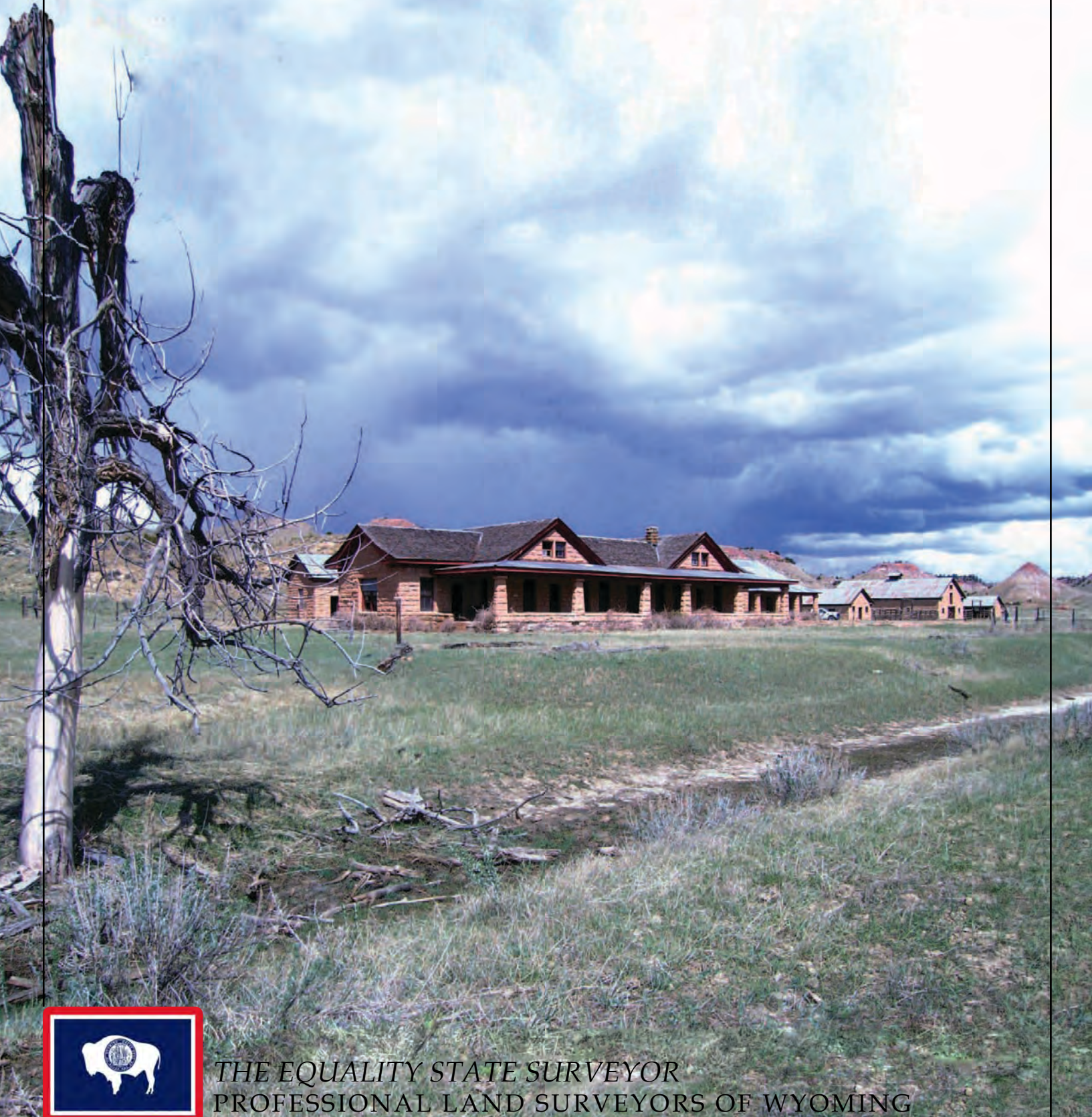


Volume 23: Issue 4  
October, 2012



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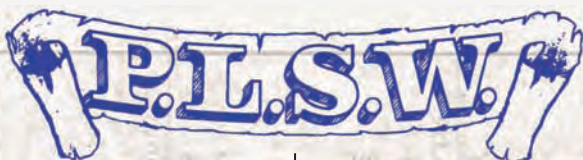
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**LINES & POINTS  
EDITORIAL COMMITTEE**

**Committee Chair** • Larry Perry, PLS  
arpentator@yahoo.com

**Editor in Chief** • Michael Flaim, PELS  
mike.flaim@bresnan.net

**Treasurer** • John "Jack" Studley, PLS  
jklz0318@gmail.com

**Circulation** • Joel Ebner, PLS  
joel\_ebner@blm.gov

**Advertising** • Pete Hutchison, PELS  
peteh@bresnan.net

**Copy Editor** • Herbert W. Stoughton, PhD, PELS, CP  
hws.geod.engr@bresnan.net

**Editor at Large** • Steven "Dennis" Dawson, PLS  
denniemdbarb@aol.com



On The Cover

MAIN HOUSE  
AT LX BAR RANCH  
(Photo by Tony Knievel, LS)

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SCHEDULE BY CHAPTER**

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PLSW (Professional Land Surveyors of Wyoming) is a statewide organization of Registered Land Surveyors licensed to practice in the Equality State of Wyoming. PLSW is dedicated to improving the technical, legal, and business aspects of surveying in the State of Wyoming. PLSW is affiliated with the National Society of Professional Surveyors (NSPS) and the Western Federation of Professional Land Surveyors (WestFed).

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## PRESIDENT'S MESSAGE



Greetings all,

Well it's that time again to put away the shorts and short sleeves and get ready for the fall and winter seasons. I'm not sure about the rest of you but the cooler weather and no more smoke are a welcome change. I hope everyone has had a good summer; I know I have.

Not a lot to bring up this go around other than I hope that your Directors will present the proposed all in one membership for PLSW and NSPS if we can get a proposed small dues increase moved forward and a possible vote at the Annual meeting in February. Your Directors should have the necessary information to be brought up during your chapter meetings. Any questions that cannot be answered by the Directors can be directed to me, so feel free to contact me with any questions or concerns.

I look forward to seeing everyone at the Fall Technical Session November 1-2, 2012 in Casper at the Ramkota. Notices were mailed out this past week so don't forget to reply it should be a good presentation. The State Board will have an informative session regarding the proposed changes in legislation that has been going on for a while now during lunch on Thursday. I will also have a brief presentation on the NSPS membership issue either just before lunch or after.

With that, I will get out the way until next issue.

Respectfully,  
Cotton D. Jones, President  
Professional Land Surveyors of Wyoming

## ANNOUNCEMENTS

LARRY AND LUCILLE PERRY  
CELEBRATED THEIR 50<sup>TH</sup> WEDDING ANNIVERSARY



A reception was held at All Saints Anglian Church in Cheyenne on August 16<sup>TH</sup> 2012.

~•~

The Surveying community is invited  
to attend the Celebration of  
PAUL N. SCHERBEL 95TH BIRTHDAY  
OPEN HOUSE.

DATE: 20 October 2012

PLACE: Senior Citizen's Center,  
in Marbleton, Wyoming

TIME: Noon until 2:00 P.M.

Lunch will be served. Dress is casual.

~•~

John Steil has retired effective September 1st. Jeff Jones and Brad Steil are purchasing Steil Surveying Services from John. John started the company in 1982, and has been successful for 30 years. John will be celebrating the 10th anniversary of his 60th birthday shortly.

~•~

The Wyoming Engineering Society is soliciting applications for the 2012 President's Project of the Year Award. The award increases the public's recognition of engineering and surveying projects in Wyoming. The guidelines for submission of a project may be found at [www.eng.uwyo.edu/societies/wes](http://www.eng.uwyo.edu/societies/wes). Please keep the guidelines in mind during this construction season as the projects progress and are completed so that all necessary documents and photos are compiled. Entries must be received in Laramie on or before Thursday, January 3, 2013. It is encouraged that the guidelines and application form be reviewed to determine a project worthwhile for statewide recognition

## GREETINGS FROM THE PREXY PASTURE PARTY CHIEF

By the time you read this, the fall semester will be underway and the CE 2070 Engineering Surveying class will be surveying Prexy's Pasture one more time. This is one part of the University of Wyoming tradition that hasn't changed. However, while the sun is still very warm, the air is cooler than it was a couple of weeks ago and change is in the air as well as within the Land Surveying Program. I would like to fill you in on these changes.

- This fall the surveying students will be transitioning from Wild T-16's to digital theodolites.
- The Land Surveying Advisory Board has drafted and approved By-Laws and an interim advisory board has been appointed to help guide the program.
- A least squared adjustment class will be offered for the first time during the spring 2013 semester. The class will be taught by Danny Swain.
- I am 57 years old. This is not old old, but I am probably at least  $\frac{3}{4}$  of the way through my life and my working years. I am not ready to retire and I would like to continue as Director of the Land Surveying Program

for an additional 8 to 11 years if I can be effective and my health and my enthusiasm allow. I have been thinking about the sustainability and the direction of the program. Sustainability will require a successor. What type of background should my successor have, should my successor have a Ph.D. and if so in what area? Should my successor have an interest in research? What are the qualities that my successor should have? The background of my successor will have a significant influence on the direction of the program. These aren't questions that need to be answered immediately, but they need to be thought out. I would much prefer that the land surveying program have a direction rather than just haphazardly evolve. The direction of the program will mold your future employees who will influence your business and your future economic success. Let's be proactive, let's think this through and start guiding the Land Surveying Program to where it should be.

Sincerely,

Mark Rehwaldt

The Prexy Pasture Party Chief



# Geodetic Surveying: Part I *The Underlying Principles*

Herbert W. Stoughton  
Geodetic Engineer

## INTRODUCTION

In the article "Eratosthenes of Cyrene's Contribution to Geodesy", the author's concluding remarks introduced the concepts of triangulation and the size and shape of the earth. In the approximately 2,000 years between Eratosthenes and Isaac Newton, numerous developments in the mathematical sciences, astronomy, and navigation occurred. For instance, sines and tangents of angles were being used in mapping, engineering and astronomical problems. It would be Isaac Newton (1642 - 1727), a student at Cambridge



University (England), who would "rock the foundations" of intellectual thought about natural science and mathematics. Employing the works of Galileo Galilei (1564 - 1642) and Johann Kepler (1571 - 1630), Newton wrote a magnus treatise describing physical phenomena, forces of attraction and repulsion,

work, energy, gravitation, etc. Newton and other mathematicians developed the mathematics of calculus necessary to describe the "instantaneous" and continual motion of phenomena. There has been considerable debate and argument as to the identity of the developer/inventor of calculus (Isaac Newton or Gottfried Wilhelm Leibniz (1646 - 1716)). This writer does not have a "favorite" and takes the position "It probably was developed independently by both within a short period of time. Also, the length of time of communication of these developments contributed to this controversy." Newton had already made his name in the seminal work on the nature of light. *Principia* was published in 1687. The original work was published in Latin - the language of intellectual writings for that era. Currently, there are two inexpensive English translations available. Only a reader educated in 17th century scientific writing could easily follow Newton's reasoning. However, in the later portion of that work, without any physical observations to substantiate his conclusions, Newton employs the basic law of universal gravitation and centripetal force to demonstrate that

the earth (the surface of "quiet" seas) is not a sphere, but a surface generated by an ellipse rotated about its minor axis, which coincides with the earth's axis of rotation (called an oblate ellipsoid).

Newton's *Principia* had the same effect on the scientists of his generation as Einstein's Special Theory and General Theory of Relativity had on 20th century physicists. Each proposal was a gigantic leap in scientific knowledge and thought. Although Newton's contemporaries at the Royal Society generally did not comprehend all the nuances of *Principia*, they supported and defended him from the attacks by mathematicians and scientists on the Continent. The members of the French Royal Academy mainly disagreed with Newton's work. Newton's proposal was called an oblate spheroid in older literature with the ellipse's minor axis coinciding with the earth's axis of rotation. The French proposal was a prolate ellipsoid (called a prolate spheroid in the older literature) with the major axis coinciding with the earth's axis of rotation. Since there existed no verification data/observations supporting either claim, the French authorized two survey teams (expeditions) to resolve the matter. The field procedures for both expeditions were to measure (directly or indirectly) a length of the earth's meridian. At the northerly and southerly points of each meridian the astronomic latitude was observed. For each expedition, the linear measure of the meridional arc length divided by the observed difference in the astronomic latitudes gave the unit length of the meridian in linear units/arc second for the mean latitude of the arc. If the unit length/arc second for the meridian near the pole was longer than the unit length/arc second for the meridian near the equator, then Newton's theory was correct. If the unit length/arc second of the meridian near the pole was smaller than the unit length/arc second for the meridian near the equator, then the French proposition would be correct. Newton won!

In the two French expeditions, triangulation was employed to measure the linear meridional arc length. In plane trigonometry, it has been demonstrated that when three elements of a triangle in a plane are known (measured), with at least one element being a triangle's length, then all remaining elements can be computed (exactly/uniquely), which is the basis of triangulation.

Thus, we entered the "modern era" of geodetic surveying.

## THE MATHEMATICAL FOUNDATIONS

The approach to geodetic surveying and positional astronomical observations adhere strictly to a set of principles embodied in the disciplines plane and solid geometry and plane and spherical trigonometry (with a good dose of elementary, intermediate, and advanced/college algebra). In order to develop and apply geodetic surveying technology individuals require a fundamental working knowledge of these mathematical disciplines. The first premise is that the earth is a sphere. Although inspection of the earth's topographic surface raises considerable skepticism, an observer on the earth's moon would not question this premise.

Astronomers, map makers, and navigators were keenly interested in describing the directions and distances between widely spaced points on a spherical earth and the heavens. Since all but our solar system's satellites (planets and their moons) appeared to be at infinite distances from the earth, it was a logical conclusion to state that their positions be placed on a sphere of infinite radius whose center was either the earth or the sun. These approaches lend themselves to the adoption of the tenets of plane and solid geometry and plane and spherical trigonometry.

From solid geometry, the definition of a sphere is the loci of all points a fixed distance from a single point. Given two points on the sphere which are not on a single line (colinear) through the center of the sphere only one plane exists containing these three points. Or, if the lines are drawn from the points on the sphere to the sphere's center, and these lines are not colinear,

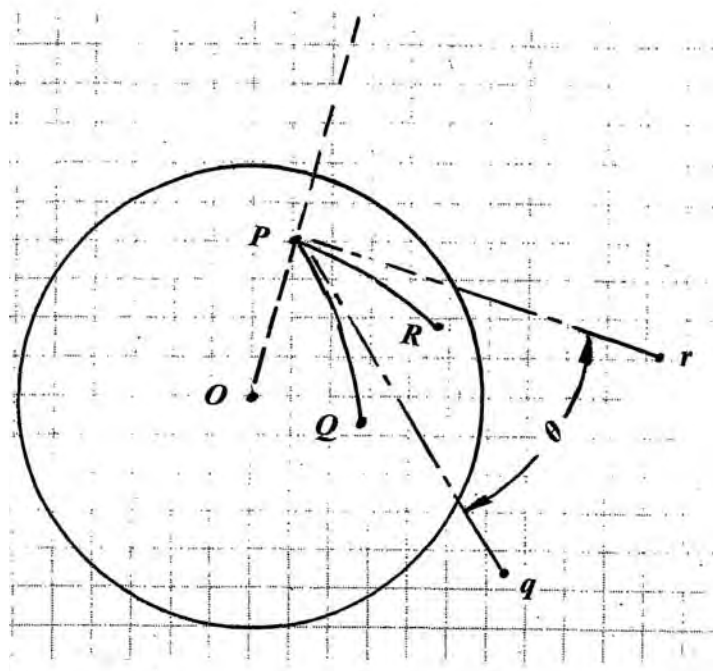


Figure 1

then only one plane exists containing these three points. Furthermore, the intersection of a plane and a sphere is a circle. If the intersecting plane also contains the center of the sphere, then the radius of the circle of intersection equals the radius of the sphere, and is called a great circle. If the intersecting plane does not contain the center of the sphere, the radius of the circle of intersection is always smaller than the radius of the sphere. When describing the distance and direction between two points on the sphere, the arc of the great circle is employed. When demarking a parallel of latitude, except for the equator which is a great circle, the surveyor must first layoff a great circle and then measure the offsets from that great circle to establish the requisite point on the parallel.

To measure the angle (spherical angle) at the intersection of two great circles utilizes spherical trigonometry. Note that there are four points involved (see Figure 1). Three of these points are on the surface of the sphere and the fourth point is the center of the sphere. In Figure 1, OPQ lies in a plane with PQ being a portion of the great circle of intersection of that plane.

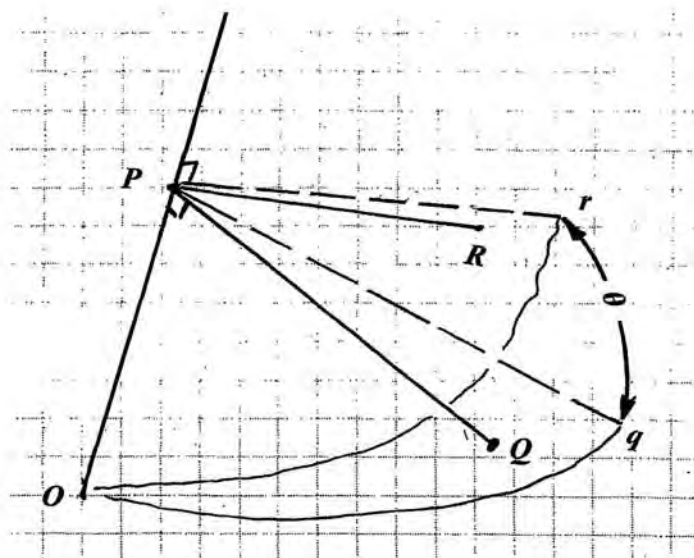


Figure 2

OPR lies in a plane with PR being a portion of the great circle of intersection of that plane. Now, at point P draw perpendiculars to the line OP in the planes OPQ and OPR. These perpendiculars (Pq and Pr) are tangent to the sphere and to the respective great circles PQ and PR. Furthermore, Pq and Pr are two lines in a plane which is perpendicular to the radial line PO and tangent to the sphere at P. In surveying (both plane and geodetic) this latter plane is called the horizon at P. The angle rPq is the spherical angle at P on the sphere.

In solid geometry, the same problem is approached slightly differently. In Figure 2, points O, P, Q, and R are situated in three dimensional space. Draw the

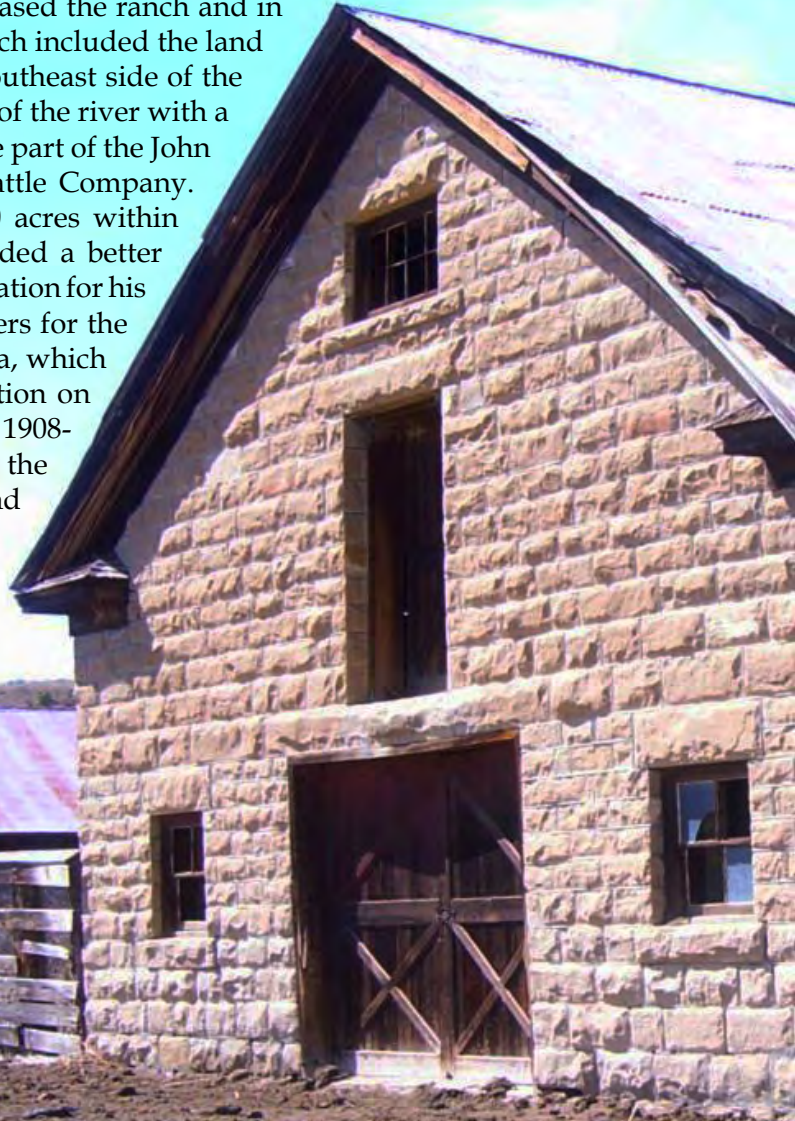
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# LX RANCH

by Tony L. Knievel, LS

Earlier this year, the Wyoming Joint Travel Recreation Wildlife and Cultural Resources Committee sponsored a bill (Senate File 36) to fund the stabilization and preservation of the historic LX Bar Ranch located in Northern Campbell County, Wyoming. As part of the discussion leading up to the acquisition, Campbell County Board of Commissioners agreed to have a Record of Survey prepared for the property. The Department of Public Works surveying crew set out in April, 2012, to retrace the boundary of the 1917 survey and locate improvements on the 60 acre parcel.

**History:** The LX Bar brand and ranch was originally owned by the Stanton-Howard Livestock Company. In 1888, A.J. Collins purchased the ranch and in 1902, John B. Kendrick purchased the Collins Ranch, which included the land on the Powder River and log buildings located on the southeast side of the river. In 1910, construction started on the northwest side of the river with a set of stone buildings. The structures and the land became part of the John B. Kendrick cattle operation known as the Kendrick Cattle Company. The Kendrick Cattle Co. owned approximately 210,000 acres within Montana and Wyoming. The LX Bar Ranch site provided a better balanced operation for Kendrick, allowing him better irrigation for his pastures lying adjacent to the Powder River. Headquarters for the cattle operation was at the OW Ranch located in Montana, which began operation in 1891. Kendrick later began construction on the Trail End Mansion in Sheridan, Wyoming, between 1908-1913. Other sites owned by the Kendrick Ranch included the above mentioned OW Ranch (T8S, R43E S.16), Trail End State Historic Place (Sheridan, WY), E-U Ranch (T57N, R81W S.7), Cabin Creek (T58N, R77W S.28), Hanging Woman line camp (T58N, R79W S.28), K Ranch (T56N, R77W S.1), Forks Ranch (T10S, R43E S.2), 76 Ranch/camp (T9S, R45E S.30), 77 Ranch/camp (T58N, R80W S.20&21).

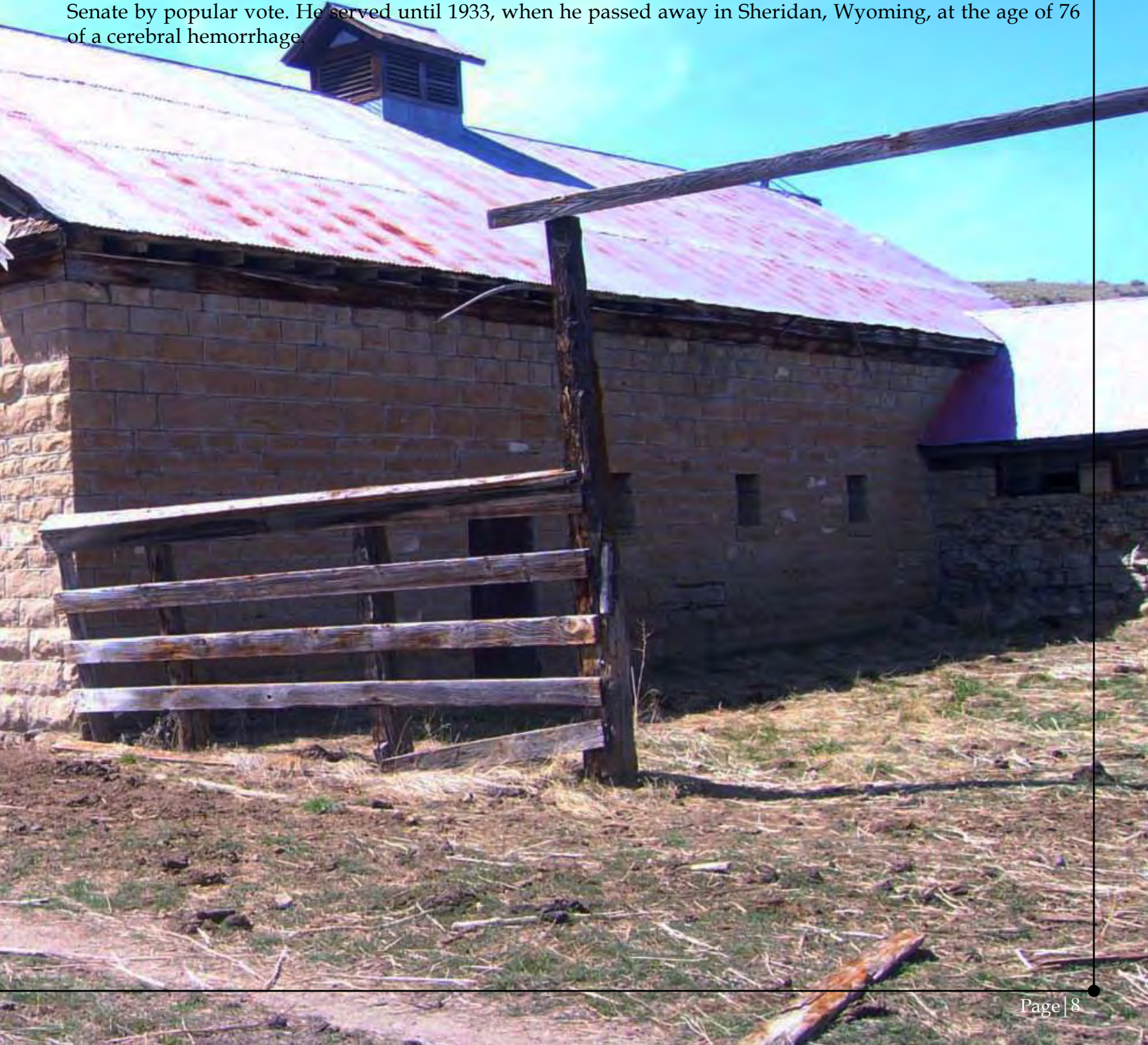




**Mr. John B. Kendrick:** Arriving in Wyoming in 1879, at the age of 22, Mr. Kendrick hired on with the Snyder-Wulfjen Brothers Ranch of Round Rock, Texas, to help move a herd of cattle from the Gulf of Mexico to the grasslands of Wyoming. Mr. Kendrick's formal education was limited. He didn't attend school much after the fifth grade. However, instead of drinking and carousing like his fellow trail hands, he spent his spare time reading and studying from the books he carried in his saddlebags.

While working for Charles Wulfjen, Kendrick started building his own herd. In 1882, when Wulfjen's holdings were sold to the Converse Cattle Company, Kendrick too sold his cattle, using the profits to begin another herd. He was so successful with his herds and finances that when the devastating winter of 1886-1887 put many ranchers out of business, he was in the perfect financial position to take advantage and expand his operation.

Mr. Kendrick later became a large landowner and was elected president of the Wyoming Stock Growers Association in 1912, serving until 1913. In 1910, he was elected to the Wyoming Senate and then ran for the US Senate in 1913, but lost. He was elected Governor of Wyoming in 1914, and in 1916 was elected to the US Senate by popular vote. He served until 1933, when he passed away in Sheridan, Wyoming, at the age of 76 of a cerebral hemorrhage.



## Building the Ranch:



immigrant, moved with his wife and three sons to the site of the LX Bar Ranch to begin work. The buildings at the site included a five bedroom main house, bunk house, ice, coal and laundry house, the first solar-powered chicken house in Wyoming, and a two story stock barn. The main focus of this ranch was stock tending. The property still has a large cement dipping vat in good condition. The barns were intended to house stock in a carved stone setting; the inside wall of the first box stall has finely curved walls instead of squared corners. Mr. Husman was a recognized authority on the cleavage and fracture of stone. As still recognizable today, Mr. Husman was very careful in the selection of the stone and materials used in the buildings. The light colored sandstone rock was

Construction at the LX Bar Ranch started in 1910. The masonry work was contracted to expert stonemason Oscar Husman of Sheridan, Wyoming, and his family. Mr. Husman, a Swedish

quarried nearby and hauled to the site with horses and wagons. The walls are eighteen inches thick and the foundation is two feet wide.

At the beginning of construction of the structures, Kendrick was under the assumption the county road along Powder River would follow the northwest bank where the LX was located. When the county chose to construct the road on the southeast bank, along which the rural electric and telephone lines were routed, Kendrick appears to have lost interest in the LX Ranch, as it was never converted to electricity. John's nephew



Tom Kendrick came to work for him in 1902 and lived on the ranch until he retired in 1951. After Tom moved away, several employees continued to live on the ranch until the 1960's, after which the buildings were abandoned. The property has not been occupied since. In 1992, the large property was reduced to include all the structures along with approximately 60 acres. At the time of this writing and survey, the property is still owned by Mr. James Guercio (music producer, musician, songwriter, movie producer). Mr. Guercio has offered up the property to the State on the condition that they preserve its historic buildings.



Inside stone walls of main barn.



Front porch of main house.



Overview of the LX Bar Ranch, Campbell County, Wyoming



**The Survey:** Located in Township 57 North, Range 76 West, of the Sixth Principal Meridian, the legal description of the parcel known as the LX Bar Ranch at present is as follows: Tract 53A; that portion lying north of the Powder River; Tract 82: that portion lying north of the Powder River. The scope of the survey requested was not to determine or monument the southern boundary of this parcel. Furthermore, the boundary between the owners on both sides of the river is not in dispute. However, the somewhat vague description of “north of and south of the river” does bring up a few questions with regards to location and intent. The G.L.O. did not meander or separate out any portion of the Powder River in this particular area in the original survey. For taxation purposes, the County Assessor’s office is only concerned with the approximate acreage of the upland portion of the tracts as seen in the Figure 1.

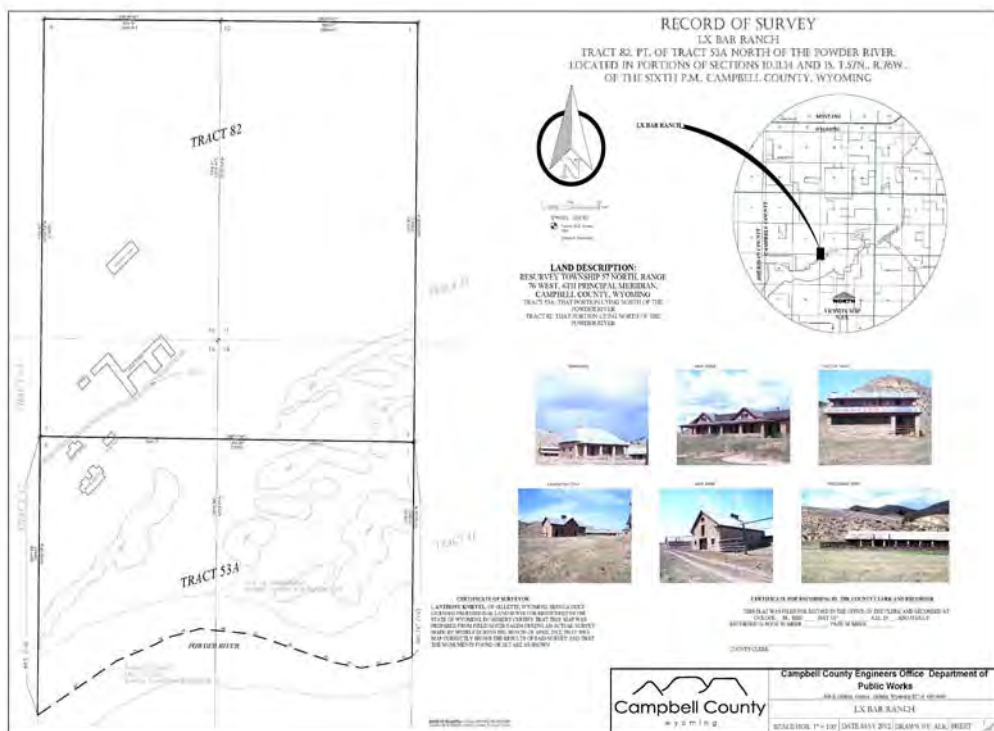
So where is the legal boundary separating north of the river and south of the river? Several opinions exist, depending on where you go to look for answers. If the issue of determining the “property” line were to arise, my first suggestion would be to go directly to the affected landowners and attempt to come to an agreed



Figure 1

property line agreement. If that is not a viable solution, then looking towards case law is the next step.

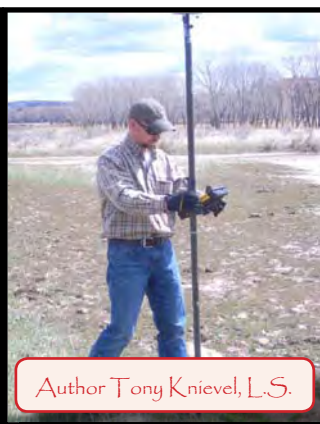
While preparing this article, I wanted to bring up this issue for readers to think about cases or projects they have been exposed to for possible future discussion. What I found was, that generally in Wyoming, where a non-navigable river or stream is the boundary between two parcels of land, the boundary lies along the thread of the main channel. (Jourdan v. Abbott, 464 p.2d, 311 Wyo.1970) Sounds simple enough, but what is the definition of "thread"? The "thread" or center of a channel, as the term is used, must be the line which would give the owners on either side access to the water, whatever its stage might be, and particularly at its lowest flow. Monument Farms, Inc. v. Daggett, 2 Neb. App. 988, 520 N.W. 2d 556 (1994); State v. Ecklund, 147 Neb. 508, 23 N.W.2d 782 (1946) The interpretation here was the thread of the stream is the deepest groove or trench in the bed of a river channel, the last part of the bed to run dry. In regards to a navigable river, Ray Hamilton Skelton, C.E. and author of "The Legal Elements of Boundaries and Adjacent Properties" states: "Thread of a River: The thread of a stream or river when called for as a boundary line is the middle line between the shores, irrespective of the depth of the channel, taking them in the natural and ordinary stage of the water, at medium heights, neither swollen by freshets or shrunk by droughts." State v. Muncie Pulp Co., 119 Tenn. 47, 104 S. W 437. As I stated earlier, establishing the southern boundary of the description was not part of the scope of the assignment and the legal description still stands as that portion lying north of the river. We did,



however, survey both the depth of the channel (figure 2) and each bank, so if needed, the information could be used in the future. (Lucky for us, a local cowboy and his horse arrived on site just in time to survey the river.) In this case, both definitions of the thread were almost identical in location.

**Looking to the Future:** As of now, the plan to preserve the property is to mothball the buildings to help curtail the deterioration that has taken place over the years. Access to the site remains an issue, as the Powder River to the south is not yet an option at this point and private roads lead to the site from the north. Hopefully, restoration and access will be resolved, and the public will be able to visit and enjoy this wonderful piece of Wyoming history.

**Citations:** Wheel of Time 1800's-1984, By Arvada Historical Group & Printed by State Publishing, Pierre, SD; wyoshop.state.wy.us; www.wikipedia.com; <http://wyoparks.state.wy.us/pdf/LXBARRANCH.pdf>, by Tobin & Associates, P.C.



(Continued from Page 6)

lines OP, OQ, OR, PQ and PR. Lines OP and OQ form a unique plane, and lines OP and OR form a second unique plane. These two planes intersect along line OP. From plane geometry it is stated that in a given plane and at a given point on a given line only one line can be drawn perpendicular to the given line. In the plane OPQ, this perpendicular line is Pq, and in plane OPR, this perpendicular line is Pr. Notice that the lines Pq and Pr form a third plane, which is perpendicular to the line OP. The plane angle rPq is the angle between the two planes (OPq and OPr). In solid geometry this angle is called the dihedral angle.

The geometrical discussion just demonstrated produces identical results. This concept is very important in astronomy and surveying. It establishes the fundamental design criteria for astronomic and surveying theodolites and levels. Either method to measure the angle between two vertical planes whose line of intersection is OP results in the dihedral angle between two planes. Furthermore, the plane perpendicular to the line of intersection OP is the horizon through P.

The geometrical concepts employed in spherical trigonometry and solid geometry are the underlying principles of the two-dimensional and three-dimensional theory of surveying, mapping, geodesy, and astronomy. Once these geometrical principles/concepts were understood, it has been the goal of instrument designers/makers to build and perfect the "perfect" instruments. More about the development of these instruments will appear later.

During this period 1500 through 1900, a number of other mathematical developments occurred. John Napier (1550 - 1617) developed the theory of natural



logarithms. Before the development of the digital computer, logarithms were the computational tool for small, large, and complex mathematical computational problems. Surveyors were using logarithms to compute latitudes and departures for plane traverses by 1580.



Carl Friedrich Gauss (1777 - 1855) was probably the most significant contributor to geodetic surveying. Gauss was deeply involved in astronomy, surveying, cartography, and geodesy. These efforts supported his work in the field of pure mathematics (surveying the Electorate of Hanover, 1818 - 1832). His work led him to perform numerous mathematical investigations in geometry, geodesy, and map projections. In all likelihood the most important writing was the paper presented to the Royal Society of Göttingen in 1827. The paper was entitled "Investigations of Curved Surfaces". It was an expanded version of the paper "New General Investigations of Curved Surfaces" published in 1825. Although important to surveying, geodesy, and cartography, the 1827 work had far reaching consequences. Albert Einstein wrote: "If he (Gauss) had not created his geometry of surfaces, which served (George Friedrich Bernhard) Riemann (1826 - 1866) as a basis (for his geometry), it is scarcely conceivable that anyone else would have discovered it." Riemann's geometry, mentioned here, "was essential in the formulation of Einstein's theory of general relativity".

Besides Napier and Gauss, there were numerous other contributors. The list is extensive and their efforts were significant. A partial list include Friedrich Wilhelm Bessel (1784 - 1846); Nathaniel Bowditch (1773 - 1838); Leonhard Euler (1707 - 1783); Joseph Louis de Lagrange (1736 - 1813); Pierre Simon Marquis de Laplace (1749 - 1827); Andre Marie Legendre (1752 - 1833); Gottfried Wilhelm Leibniz (1646 - 1716); and Colin Maclaurin (1698 - 1746).

The subject of survey adjustments has not been presented in this section, because it is a subject unto itself, and will be discussed in a later issue of Lines and Points.

# P.L.S.W. TECHNICAL SESSION

NOVEMBER 1ST & 2ND, 2012 • BEST WESTERN RAMKOTA HOTEL • CASPER, WYOMING

## GENERAL INFORMATION

### PRE-REGISTRATION:

FEE: \$100 PLSW Members  
\$50 PLSW Affiliate Members  
\$175 Non-Members

A \$20 late registration fee will be added to all registrations received after October 26, 2012.

### AGENDA

November 1 <sup>ST</sup>	7:00 a.m. - 8:00 a.m.	Registration
	8:00 a.m. - 12:00 p.m.	Seminar
	12:00 p.m. - 1:00 p.m.	Luncheon
	1:00 p.m. - 5:00 p.m.	Seminar
	5:00 p.m. - 9:00 p.m.	Social Hour
November 2 <sup>ND</sup>	7:00 a.m. - 7:45 a.m.	Breakfast Buffet
	8:00 a.m. - 12:00 p.m.	Seminar

## LOCATION AND LODGING

A block of rooms has been reserved at the Best Western Ramkota Hotel, 800 N. Poplar Street, Casper, Wyoming.

Rate: \$70.99 per night. Telephone: 307-266-6000.

## PROFESSIONAL DEVELOPMENT HOURS

12 Professional Development Hours will be awarded for the entire seminar.

## FOR MORE INFORMATION, CONTACT:

Paul Svenson 307-266-2524  
Bill Fehringer 307-995-2620

## NSPS MAP/PLAT COMPETITION

The Wyoming Land Surveyors NSPS Map/Plat Design Competition will be held in conjunction with the seminar. Send your entries to Bill Fehringer or bring them to the seminar.

## Writing Legal Descriptions for Parcels and Easements

The seminar is a detailed overview of writing land boundary and easement and right-of-way descriptions. The topics include the surveyor's role in writing legal descriptions based upon boundary surveys. All types of easements will be discussed in order that the surveyor can identify existing easements. Each of the basic elements of the description will be addressed. Grammatical style and punctuation will be discussed and interpreted. All the basic types of legal descriptions are presented. Besides the study of the dimensional aspects of boundary and easement descriptions, the use of physical calls; adjoiners; exceptions; restrictions; and other topics will be addressed.

## Overview of Map Projections used by Surveyors

The seminar presents details about the map projections that are frequently used in local, regional, and national mapping programs. Emphasis will be on the polyconic, the coniform, and the equal area projections used. That state plane coordinate systems (Universal transverse Mercator and Polar Stereographic), and regional coordinate systems will be presented. Discussions will include conversion of geodetic positions to plane coordinates and the converting of plane coordinates from one coordinate system to a second coordinate system. The plan coordinate and coniform transformations are described. Examples of the errors that could occur with improper usage of the various mapping equations will be presented.

## Early History of the GLO

The early history of the General Land Office is an overview of the operations of the General Land Office for the first surveys (the surveys of the Seven Ranges in southeastern Ohio) through 1855 when the first set of general instructions were issued by the General Land Office. Topics will include some of the early participants and the territorial survey instructions issued by the territorial surveyor generals. The intent is to indicate to the audience that the original surveys in the Public Domain east of the Mississippi River and those states bordering on the western side of the Mississippi River may be radically different than the surveys executed under the general instructions issued from Washington in 1855 and thereafter.

Since 2012 is the 200th anniversary of the General Land Office, we will have a special guest appearance from Mr. Edward Tiffin, the first U.S. Surveyor General. Mr. Tiffin was selected by President James Madison as the chief commissioner of the United States General Land Office in 1812. Mr. Tiffin will speak on his experiences in establishing the US General Land Office.

## Herbert W. Stoughton, Ph.D., P.E., P.L.S., C.P.

Herbert W. Stoughton, earned B.S.E. (Civil Engineering), M.S.E. (Geodetic Engineering), and Ph.D. (Civil Engineering) degrees at the University of Michigan, and pursued additional academic studies at the University of California at Los Angeles and the University of Illinois. Dr. Stoughton has taught at the University of Michigan, SUNY Alfred Agricultural and Technical College, Laramie County Community College; and

Metropolitan State College of Denver. At the latter institution he was professor and Head of the Survey and Mapping Program and developed an extensive series of courses in surveying for distance learning. Dr. Stoughton was employed by the Department of Defense, Defense Mapping Agency Geodetic Survey Squadron, as a geodesist, where he worked on geodetic support for numerous programs supporting the DOD strategic and tactical weapons systems and NASA.

Professor Stoughton was a land surveyor member of the New York State Board of Registration. He is a member of the American Congress on Surveying and Mapping; American Society of Photogrammetry and Remote Sensing; American Geophysical Union; Wyoming Engineering Society; Professional Land Surveyors of Wyoming; and Professional Land Surveyors of Colorado. He has authored over twenty technical books; sixty technical papers; and eighty book/literature reviews. For the last forty years, Dr. Stoughton has held numerous elected and appointed offices in American Congress on Surveying and Mapping; American Association for Geodetic Surveying; American Society of Civil Engineers; American Society of Photogrammetry and Remote Sensing, and the Professional Land Surveyors of Wyoming.

## Reid Miller

During thirty-three years of federal service in five separate job series, Reid Miller has worked in seven states for three civilian agencies and two military services. His interest in surveying was inspired by the stories at each of seven units of the National Park Service where he was duty stationed as a Park Ranger. From the history of the Agate Springs Ranch in Sioux County, Nebraska where rancher James H. Cook laid out his own irrigation ditches with homemade surveying equipment, to Allegheny Portage Railroad National Historic Site in Pennsylvania, where professional surveyors defined the route of a complex railway across the Allegheny mountains that featured ten inclined planes, Miller has found and interpreted for visitors a connection to surveying at every stop along the course of his career.

A native of Nebraska, Reid Miller has served for the past ten years with the Bureau of Land Management at the National Historic Trails Interpretive Center in Casper. He was contacted in 2009 by the Bureau's National Training Center in Phoenix to present a first-person historic character that would complement the story of the nation's public lands, and so chose Edward Tiffin, whose service as first Commissioner of the General Land Office (1812-1814) set the stage and established standards for surveying and sale of the public domain into private ownership. For Miller, "Edward Tiffin was an outstanding public servant and remains an inspiration 200 years on."

## Lunch Program:

During Thursday's lunch, representatives from The Wyoming State Board of Registration for Professional Engineers and Land Surveyors will provide a short presentation on the upcoming legislation changes proposed to the State Legislature this year. After the presentation they will be available for questions. We encourage everyone to attend.

## NEW QUALIFICATIONS FOR CFEDS PROGRAM

The Bureau of Land Management (BLM) has modified qualifications for acceptance into the Certified Federal Surveyor (CFedS) Program to include pre-registered/pre-licensed applicants that have passed the National Council of Examiners for Engineering and Surveying (NCEES) Fundamentals of Surveying examination. Pre-registered/pre-licensed applicants who pass the CFedS examination will earn certification when they become registered/licensed in at least one state, territory, or the District of Columbia. In the interim between passing the CFedS examination and becoming registered they will have the same continuing education and renewal requirements as a CFedS.

The CFedS Program was developed to ensure that land boundary surveys for federally recognized tribes, individual Indians or Alaska Natives are executed in accordance with accepted professional standards, and are in compliance with the current policies and legal interpretations of the Department of the Interior and Bureau of Land Management. The Program consists of seven courses, a certification examination, and required continuing education courses. There are currently 550 CFedS registered in 44 states. For more information about how to register, the CFedS program, or to find a CFedS in your area, go to: [www.cfeds.oer](http://www.cfeds.oer).

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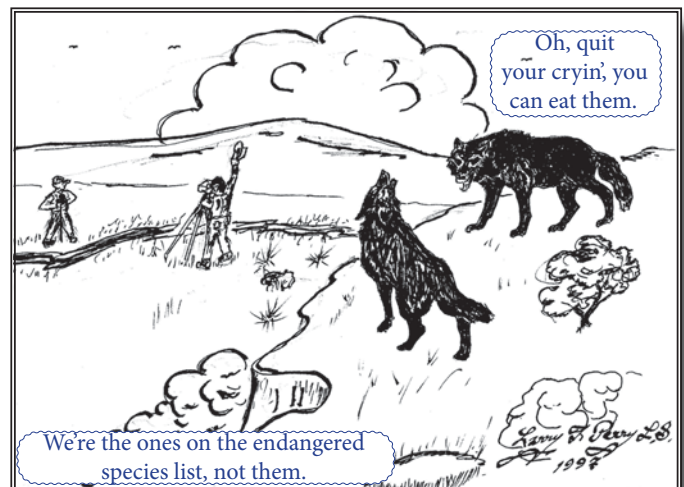
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### MORE ANNOUNCEMENTS

- The Wyoming Board of Registration is now offering Professional Land Surveyor candidates the opportunity to take the 2-hour State Specific Examination on a given day each month during the year.

- The Bureau of Land Management respectfully requests that readers of the Manual of Surveying Instructions (2009) report any errors found. Email with the details to [blmsurveymanual@blm.gov](mailto:blmsurveymanual@blm.gov). For information and to view postings of reported errata visit the BLM Manual website at: [www.blmsurveymanual.org](http://www.blmsurveymanual.org).

## Lines and Points

### Article Rotation Submission Schedule

#### By Chapter

Beginning in September 2012

Responsible Chapter	First Call Date	Last Call Date	Publication Date
Northeast Chapter	THANK YOU! (SEE "LX RANCH" IN THIS ISSUE)		
Northwest Chapter	December 1	December 15, 2012	January 1, 2013
West Chapter	March 1, 2013	March 15, 2013	April 1, 2013
Central Chapter	June 1	June 15	July 1
South Central Chapter	September 1	September 15	October 1
Southeast Chapter	December 1	December 15, 2013	January 1, 2014
Laramie Valley Chapter	March 1, 2014	March 15, 2014	April 1, 2014
Upper Platte Chapter	June 1	June 15	July 1
Southwest Chapter	September 1	September 15	October 1, 2014

As the Board of Directors discussed, any four page article (with pictures) may be from within the particular chapter membership (Survey stories, or technical experiences) or after acquiring permission to use an article from another professional society publication or which provides information of interest to the PLSW members. The Board also approved assigning the responsibility for the article development and submission to each chapter's vice president. If a Chapter does not provide an article that same Chapter be obligated to provide an article for the next publish date.

## ATTENTION!

### SAFETY MANUAL FOR SURVEYORS



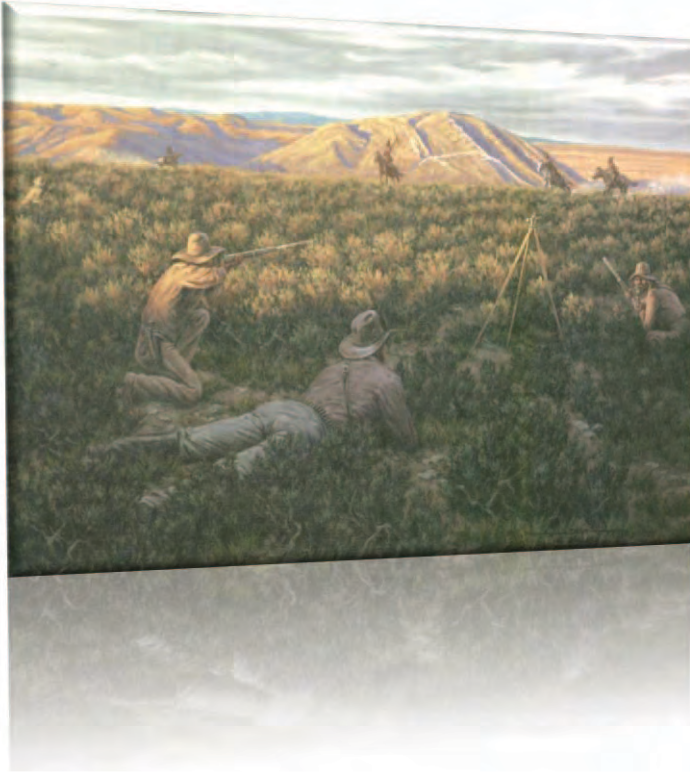
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~ GRENVILLE DODGE AND PARTY AT THE GANGPLANK ~



A signed and numbered reprint of Dave Paulley's original oil painting of UP Rail Road's survey party finding a route over the Laramie Mountains after being forced there by an Indian war party.

FOR SALE BY THE PLSW SE CHAPTER

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DennieandBarb@aol.com

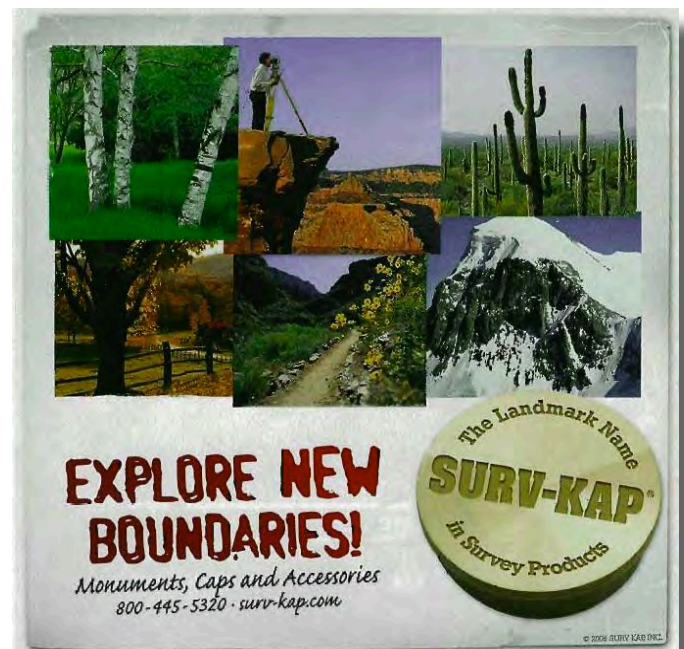
**Land Surveyors - USDA Forest Service - Laramie, WY.**

The Medicine Bow-Routt National Forest is seeking candidates for 3 Land Surveyor positions. The program operates as the Region 2, North Zone Land Survey team, supporting 4 National Forests and 1 National Grassland in Wyoming and northern Colorado, and is based in Laramie, WY. The team consists of a Forest Land Surveyor GS-12, a Project Surveyor GS 9/11, and a Student Intern Surveyor GS -4/5 open to students currently enrolled in an accredited degree program in Surveyor, Geomatics, or similar.

The work of the team is primarily Boundary Surveying in a rural environment. Surveys are requested by our District Rangers across the Zone, and may involve identifying boundaries for Timber Sale, trespasses, easements, or land exchanges.

The positions are open to qualified current Federal Employees and candidates outside the Federal workforce. The Forest Service is an equal-opportunity employer, and is actively seeking to increase the diversity of its workforce. It is in the interest of members of under-represented groups to self identify. Veteran's preferences may apply. This is an outreach only - the official announcement will be published on USAJOBS. Interested candidates should contact Forest Land Surveyor Tom Stockslager at 307-745-2434 or [tstockslager@fs.fed.us](mailto:tstockslager@fs.fed.us) for more information and to be directly alerted to the official announcement.

SE CHAPTER HAS LOGO  
MERCHANDISE AVAILABLE  
CONTACT JACK STUDLY FOR DETAILS

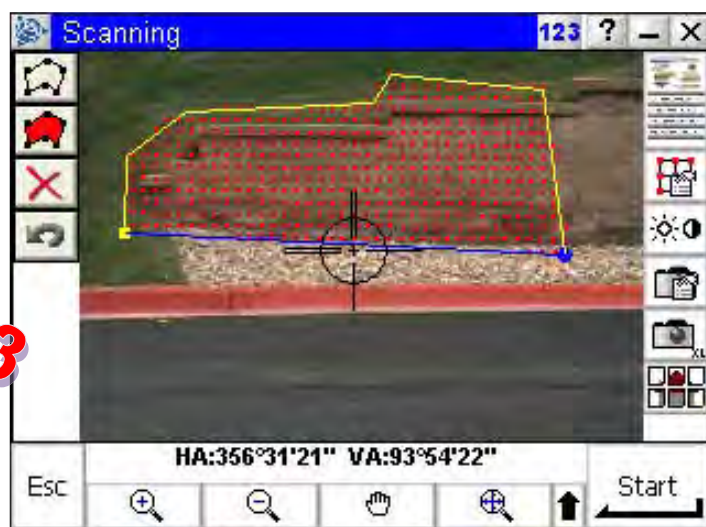




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