Gone?

by Richard L. Elgin, PhD., LS, PE

May I get on my soapbox and vent for just a bit? This has to do with the demise of basic surveying mathematics. Where has the knowledge of the basic math skills gone, knowledge on which our profession is founded? Where has the ability gone for those young people entering our profession to accomplish seemingly simply math problems? Where has the responsibility gone for teaching the basic math that is needed for a career in surveying?

Each semester since the fall of 1980 (that's 52 of them) I have taught a "first" course in plane surveying. It has been a conventional, fundamentals course: differential and trigonometric leveling, direction and angles, latitudes and departures, polar to rectangular conversions (and the reverse), coordinates, areas, horizontal curves and vertical curves. The Course has a lab component in which the students accomplish 13 field exercises. Over the years, the course and its labs have changed to reflect changing equipment, calculators (whatever happened to HP and RPN?), hardware and software. The department has changed as well, recently reducing the number of credit hours to receive the B.S. in Civil Engineering degree. As a part of the reduction, the surveying course went from 4 to 3 credit hours.

But something very troubling has changed during my many semesters teaching the class, and that is the distinct decline in the math skills of the students taking the class. This has especially been the case in the past decade or so. The rate of decline in the students' math skills has increased.

In the "old days", students entered the class with a generally excellent (by today's standards) understanding of algebra, trigonometry and geometry. I would say to the class, "Surveying is one big applied trigonometry class..." and start teaching surveying.

Triangle solutions? No problem. Calculate coordinates? No problem. Polar to rectangular and the reverse? No problem. Areas by coordinates? No problem. Applying geometry to horizontal circular curve nomenclature, then derive equations to compute curve parts? No problem.

The students' general knowledge of algebra, trigonometry and geometry was excellent. There was no need to review or explain these subjects before jumping off into surveying.

Missing the Basics

Most of that has changed for the worse. The entering students' knowledge of the basic subjects of algebra, trigonometry and geometry has sunk to such a low level in the past five to ten years, that for all practical purposes I can say they have virtually none when it comes to being prepared to attack surveying.

Discussing such pre-surveying topics as triangle solutions, orthogonal vectors calculations (i.e. latitudes and departures), even doing something simple as recognizing similar triangles when trying to derive horizontal curve equations just draws blank stares.

What's the problem? I believe we can lay most of the blame at the feet of high school math curricula. In the "old days", algebra, trigonometry and geometry were the staples of high school mathematics. Calculus was largely left to colleges and universities. It seems these days that high schools, in their rush to impress or seek prestige or to offer students the opportunity for AP (Advanced Placement) and to get college credit for their students prior to even entering college, have swept aside the basics of algebra, trigonometry and geometry to teach calculus. It's not "cool" to grind away at those basics, therefore let's "help" our students and offer calculus.

> ***I believe surveying (as well as science and engineering) would be best served if high schools went back to the basics and taught straight up courses in algebra, trigonometry and geometry and leave calculus to colleges and universities.***

Look at the titles of math courses in today's high schools. Don't expect to find a straight up course titles "Trigonometry" or "Geometry". I'm told these subjects are inside courses like "Math Methods" or some such class.

I believe surveying (as well as science and engineering) would be best served if high schools went back to the basics and taught straight up courses in algebra, trigonometry and geometry and leave calculus to colleges and universities. Pass a law. No calculus will hereafter be taught in high school. Forget math AP, it is a disservice to students and our profession. Give us students well founded in algebra, trigonometry and geometry!

College Students Aren't the Only Ones

But the problems of poor math skills for those entering or in the early years of our profession aren't limited to troubles with courses taken while in high school. It seems those doing survey calculations now rely almost totally on software. Gone are the days when surveying calculations were done on a calculator (aided by elementary survey programs). Azi-

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Where Have all the Trig Skills Gone? (continued)

muth and distance to stake a point from a known instrument position and backsight point? Where's the computer?

Still needed is basic knowledge of surveying mathematics and the ability to solve those problems using a calculator along with skills in trigonometry and geometry. We can't be complete monkeys . . . yet. You don't believe this is true? Is it okay to be a trained monkey and only know which buttons to push in which order? If so, then what about the licensed surveyor exams? Trained monkeys can't pass the exams. That's good. State licensing boards are licensing professionals, and knowledge of basic surveying math and the ability to solve problems with a scientific calculator are a part of the exam process and part of being a surveying professional.

So Who's Failing?

As one who has worked on two states' state specific exams for many years, I can report that it seems the examinees' abilities to solve relatively simple coordinate geometry problems has declined. These typically are single proportion or double proportions problems using coordinates, applied to the U.S. Public Land Survey System (USPLSS). Lower skill levels in solving this type of problem is due either to lack of knowledge in using coordinate geometry and a scientific calculator or lack of knowledge in proportioning in the USPLSS. Either is not acceptable.

Someone has failed those who fail these exams: either they're surveying educators (by not teaching the correct materials) or the practitioners under whom the prospective licensees have been working (by not coaching the employee), or the examinee (by not being disciplined enough to prepare for the exam), or by "whizzing by" or ignoring trigonometry and geometry while in high school.

It's sad to say, but it appears surveying education programs need to develop an early course in surveying titled something like "Elementary Surveying Mathematics". The course would be algebra, trigonometry and geometry applied to surveying. Proportioning, coordinate geometry, areas, curves, coordinate transformations, rotations, "setting out". All would be covered with healthy doses of homework.

The calculation device would probably be limited to a scientific calculator. And, oh yes, have the course taught by a surveying educator with surveying practice background, not a mathematician.

In the "old days", this course would not be needed, the subject matter would have been taught inside other surveying courses to those with competent algebra, trigonometry, geometry and scientific calculator skills.

Unfortunately today we are in the position of having to teach those skills to our own.

Dr. Richard Elgin is President of Elgin Surveying & Engineering in Rolla, Missouri. He serves as Adjunct Professor of Surveying at the University of Missouri-Rolla (UMR), and is a principal in the firm of Elgin, Knowles & Senne, Inc.

Note: Dr. Elgin is that rare combination of surveying practitioner and surveying educator. He as Asst. Professor of Civil Engineering at the University of Missouri Rolla (UMR) prior to purchasing the family surveying business (in 1984) which he now owns and operates. He now is Adjunct Professor of Surveying at UMR. He is a former Missouri Registration Board member, coauthor of the Sokkia Celestial Observation Handbook and Ephemeris, has written many questions for the NCEES surveying exams as well as other books and software with Drs. Knowles and Senne.

As seen in The Oregon Surveyor, June/July 2008

What did he say? (continued)

and then when we were done we could just pull the door shut and go on our way. I was to go with him to the basement.

My cohort was still standing near the front door of the bank. I turned to him and said "set the gun up so that we can shoot in through that door, the manager and I will go to the basement and open the door".

As I turned around I caught sight of the nice little old lady that had been counting coins. Her face was now nearly as white as her hair. I truly was concerned that she might end it all, her level of fright was off the scale. I quickly explained what I meant by a gun and what shooting a level rod meant and as I did so the color began to return to her face.

Jargon is fine when used in the appropriate setting and the bank was clearly not the setting for my choice of words.

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