Volume 37: Issue 2
April, 2026

LINES & POINTS

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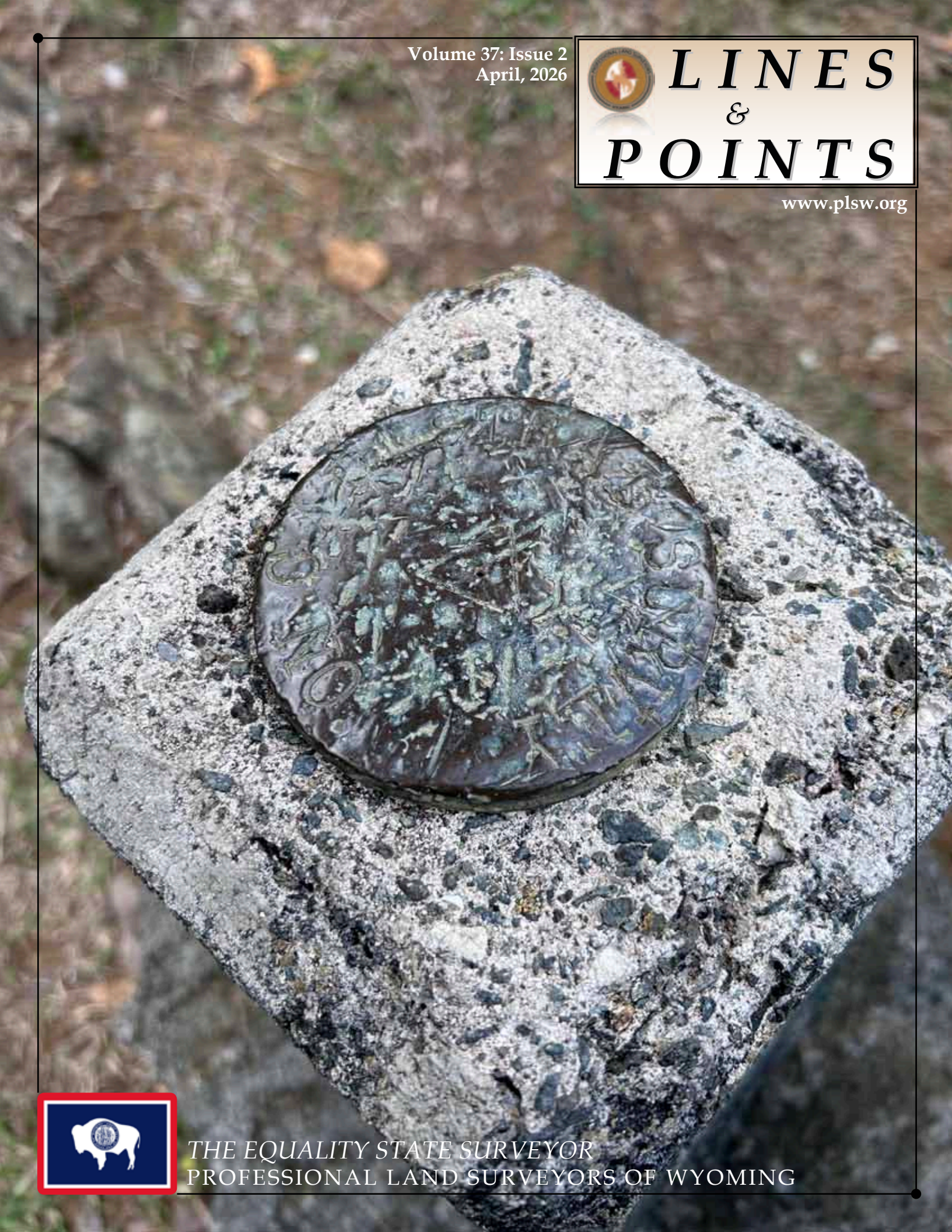

THE EQUALITY STATE SURVEYOR

PROFESSIONAL LAND SURVEYORS OF WYOMING

On The Cover

The "On Cadastral Survey" Corner behind Drake's Seat overlooking Magen's Bay, St. Thomas, Virgin Islands

Photo from Cody Schatz, P.L.S.

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- Jason Dysthe - Frontier Precision Inc.
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PLSW (Professional Land Surveyors of Wyoming; PO Box 8, Cheyenne, WY 82003) is a statewide organization of Land Surveyors registered 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

Hello again.

This winter has been crazy all over Wyoming. Between a few snowstorms and lots of wind, we were able to survey from Christmas to President's Day with some days in the 60-degree range. Summer might give us a run for our money if this continues.

I want to give a big thank you to all the survey/educational speakers around us this winter. For those who take advantage of these conferences, thank you for building up our profession. If you didn't attend one (or more of the following) you missed out on some great classes. South Dakota Society of Professional Land Surveyors (SDSPLS) had their convention the first full week of January. Wyoming Engineering and Surveying Society (WES) had a great turn out of surveyors the first week of February. Montana Association of Registered Land Surveyors (MARLS) had their convention the first week of March. Also, Western Federation of Professional Surveyors (WFPS) had their conference in Las Vegas March 18-21 to over 900 folks.

As spring/summer work starts, please continue to mentor young and/or the new folks into our surveying world. I know my firm has been job shadowing a few students from local schools this past year. We also have hired some summer interns to help get work completed, and also help train up the next generation of great surveyors.

This picture and a close up of the corner on the cover is from a trip that my wife and I took with some friends and family back in January. If you are ever in St. Thomas in the Virgin Islands, I recommend you take Skyline Drive and find Drake's Seat. Behind Drake's Seat is this corner labeled "On Cadastral Survey" and it overlooks Magen's Bay and you can see Hans Lollik Island in the background. The views are well worth it.

Until next time, I am wishing you all a great and prosperous summer.

Cody A. Schatz, P.E., L.S.

President,
Professional Land Surveyors of Wyoming

ANNOUNCEMENTS

Are you ready to make a lasting impact on an entire state's infrastructure?

We are seeking a Professional Land Surveyor for a critical leadership position, overseeing all statewide landsurvey operations and driving right-of-way engineering initiatives for Wyoming.

This isn't just a management job; it's a chance to shape the future of transportation and infrastructure across the state. You will lead vital initiatives, direct consulting professionals, and provide the professionalcertification that moves Wyoming forward.

Why this is your next career move:

- **High-Impact Leadership:** You will be the primary authority, managing all land survey projects,setting standards, and chairing the Survey Oversight committee.
- **Immediate Rewards:** This position offers a **$2,000 Hiring Bonus** and **Moving Expense Reimbursement** to help you get started.
- **Excellent Benefits:** We provide comprehensive health insurance, a state retirement plan, and a culturethat values work/life balance.

If you are a licensed PLS with a passion for leadership and a desire to see your work build a legacy, we wantto talk to you. See the job description and apply at:

https://www.governmentjobs.com/careers/wyoming/jobs/5255579/state-land-surveyor-2026-00630

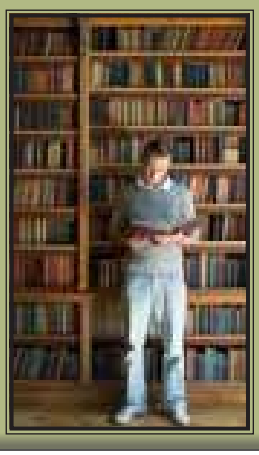
Working for the State of Wyoming offers more than a paycheck. Our total compensation package includes:

- **Comprehensive health, dental, and vision insurance**
- **Paid vacation, sick leave, FMLA and holidays**
- **Retirement - Pension and 457B plans that help you build a secure future**
- **Flexible schedules and work-life balance options**
- **Meaningful work that makes a difference for Wyoming communities**
- **and MUCH MORE!**

APPLY NOW FOR A PLSW SCHOLARSHIP

If you are attending college with the intent of pursuing a career in Land Surveying in Wyoming, we want to give you money!

A Scholarship Application is available on our website http://www.plsw.org



LINES & POINTS

HINTS TO AUTHORS

Dear Readers:

The editors of Lines & Points wish to convey our gratitude to the numerous authors who have contributed photographs, technical and professional articles, and other information to be incorporated into the quarterly journal. In recent years, the assembly and redaction of the submitted materials has taken on considerable technical application of the various English language compilers, office suites, and "publishing suites". This means that the communication and transfer of information and materials arrive at the editors' desktops in a multitude of formats and styles, which sometimes are not compatible with the PLSW personal computers.

We, the editors, are setting forth some simple rules for submitting materials which, hopefully will simplify your efforts and make the transition to the published version simpler and less time consuming.

1. If you have any questions or comments, please contact S. Dennis Dawson, Publications Comm. Chm., (dennieandbarb@gmail.com) or Michael A. Flaim, Editor-in-Chief (mike.flaim@bresnan.net).

2. If an article contains any illustrations, photographs, graphs, or other graphics, please transmit them as separate individual files. You may also include the illustrations within your manuscript, but the image integrity/quality is degraded seriously when attempting to extract them from the manuscript to create a published digital image. The Editor-in-Chief states that a much better digital resolution is obtained from the separate, individual illustrations submitted.

3. All submissions (electronic and snail mail) should be sent to S. Dennis Dawson (4005 Snyder Avenue; Cheyenne 82001). It is recommended a second copy be sent to Michael A Flaim (1212 Southwest Drive; Cheyenne 82007). It is further recommended a third copy be sent to Dr. Herbert W. Stoughton (2821 Carey Avenue; Cheyenne 82001). Dr. Stoughton has spent over two decades as a technical review editor of two national surveying journals, and will provide editorial/redactory review for grammatical presentation and punctuation format. The criteria for acceptable conformity to grammatical usage and punctuation shall be governed by the U.S. Government Printing Office Style Manual (any edition is acceptable).

4. It is strongly recommended that all submissions be transmitted six weeks prior to the publication deadline. The publication deadlines are: 1 January; 1 April; 1 July; and 1 October, annually.

5. Lines & Points is the official publication for the Professional Land Surveyors of Wyoming. Therefore, hence forth there will be incorporated in the publication all formal announcements pertaining to official business of the organization and other announcements. This includes announcements for the Annual Meeting; state-wide membership meetings; seminars; and the Fall Technical Session. These announcements are to be submitted to the current PLSW Secretary/Treasurer (PLSW; P.O. Box No. 8; Cheyenne 82003), at least four weeks prior to the *Lines & Points* publication deadline in which the announcement will/shall appear. The PLSW Secretary/Treasurer will circulate the announcements to the PLWS Publication Comm. Chm./Chief Editor, and the PLSW Board of Directors.

6. Advertisers and prospective advertisers should communicate directly with the Publications Secretary (P.O. Box No. 8; Cheyenne 82003) about any advertisements and modifications.

Lines and Points Article Rotation Submission Schedule By Chapter

Responsible Chapter	First Call Date	Last Call Date	Publication Date
Northwest Chapter	THANK YOU!	(see "Retracing The 1909 Tripple Murder Survey")	
West Chapter	June 1	June 15	July 1, 2026
Central Chapter	September 1	September 15	October 1, 2026
South Central Chapter	December 1	December 15	January 1, 2027
Southeast Chapter	March 1	March 15	April 1, 2027
Upper Platte Chapter	June 1	June 15	July 1, 2027
Southwest Chapter	September 1	September 15	October 1, 2027

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 shall be obligated to provide an article for the next publish date.

THE PROFESSION OF SURVEYING, LAND SURVEYING, GEODETIC ENGINEERING, AND GEOMATICS

BY: Herbert W. Stoughton, Ph.D., P.E., P.L.S., C.P.
Geodetic Engineer

The profession of "surveying"; "land surveying"; "geodetic engineering"; and/or "geomatics" date their formation to the third millennium B.C., or earlier, in China, India, Mesopotamia, and Egypt. Their development was a 'specialized endeavor' to improve the quality of life. Archaeological investigations and the remaining fragments of ancient literature indicate that 'surveying' was instrumental in the construction of irrigation systems, navigation canals, highways, and large civic monuments (as well as military operations). Scholars studying the activities of the ancients have noted the interaction between the geometric/trigonometric mathematics and the application to the construction of "civil works". When reading these scholarly works, the old adage "which came first - the chicken or the egg?" is apparent. Many of the specific activities and the associated geometrical theories are precisely undated as to their formal appearance/acceptance, and may have evolved at separate geographical locations at nearly the same time.

From the earliest time of these activities, the study of the geometry of the night sky (for astrology) entered the scene, and soon played and important role in mare navigation in the ancient world including the Mediterranean Sea and the India Ocean. Early trigonometric relationships were developed through careful monitoring of the motion of the planets, planetary satellites, stars, and other celestial objects (i.e. comets). By about 1000 A.D., most of the classical fundamental theories of trigonometry and of plane and solid geometry had been developed. Through the subsequent era, scholars refined the mathematical theories, developed logarithms and other computing procedures, and started to address consolidating the mathematical theories of associated physical phenomena into "topics/subjects". By the mid fourteenth century A.D., centers of learning, some being associated with a religious sect or organization, arose. Initially, there were two major subject areas - natural philosophy and theology. However, in a relatively short time, law, languages/arts, and other intellectual disciplines were created, and the modern university became a reality. In England (prior to 1550) writings describing the physical method of laying out a parcel of land and the instruments employed were published. Near the close of the sixteenth century the English philomathematians Aaron Rathbone and Edmund Gunther wrote tracts and taught courses about surveying instruments, plane table mapping, and traverse computations employing plane trigonometry. Gunther is remembered for standardizing the length of the surveyor's chain (66 feet); teaching at Gresham College, London; wrote *In Canon Triaguloram*, or, *Table of Artificial Sines and Tangents* (the first publication of common logarithms of sine and tangent); and introduced the cosine and cotangent. Rathbone published his first edition of a book on surveying around 1591. The fourth edition is entitled: *The Compleate Surveyor, Containing the Whole Art of Surveying of Land by the Plane Table, Circumferenter, Theodolite, Persetor, and Other Instruments With Divers Kinds of Menfurations, and matters Pertinent to a Work of this Nature. The Whole Treatise being Compiled in VII Books*. ; 4th ed.; William Leybourn, Philomathemation (London; 1679). Rathbone's work was very detailed with respect to the geometry, trigonometry, and common logarithms required to survey boundaries of plots of land, determine heights, and make maps. The fourth edition was so popular that it became the "model" of subsequent surveying books authored by Gibson and others. For instance, the problem of computing the 'closed boundary' of a plot of land appearing in Rathbone is identically described in twentieth century books on plane surveying. The only difference between the two problems is the numerical precision achievable in the latter publications.

Through the eighteenth and first one-half of the nineteenth centuries all subsequent English-American language surveying publications for land surveying contained few changes. In the US the popular surveying publications contained algebra, trigonometry, and surveying practice in a single volume. In 1845, William Mitchell Gillespie

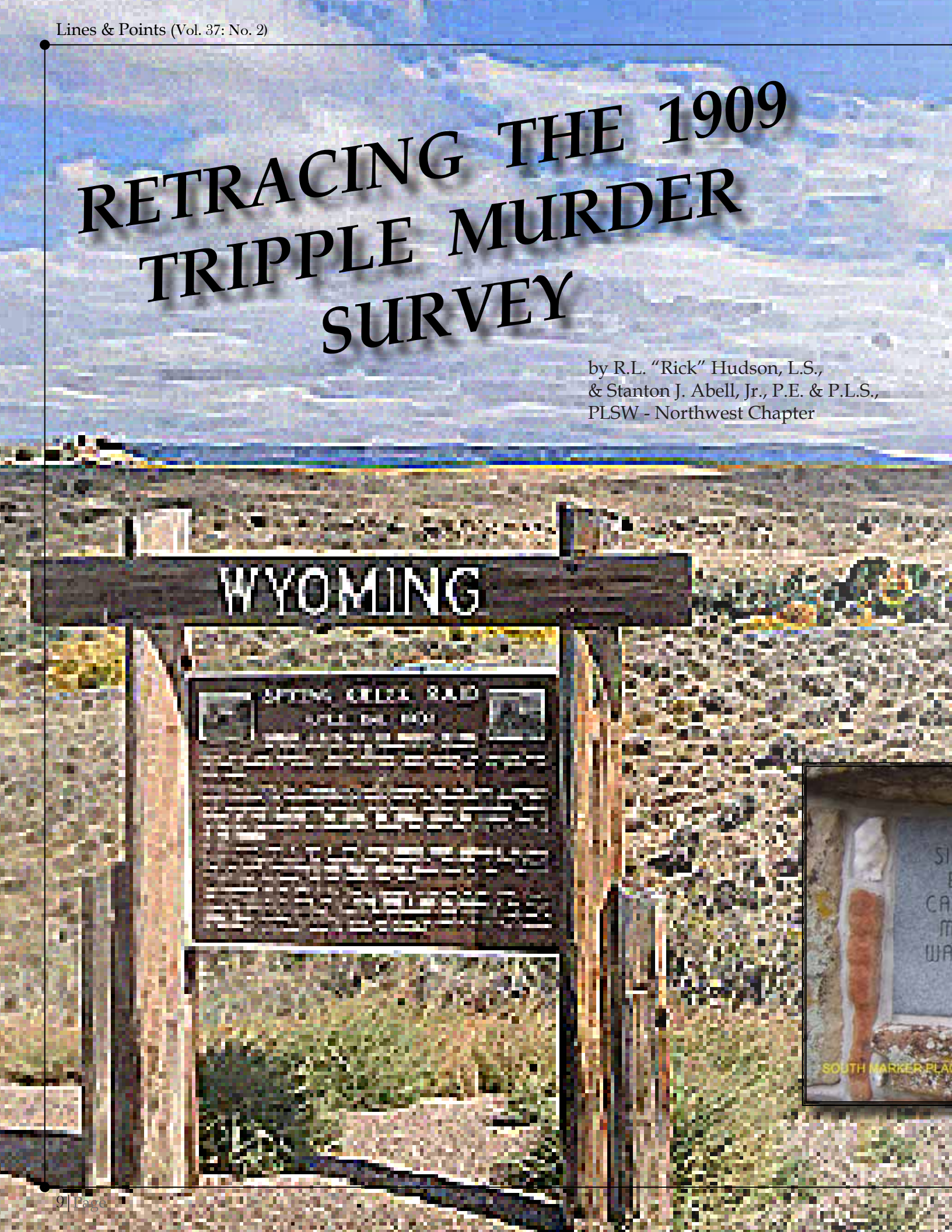
(15 April 1816 - 1 January 1868) joined *Union College* to develop the Department of Civil Engineering and served as an adjunct professor of mathematics. In 1851 he wrote a "set of lecture notes" (actually a book) of surveying. At that time, approximately fifty percent of the engineering courses pertaining to civil engineering incorporated the practice of all phases of surveying (plane surveying; cartographic drafting; geodesy; hydrographic surveying; cadastral surveying; surveying astronomy; etc.). Research indicates that the 1851 edition was a classroom reference, and apparently was not published for public consumption. However, in 1855 the second edition was published, and gained immediate recognition. Several writers of surveying histories state that Gillespie's work was the first "modem surveying textbook". The structure and order of the work has been the model for all subsequent general topical surveying books. The topics of plane and route surveying; geodesy; cadastral surveying/mapping; topographic mapping; surveying astronomy; etc. were treated in depth, and contained detailed mathematics and computations supporting the theoretical and technical aspects of the problems. In the first decades of the twentieth century a number of authors wrote surveying books purporting to be encyclopedic in content.

By 1820, the major academic programs in engineering were at the U.S. Military Academy (West Point) and at a few colleges in the eastern states. With the development of railroads, water transprotation, and for water supply and sewerage services needed to be developed for civilian requirements (compared to military requirements) -thus the 'infant' discipline *civil engineering* was formed. In the early civil engineering academic programs a major portion of the curriculum emphasized surveying topics, because intensive surveying and mapping requirements were needed to support the design and construction of the projects. After the American Civil War, more engineering institutions became major academic components at colleges and universities. Also, as the engineering projects became more complex other engineering subjects were identified and some of the existing components of civil engineering were selected to be separate academic disciplines. Mechanical, electrical, industrial, mining, and railroad engineering were some of the major academic disciplines by 1900. In civil engineering, the academic subject matter addressed the original subjects, but identified the need to subdivide the existing civil engineering subjects into additional specialized subjects, such as research, design, and construction, indicated the need for specialized classes to investigate and understand their applications. By 1960, civil engineering added three additional topics considered meaningful to civil engineering practice - contracts and specifications, engineering economics, and engineering ethics/professional practice. In most instances the remaining engineering disciplines incorporated similar courses. In order to maintain the minimum graduation credit hours between 120 and 150 semester credits, the faculty modified the curriculum by removing "unnecessary" courses and adding or modifying remaining courses. The civil engineering faculty and profession recognize that between 1900 and 1940 that there were very few significant modifications in theory, instrumentation, and applications, except in geodetic, hydrographic, and very large engineering projects. In those instances, very specialized instrumentation (one-of-a-kind) was designed. During the period between 1900 and 1945, there was little communication (exchange of technical matters) between the surveying organizations and instrument makers in Europe and in the US. World War II produced tremendous war effort instrumentations which were subsequently modified to create a new generation of surveying and mapping operations. Although many of the mathematical and geophysical theories (and science fiction proposals) had been published in the eighteenth and nineteenth century, the technology took several decades to apply and implement these theories. For instance, Christian Doppler (29Nov1803 - 17Mar1853) noted that the observed frequency of light/sound waves affect motion of the source and detector. Doppler applied this phenomena to positional astronomy investigations. After the launching near earth artificial satellites (1957), astronomers and engineers identified the doppler effect on the satellites' broadcasted messages/signals. This led to the determine of geographic positions on/near the earth's surface employing 'listening' to the

(Continued on Page 15)

RETRACING THE 1909 TRIPPLE MURDER SURVEY

by R.L. "Rick" Hudson, L.S.,
& Stanton J. Abell, Jr., P.E. & P.L.S.,
PLSW - Northwest Chapter



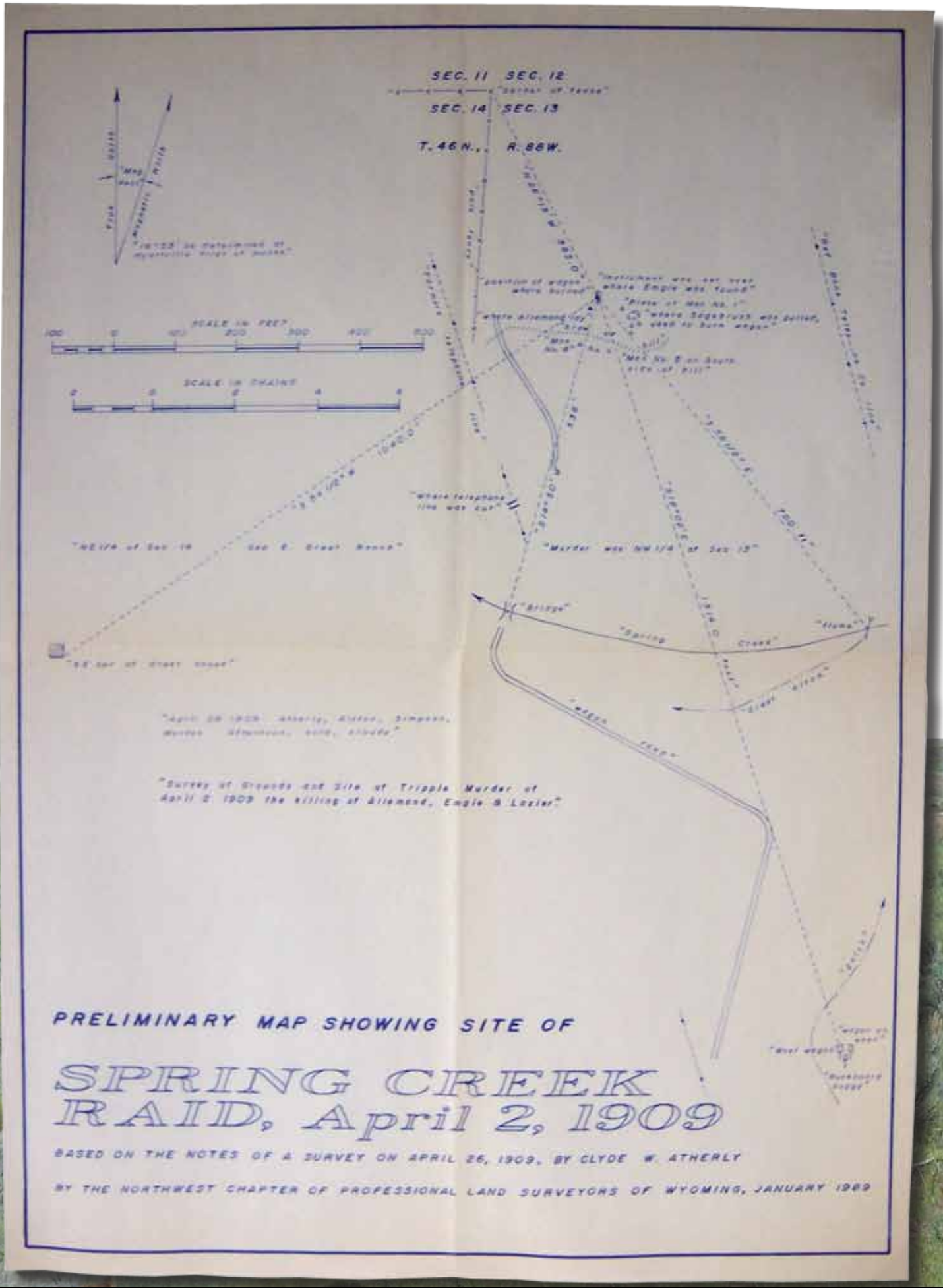
THE SPRING CREEK RAID

The Spring Creek Raid on the night of Friday, April 2nd, 1909, approximately seven miles south of Ten Sleep, in then Big Horn County, now in Washakie County, resulted in the deaths of three sheepmen. The incident is well documented in Wyoming history as the last public encounter between the cattlemen and the sheepmen over "deadlines" involving free range territory.

As word reached Basin, the county seat, a party of officials was dispatched to the crime scene to gather evidence and document the site conditions. On Monday, April 26th, they left Basin and traveled to the site near Spring Creek, arriving on a cold and cloudy afternoon. The party consisted of Clyde W. Atherly, County Surveyor; Felix Alston, County Sheriff; W.L. Simpson, Special Prosecutor; and Al Morton, Deputy Sheriff. Mr. Atherly commenced the survey of various features as requested by the sheriff, recording the measurements, descriptions and sketches in a bound field book as was, and still is, used by land surveyors.

THE ATHERLY SURVEY

County Surveyor Atherly titled his April 26th field notes "Survey of Grounds and Site of Tripple Murder of April 2 1909 the killing of Allemand, Emgie & Lazier." The notes, which give the murder location as the NW 1/4 of Section 14, Township 46 North, Range 88 West (of the Sixth Principal Meridian); state "Instrument was set over where Emgie was found" and provide a bearing and distance tie to the corner of Sections 11, 12, 13 and 14 as "N 26°13' W 383.0 (feet) which is "corner of fence of NE cor. Greet ranch." An additional tie "S 18°02' E 1314.0 feet to wagons on South Side of Spring Creek" provides enough information to plot the relative locations of the north and south wagons. Additional ties were made to various improvements such as telephone lines, the wagon road and the flume on the "Greet ditch where it crosses Spring Creek". The notes provide 33 survey ties.


SEC. 11 SEC. 12
SEC. 14 SEC. 13
T. 46 N., R. 88 W.
SCALE IN FEET
SCALE IN CHAINS
"Bridge"
"Spring Creek"
"Murder was NW 1/4 of Sec 13"
"Survey of Grounds and Site of Tripple Murder of April 2 1909 the killing of Allemond, Eagle & Lozier"
PRELIMINARY MAP SHOWING SITE OF
SPRING CREEK RAID, April 2, 1909
BASED ON THE NOTES OF A SURVEY ON APRIL 26, 1909, BY CLYDE W. ATHERLY
BY THE NORTHWEST CHAPTER OF PROFESSIONAL LAND SURVEYORS OF WYOMING, JANUARY 1989

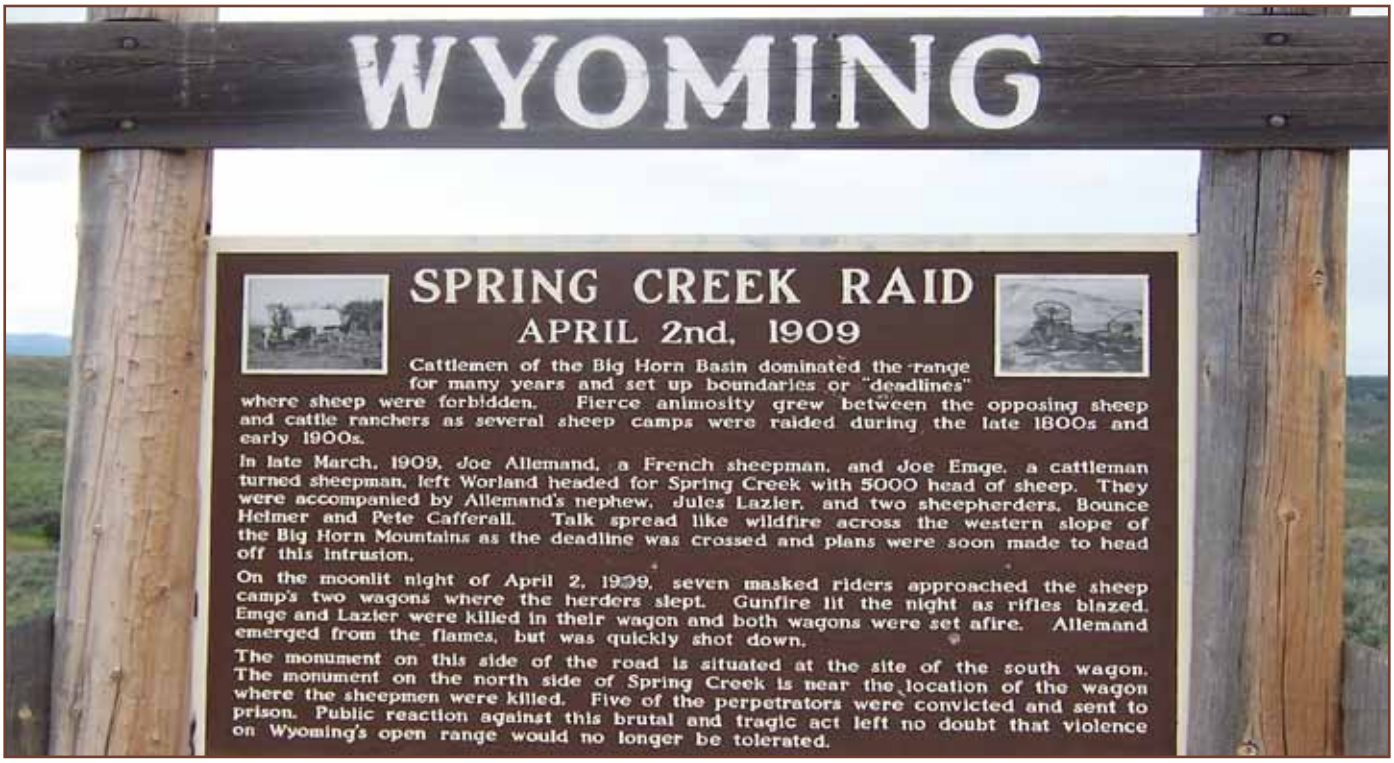
THE REQUEST AND THE RESEARCH

Our Northwest Chapter of Professional Land Surveyors of Wyoming (PLSW) was contacted late in 1988 by local historian Clay Gibbons of Worland requesting our assistance in locating the north and south wagon sites as surveyed in 1909. He provided us with a copy of the Atherly field notes, obtained from the Big Horn County Court House and made a presentation of the facts of the event. Being land surveyors, ever eager to perpetuate history, we agreed to assist in his project. As with all retracement surveys, our first task was to research the public records of previous surveys. In this case we obtained records of the General Land Office original survey in 1884 and independent resurvey in 1926, the Greet Ditch survey in 1898 and highway plans for project number SC-CFM 4611. The site now falls in Tract 47 of the 1926 resurvey, State of Wyoming land, and the original survey section corner is now Corner 2 of Tract 47. Both the tract corner and the resurvey section corner are shown on the highway plans; to the east of now Wyoming Highway 434. We prepared a preliminary map based on the Atherly field notes supplemented by the other survey records and set a date for the field work.

THE 1989 RETRACEMENT SURVEY

We chose Saturday, March 4th, 1989, to perform the retracement survey. Members of that crew were Stanton J. Abell, Jr. (PE&LS 2877), from Worland, R.L. Hudson (LS 519), from Thermopolis, Paul A. Blough (PLS 2332) and Paul Campbell (PLS 2571), both from Cody. While early March sometimes provides moderate temperature and bare ground, this day did not, as the temperature was approximately 10° F. with 8 inches of snow covering the site. Stan operated the Wild TC1L total station, Rick served as note keeper, both of the Paul's manned prism poles to tie various features projecting from the snow. Additionally, we searched both the north and south sites using magnetic locators, hoping to recover any metal artifacts. We subsequently learned that local residents, tired of seeing the burnt remains of the wagons, had removed the wood and metal residue decades before our visit.

During that day we marked a control point, using a rebar with aluminum cap near the east right-of-way fence and tied 44 features, including the resurvey section corner, fences, utility poles, ditch structures, creek banks and "brow of the hill" as mentioned in Mr. Atherly's field notes. We



performed a solar observation at the 1926 "brass cap" section corner for the basis of bearing of our retracement survey. Following Stan's computations and our analysis of the survey data, he and I returned on Saturday, March 11th, and set wooden stakes marked "Emge, Allemand" and "Man #1" through "Man #8" near and along the brow of the hill, and the "west wagon" south of the creek, as referenced in the 1909 survey notes; thus providing Clay Gibbons with reliable evidence on the ground for his later location of the markers.

THE 1990 SPRING CREEK RAID PLAT

Our preliminary map, dated January 1989, had been compiled from the Atherly survey notes at a field convenient scale of one inch equaling 100 feet and drafted to then Wyoming size D format, measuring 15 by 21.5 inches. Attorney at Law John W. Davis, of Worland, organized a reenactment of the district court trial State of Wyoming versus Herbert Brink; with Stan Abell portraying County Surveyor Clyde Atherly. The reenactment was held on August 10th, 1990, at the Washakie County Court House. The transcript contains references to a plat made by said surveyor, drafted at a scale of "one inch equals forty feet" and being marked as Plaintiff's exhibit "B". In a letter dated July 3rd, 1990, Stan informed Mr. Davis that a full-size map was being prepared by the chapter for the reenactment.

The resulting map, titled "Plat Showing Site Of The Spring Creek Raid April 2, 1909", and sub-titled "Based on the Notes of a Survey by Clyde W. Atherly on April 26, 1909", was drafted at the exhibit scale of one inch equals forty feet and measured 36 inches by 48 inches overall. Following its use in the reenactment the original was reportedly donated to the Ten Sleep Museum. A paper print is in the Northwest Chapter files and a facsimile of the preliminary version accompanies this article. All four of the chapter members who performed the 1989 location and retracement survey signed the Certificate of Surveyor appearing on the plat.

THE REVISITATION

During another Northwest Chapter project, GPS on BMs, I revisited the site of the Spring Creek Raid on the 10th of May, 2018, armed with hand-held GPS receiver and digital camera. Having driven by the sign and masonry markers numerous times a physical encounter was necessary. The large brown metal sign, titled Spring Creek Raid, sets forth the history of the event, including two photographic insets showing the burned wagons. A short distance to the east is the south marker, of native rock masonry, with the inscription "Site of south wagon where Bounce Helmer and Pete Cafferall were captured by masked raiders and their wagons burned on the night of April 2nd 1909." A closer look at the marker disclosed an

embedded Winchester Repeating Arms Co. 45-70 cartridge in the upper right corner.

The observed "hand-held GPS" position, on top of the marker, was 43.955527° N., 107.387857° W., elevation 1379.6 m.; the horizontal reference frame being NAD83(WAAS) and the vertical being NAVD88, to which my fellow 'veyor readers will recognize.

Other readers can find the sign and marker locations on Google Earth imagery dated 7/1/2014 at the following scaled NAD83 coordinates:

Sign, turnout on east side of Wyoming 434: 43°57'19.67" N., 107°23'17.56" W.

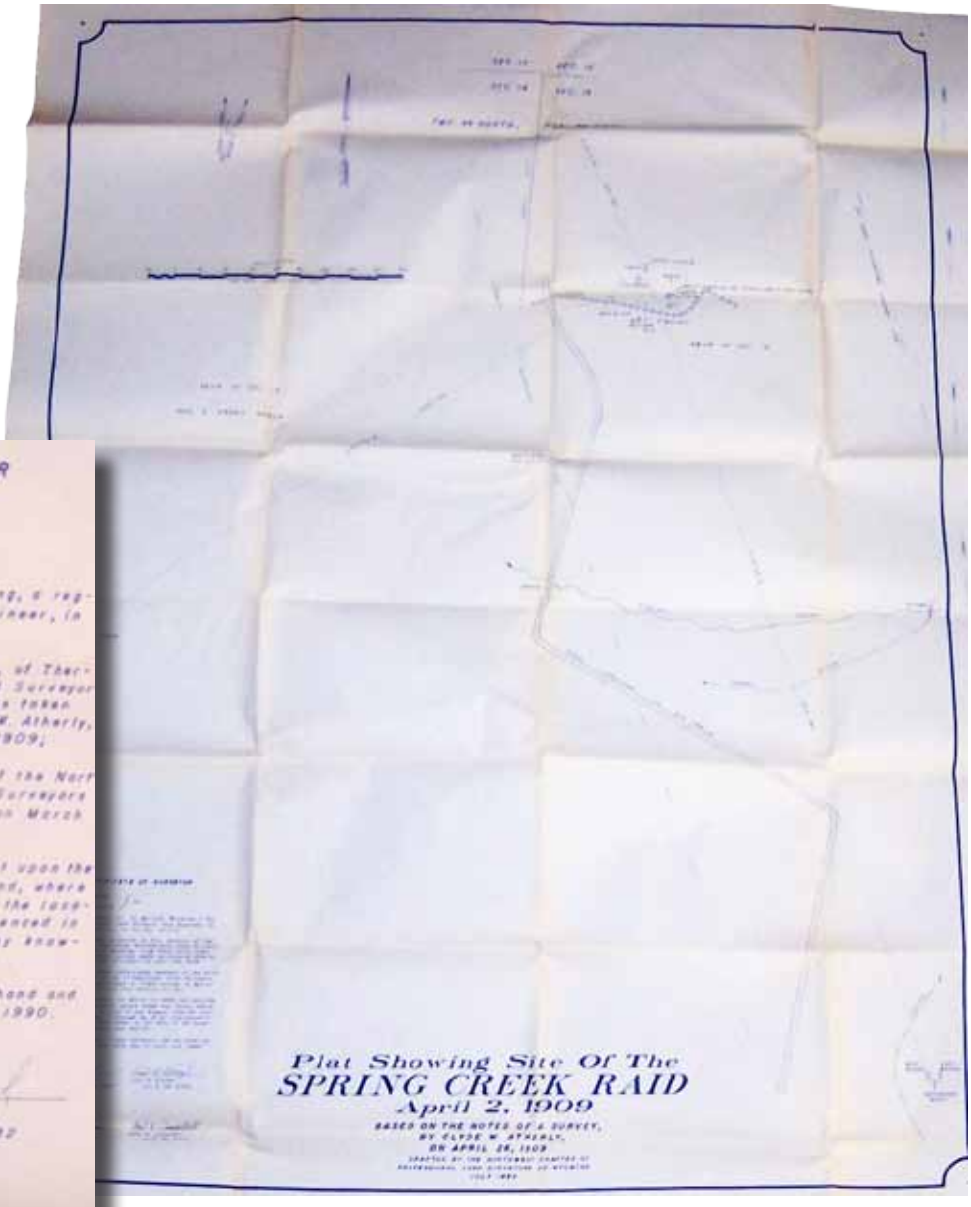
South marker, east of sign, on state land: 43°57'19.90" N., 107°23'16.26" W.

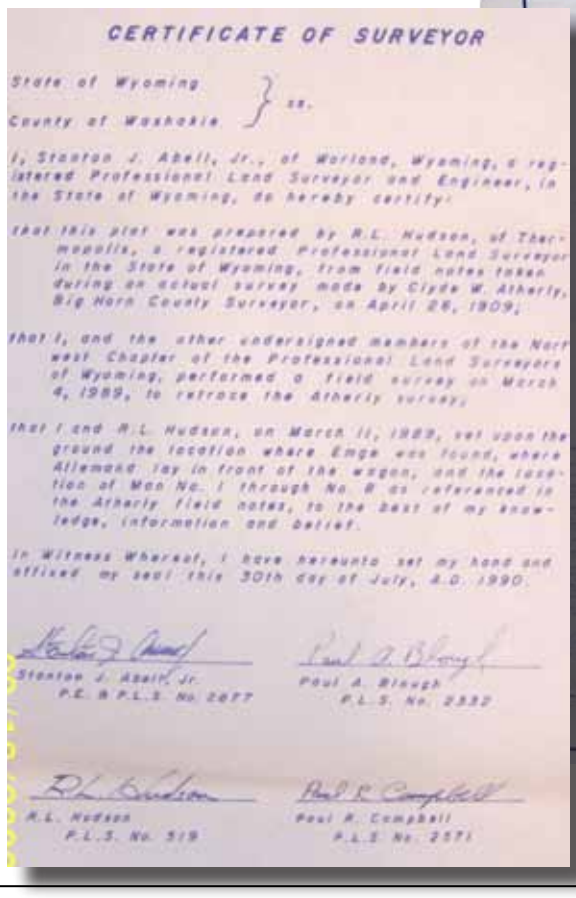
North marker, north of Spring Creek, east of highway: 43°57'33.16" N., 107°23'20.85" W.

Additionally, a State of Wyoming Corner Record, cross-index no. J-21, 46-88, dated July 2012, provides the following GNSS observed position for the corner of resurvey sections 11, 12, 13 and 14: N 3°57'38.7264", W 107°23'21.6779", NAD83(2007), elevation of the brass cap 4561.5 feet, NAVD 88.

THE EPILOGUE

As a local representative of our profession in Wyoming, the Northwest Chapter of the Professional Land Surveyors of Wyoming, was honored to have assisted Mr. Clay Gibbons with his project to perpetuate the physical location of the Spring Creek Raid of 1909. Initially, what appeared to be a relatively simple location survey, ultimately morphed into a full-blown retracement survey. From the gathering of research documents, to the survey on the ground, to the analysis of the survey data, to the marking of various features at the two sites, we were able to accomplish the assignment with confidence of having met the requirement of a preponderance of evidence.





CERTIFICATE OF SURVEYOR

State of Wyoming } ss.
County of Washakie

I, Stanton J. Abell, Jr., of Worland, Wyoming, a registered Professional Land Surveyor and Engineer, in the State of Wyoming, do hereby certify:

that this plat was prepared by R.L. Hudson, of Thermopolis, a registered Professional Land Surveyor in the State of Wyoming, from field notes taken during an actual survey made by Clyde W. Atherly, Big Horn County Surveyor, on April 26, 1909;

that I, and the other undersigned members of the Northwest Chapter of the Professional Land Surveyors of Wyoming, performed a field survey on March 4, 1989, to retrace the Atherly survey;

that I and R.L. Hudson, on March 11, 1989, set upon the ground the location where Enge was found, where Allemand lay in front of the wagon, and the location of Mon No. 1 through No. 8 as referenced in the Atherly field notes, to the best of my knowledge, information and belief.

In Witness Whereof, I have hereunto set my hand and affixed my seal this 30th day of July, A.D. 1990.

Stanton J. Abell Jr.
P.E. & P.L.S. No. 2077

Paul A. Blough
P.L.S. No. 2332

R.L. Hudson
P.L.S. No. 519

Paul R. Campbell
P.L.S. No. 2571

(Continued from Page 8)

satellites' precisely modulated signals. The US and USSR developed constellations of these satellites [Navy Navigation Satellite System - NNSS - for the US system]. Similar innovations have been developed to improve all the principle areas of surveying and mapping, and even created new technical subject areas.

Unfortunately, during this era, surveying professionals involved in surveying supporting general engineering were unaware of the new innovations, and continued to teach the old concepts employing out dated technological instruments. Before World War II, a significant number of surveyors acting as party chiefs and office project surveyors were engineering graduates. By the 1960's, nearly every civil engineering curriculum required between one to three surveying courses for graduation. Also, the number of post baccalaureate degrees being offered in the US was extremely small and was not satisfying the surveying professions' needs in government, industry, and private consulting. Also, there was relatively minimal sponsored research to attract surveying educators. In at least one major engineering program, surveying was divided into 'geographic information systems' (GIS) and land surveying. The dean of the college 'retained' the GIS program because it brought in research dollars, and transferred the land surveying curriculum to the School of Engineering Technology, because it provided minimal sponsored research funds. In another instance a tenured associate professor who was an excellent teacher, active in the institution's administration and assisted in supporting professional practitioners, was denied promotion to full professor. The department chairman indicated that it was because the individual had not produced any significant sponsored research funding.

During the same time funding for new/modern surveying information, student scholarships, etc. were not forthcoming. Also, the reorganizations of the post secondary academic institutions, expanded their physical facilities and support staff, thus reducing the funds available for education and recruitment. In the 1980's there were undergraduate institutions teaching field surveys with the vernier transit and dumpy level. In one four-year program, the surveying program had not received any financial support to upgrade surveying instrumentation in *twelve years*!

By the mid 1950's, senior surveying engineers in industry, private practice, and government recognized that the surveying profession education was seriously lacking in updating its knowledge base and recruiting students. Furthermore, many of the field surveyors in practice were not adopting the new technology and associated applications. This was exacerbated by many of the published surveying 'textbooks' being "retreads" of previous surveying textbooks, and not updated to address the application of new technologies and upgraded theories. When, in the event the new technologies are presented, the technical treatment/discussion is very elementary, or non existent, thus down-playing the intrinsic properties of the technology applied. Therefore, the *American Society for Civil Engineers* (ASCE) created a special commission to address the question whether surveying was a branch of civil engineering. The commission was comprised of Bro. B. Austin Barry, chairman; Alfred O. Quinn, *Aero Service Corporation*; and George D. Whitmore, U.S. Geological Survey Chief Topographic Engineer. Although the "Barry Report" was positive for surveying being an branch of engineering and formally endorsed by the ASCE Board of Directors, it was ignored by the civil engineering educators (for the most part). Many of the old surveying programs contained senior tenured faculty and were allowed to continue teaching until they retired, or departed the academic programs. Then, no new faculty were hired, and the surveying died a quiet administrative demise. In a few instances, a single surveying course was retained and renamed 'mensuration theory'. In many instances the

course was an "additional duty" assignment for a junior faculty member, or an adjunct instructor who did not have upper division or postgraduate education in surveying topics.

Another event was occurred on 4 October 1957 with the launching of *SPUTNIK!* Although the US Intelligence community had advance knowledge of the USSR space program, I well remember the Saturday night when we (in the US) received news of the successful launch and circum-navigation of the earth. Within days the newspapers and news media were questioning why the US was not the leader (because of this launch). Wild accusations 'flew' from every 'authoritative source' , including primary, secondary, and post-secondary educators. In hindsight, there existed a number of indicators which might identify the problems. Prior the World War II, two-year and four-year post-secondary education produced teachers for elementary and secondary academic programs. The "teaching program" is basically composed of two major components. The first component is to learn the general theories and procedures of 'teaching" and then learning how students learn and comprehend presented subjects. The second portion of the curriculum is the learning (knowledge) of technical subjects which students must learn for "graduation". This means that the teacher should have a master's degree level 'education' in the subject- matter being taught!

Since the publication of the ASCE Barry report in 1959, there have been a series of papers authored about the surveying profession addressing education, its professional profile, and where its education/training role should reside. At the time of the Barry report, the profile of the education/training of surveyors was a series of "manual operations", and very little academic exposure. Because of the low salaries offered to the surveyors, the financial rewards were negligible, the best and brightest students chose other professions. Periodically, since the appearance of the Barry report, there have been several papers authored addressing the entire scope of the surveying profession . Many of these papers offered little or no solutions. Through the decades, this writer has been asked to address the subject. Look for the following series of papers addressing various aspects of the surveying profession in upcoming publications of Lines and Points.

The titles include:

•*Status of Surveying and Mapping in the United States*
Bro. B. Austin Barry, George D. Whitmore, and Alfred O. Quinn; 1959.

•*Is Education for the Professional Land Surveyor to be Accomplished Within the Framework of the Civil Engineering Curriculum?*
Ralph Moore Berry; 1958.

•*Civil Engineering: Professional Status for Surveying*
Ralph Moore Berry; 1962.

•*The Surveyor of the Future or, "What's Wrong With Surveying"?*
Ralph Moore Berry; 1967.

•*Educationfor Professional Surveyors: A Position Paper On The Matter Of Education And Licensing For Professional Surveyors*
Ralph Moore Berry; 1971.

•*A Position Paper on the Matter of Education and Licensing for Professional Surveyors*
Ralph Moore Berry; 1971.

•*Why Are There a Lack of Competent Personnel In the Civil Engineering and Construction Professions in Wyoming?*
Herbert W. Stoughton

•and Appendix: *Lack of Construction Training Comes With A Very High Cost*
Francois Jacobs; 2020/2025.

•*Land Surveying: A Look At The Profession And A Curriculum*
Herbert W. Stoughton; 2025.

•*Funding Formal Surveying Education Programs: A Proposal*
Herbert W. Stoughton; 2025.

•*Suggested Courses To Qualify For The Statutory Thirty Semester - Credit Hours in Land Surveying*
Herbert W. Stoughton; 2025.

•*Surveying Education, Training, and Professional Development*
Herbert W. Stoughton; 2007/2025.

•*Thoughts And Experiences In Becoming And Being a Professional*
Herbert W. Stoughton; 2012/2025.

•*Do We Have A Problem In Our Primary and Secondary Education Agenda?*
Herbert W. Stoughton; 2025.

•*Professional Communication*
Herbert W. Stoughton; 2025.

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