



THE EQUALITY STATE SURVEYOR

LINES & POINTS



PROFESSIONAL LAND SURVEYORS OF WYOMING

AFFILIATE — AMERICAN CONGRESS ON SURVEYING AND MAPPING

MEMBER — WESTERN FEDERATION OF PROFESSIONAL SURVEYORS

MARK D. REHWALDT, VICE PRESIDENT

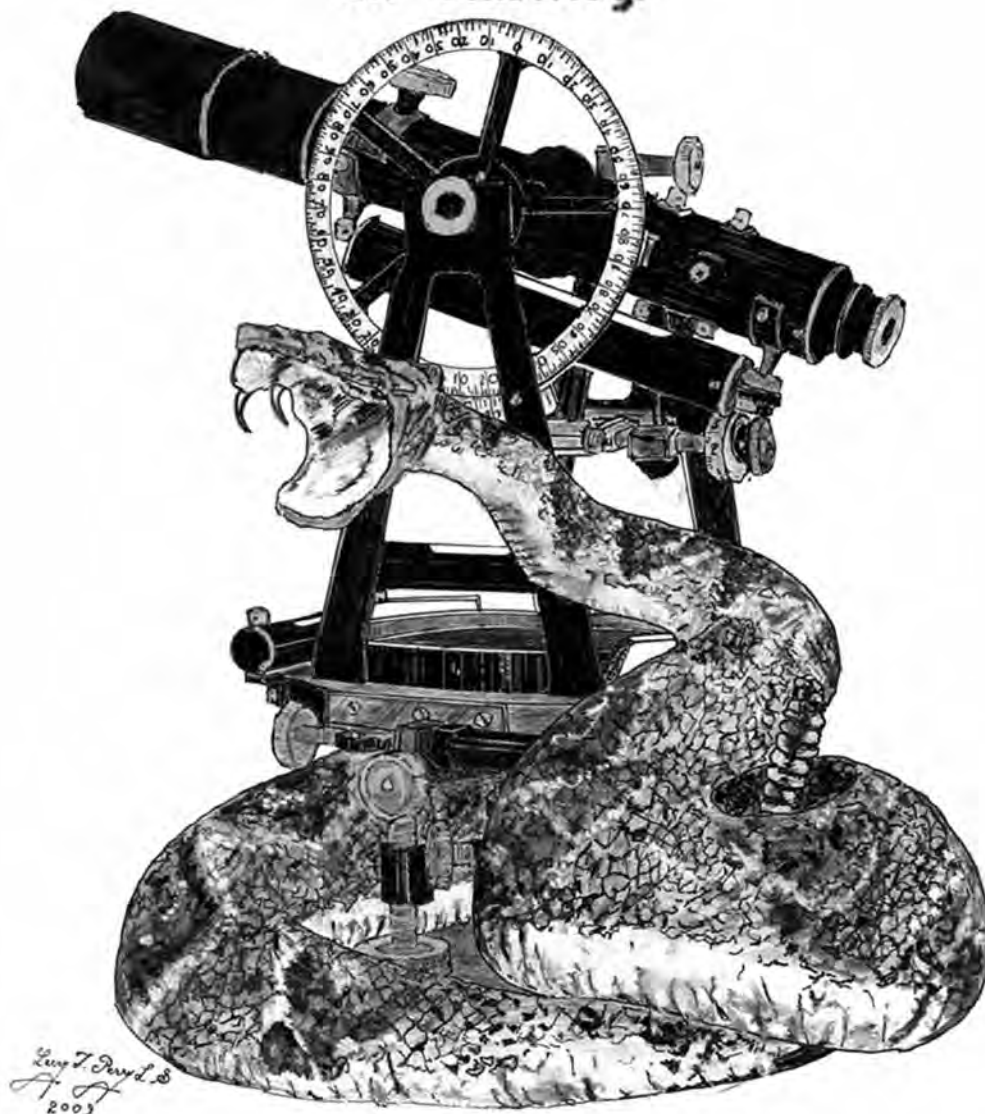
KEVIN D. JONES, PRESIDENT

MARLOWE A. SCHERBEL, SEC.-TREAS.

VOLUME 20, NO. 1

NOVEMBER, 2009

the Challenge



PLSW



www.plsw.org

Thanks, PLSW Members!

All things must change, and that applies to micro-businesses like Inland GPS Inc.



Trimble 4400 1996-1998

Since 1991 it has been our privilege to exhibit at the WES convention and participate in PLSW events. In 1996 we became a Trimble dealer, and the Trimble survey products have been the bulk of our business since then.

It is our hope that we have provided some value to the PLSW membership and others involved in Wyoming land surveying.



Trimble 4800 1997-2001

At some time in the not-too-distant future, ol' Borky will no longer be answering the "GP&S Hotline". Someone else will have to make up semi-plausible answers for technical questions.

For well over a year we worked toward the goal of creating a business-transition arrangement under which Mr. Todd Ferris, an employee of Inland GPS from May 2001 through August 2009, would be able to take over operation of the business operated by Inland GPS. This effort was complicated by the fact that Trimble does not allow the sale or transfer of its dealer contracts.



Trimble 5700 2001-Date

Ultimately any decision about the Trimble dealer network is Trimble's to make, and at the time this ad was prepared we did not know which course Trimble will take regarding the Wyoming-Montana territory presently served by Inland GPS.



Trimble R8 2003-Date

We are supposed to learn something on Friday 09 October. When we have some definite indication of how things we will go, we will post the information on the Inland GPS web site at www.inlandgps.com under the "About Inland GPS" link.

Inland GPS will continue to sell, support, and repair Trimble survey products until the transition to the Trimble-designated successor dealer is finalized.



Trimble TSC2 2005-Date

Please accept my heartfelt thanks not only for your support of this unlikely business, but also for the friendship, the encouragement, the education, the stimulating conversations, the problems we solved together (as well as two or three that remain mysteries), and the opportunity to be a small part of the Wyoming land-surveying community.

Best regards, Glenn Borkenhagen



Trimble TSC1 1997-2002



Trimble 4700 1998-2001



Trimble 5800 2002-Date



Trimble S6 2005-Date

INLAND GPS



Trimble GPS / GNSS and Robotic Surveying Equipment

Cody, Wyoming (Main Office)

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Telefax – 307-527-5900

Glenn Borkenhagen

E-mail—Glenn@inlandgps.com

Mobile—307-272-5044

Missoula, Montana Sales Office

Office – 406-829-9888

Telefax—406-542-2019

Web site—www.inlandgps.com

(There finally is some useful content on that site!)

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Article Page

Editor, Linda Abell

Co-Editors: Larry T. Perry & Mark Rehwaltd

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by

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PRESIDENT'S MESSAGE

I have been thinking about the message from the president on and off for most of the week while I was on vacation. I had several thoughts and then when I sat down to write this, THE thought came. There was a John Wayne movie and the "Duke" was talking to one of his new hands. The new hand thought it would be really great to be the "Boss" or in my case the president and not have to take orders from anybody. John Wayne explained that the new hand had it pretty good, he only had one "Boss". John Wayne in the movie however had many bosses; everybody that ate beef, bought beef, or had anything to do with beef was his boss and he could not keep all of them happy all of the time. I feel somewhat the same way as president of PLSW. Yes, I am supposed to be at the top of the heap, but as Byron Dorgan, a North Dakota politician said, "Am I leading the pack or running scared in front of the pack hoping not to stumble and then get trampled?"

With that said, the major league baseball season is less than two weeks away. The thing I like best about opening day of baseball season is that spring and summer are in the works and winter is on its way out.

On that note, I think it is time to get to work. I would like to encourage people to post their ideas to the blog. As members of PLSW, we are spread out all over the state. We need a mechanism where an idea can be posted, reviewed, refined, digested and improved upon. I believe the blog is the place. These are Harry Kessner's instructions for posting to the blog.

Greetings Gents,

Please visit the BLOG that Mark set up. The easiest way I have found to access it is to go through GOOGLE (I think YAHOO will work the same way) and search 360.Yahoo.com and you will get a list of Yahoo 360 sites. The first one has a list of yahoo sub sites; click on the SEARCH. The page that shows up will have a Search box at the top of the page. Type in Wyoming Surveyor. The BLOG will appear; a little cyan message "view blog" will be there. Click on it. Then when the blog appears, at the end of Mark's original comment, a small magenta message: "Permanent link / 2 Comments" appears. Click on "2 Comments" (This will change as more comments come in) and all comments will come up.

Also if you would like to post to the blog, but can't get it to work, PLEASE send your comments as a Note Pad or a Microsoft Word attachment to Mark Rehwaltdt at laramievalleyplsw@yahoo.com and I will post them for you.

The idea of a central computer based, internet accessible, corner recordation depository has been brought up. I think it is a good idea. The Board of Directors will be discussing this in their future meetings. We need your help implementing this idea.

**Recruit a New
PLSW Member
TODAY!**



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BOD Quarterly Meeting Minutes, February 5, 2009

Call to Order: 3:45 p.m. by Mark D. Rehwaldt,
PLSW President

Roll call:

Mark D. Rehwaldt, President [present]
Cotton D. Jones, Vice President [present]
Marlowe A. Scherbel, Secretary/Treasurer [present]
Richard Kohler, Director Northeast Chapter
[present]
Bruce W. Frederick, Director Northwest Chapter
[present]
Paul N. Scherbel, Director, West Chapter [absent,
Scott A. Scherbel representing West chapter, by
written proxy]
Randall S. Stelzner, Director Central Chapter
[present]
William R. Fehringer, Director, South Central
Chapter [present]
Michael A. Flaim, Director, Southeast Chapter
[present]
Mark D. Rehwaldt, Director Laramie Valley Chapter
[present]
Anita Morris, Director, Upper Platte Chapter
[present]
Donald M. Schramm, Director, Southwest Chapter
[present]
Kevin D. Jones, Immediate Past President [present]
Paul A. Reid, Wyoming Delegate, WFPS [present]
Jeffrey B. Jones, Area 7 Director, ACSM [present]
Cotton D. Jones, Governor, NSPS [present]

Agenda Revision and Adoption of Revised

Agenda:

Accepted addition of item 9 f), A discussion
on payment of dues in arrears and item 15 d),
A discussion of the Investment Committee
recommendations.

Introduction:

Officers and Directors

Honorary Members

Guests: Scott Pierson and Stan Abell, Members of
State Board of Registration; Linda Abell.

Minutes:

Bruce Frederick moved to approve the minutes
of the Board of Directors 13 November 2008
meeting as written. Bill Fehringer seconded, motion
carried unanimously.

Bruce Frederick moved to ratify the email vote
for Mark Corbridge to be the Chairman of the
Legislative Committee. Bill Fehringer seconded,

motion carried unanimously.

President's Report:

President Rehwaldt provided comments on his
style of meetings. Some items need to be discussed,
but other items only need to be noted. "A short
meeting is a good meeting".

Discussion is needed on important items.

Vice President's Report:

No report.

Secretary's Report:

Secretary's report was made at the annual
meeting. Secretary Scherbel also indicated that each
chapter should have received a report on Chapter
members, those paid and those yet to pay, as of
4 February 2009. He will send another list with
contact information to be updated. Please respond
and help keep contact information current. There is
no "Out of State Chapter". "Out of State" members
can associate with any chapter they wish. The
Secretary will designate "Out of State" members to
the Chapter closest to their address.

Treasurer's Report:

Treasurer's report made at the annual meeting.

The 2009 budget was discussed and approved in
the annual meeting.

Bruce Frederick moved to approve and ratify
the expenditures over one hundred (\$100.00)
for the period of November through December
2008. Seconded by Randy Stelzner. Motion Carried
unanimously.

In accordance with the approved change to the
By-Laws, Scott Scherbel moved to have the Board
approve only those expenditures with amounts
not budgeted or which exceed the amount in the
approved annual budget. Seconded by Mike Flaim.
Motion carried unanimously.

Mike Flaim moved to authorize President
Rehwaldt to sign the RBC Dain-Rauscher resolution,
which designates who can conduct business with
RBC Dain-Rauscher, the investment broker for
PLSW. Seconded by Bruce Frederick. Motion
carried unanimously.

A discussion was held concerning dues in arrears.
It was verified that members who want to pay past
dues can, but they only need to pay for the current
year. Members are shown on a suspended list for the
year which dues are not paid. If dues are not paid for
three (3) years, then the Board may terminate those

members. It was decided that the Treasurer will send Bill Fehringer, or other program chairs, a list of validated members to use for determining whether the attendee should pay the member rate or the non-member rate to attend a particular program sponsored by PLSW. Hopefully this will encourage attendees to be members of PLSW.

Committee Reports:

Allen Mace Memorial Scholarship Raffle: Chris D. Hamilton – A written report was provided in the BOD packet indicating that \$2910.00 was received from the direct mailing and the annual raffle. No additional information was added at the meeting. A new business item has been added to discuss the name of this Committee and whether this Committee and the Scholarship Committee should be combined.

By-laws: Mark Rehwaldt – It was decided to conduct another ballot vote to amend By-Laws item I and III on the 2009 ballot, which did not pass the required two-thirds (2/3) vote needed to amend the current By-Laws. This ballot would be concluded and counted at the November Board of Directors meeting held concurrently with the Fall Technical Session.

Convention: - Laramie Valley Chapter has committed to be the committee Chair for the surveying portion of the WES 2010 Convention, to be held at Laramie, Wyoming. A discussion ensued concerning reimbursement of expenses for those who are asked to present a program at the annual WES convention or possibly charging a small fee to cover expenses of the presenters. It was determined that the Laramie Valley Chapter would present a proposed budget to the BOD by its August 2009 meeting.

Education: Bill Fehringer – It was noted that the 2009 Fall Technical Session will be held at the Casper Ramkota Inn, 5th & 6th of November 2009.

History: Herbert W. Stoughton – no report was provided.

Investment Committee: Jon Anderson - A report was made at the annual meeting and a new business item has been added to discuss the committee's recommendation.

Legislative: Mark Corbridge - The Legislative Committee requested that they be given a direction on how to proceed with the current legislation (HB0044) and at a minimum be allowed to provide the Legislature the response to the questionnaire. The results of the questionnaire were reported at the Annual meeting as 33 in favor of question A. (the 2yr. Associates degree) and 32 in favor of question B. (the 4yr. Bachelor degree). It was noted that the Northwest Chapter did not respond to the questionnaire and their numbers were not included in the above totals. Bruce Frederick, NW Chapter director, indicated that there were 17 in favor of the 4yrs Bachelor degree and zero in favor of the 2yr Associate degree, making the total 33 in favor of question A. and 47 in favor of question B.

A discussion was had concerning how proactive the Board wants the Legislative Committee to be in dealing with the Legislature. It was decided that the Board would like to be active and be able to posture a position on any specific bill at the Legislature; to



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have a voice in support or no support for any new legislation affecting the Surveying profession.

A lengthy discussion was had concerning House Bill No. 44 (HB0044). This bill, which has passed the House, is now in the Senate. The passage of this legislation will change the number of members and the qualifications to serve on the State Board, re-define how a person becomes licensed as a Land Surveyor within the State of Wyoming and proposes other items to be cleaned-up in the current laws. Bruce Frederick moved to have PLSW support HB0044 and instruct the President of PLSW to so inform the Wyoming Legislature of that opinion. Seconded by Scott Scherbel. A roll call vote was called for and taken:

NE Chapter: naye

NW Chapter: aye

West Chapter: aye

South Central Chapter: aye

Central Chapter: naye

SE Chapter: aye

Laramie Valley Chapter: naye

Upper Platte Chapter: aye

SW Chapter: naye

Immediate Past President Kevin D. Jones: aye

Vice President Cotton D. Jones: aye

Sec./Treas. Marlowe A. Scherbel: aye

Ayes: 8 Nays: 4

Motion carries.

h) Manual of Professional Practice: Don Oakley - no activity.

i) Membership: Randy Stelzner/Tom Johnson – Randy reported that past PLS registrants and LSIT registrants have been identified and letters sent with a free subscription to Lines and Points.

j) News Letter - Lines & Points: Bruce Frederick – A written report was provided indicating that four

issues would be printed in 2009 and that Lines and Points would have a \$5700.00 budget for 2009, with \$2500.00 being provided by PLSW and \$3200.00 provided from advertising income. Linda Abell invited all to submit articles for inclusion in an edition of Lines & Points.

k) Nominations & Elections: Don Davis – nominations are due at the November 2009 BOD meeting.

l) Professional Awards: Mark D. Rehwaldt, President - Awards were presented at the Annual meeting.

m) Public Relations: Larry T. Perry – A written report was provided indicating participation in several projects promoting Land Surveying and suggesting that each Chapter should be involved with local Boy Scout, 4-H and other youth groups to help promote interest in Land Surveying. A report on the Clyde W. Atherly exhibit was also included. Larry is looking for a person from each Chapter to help on this committee.

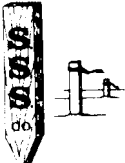
n) S.O.S. [Corner Record Honorarium]: Paul Reid – A written report was provided indicating that awards were given to the 2008 winners: Skylar Wilson 1st and 3rd place and Rick Hudson 2nd place. The 2009 competition was open and there were six (6) entries. Awards to be announced later.

o) Scholarship: Scott A. Scherbel – A written report was provided which indicated the committee recommended Justin Ness and Steve Roeing each receive a \$750.00 scholarship for the winter semester of 2009. Bruce Frederick moved to approve the Scholarship Committee recommendations. Bill Fehring seconded the motion. Motion carried unanimously.

p) Standards, Ethics & Professional Practice: Roy Holm, Northwest Chapter President – A written report was provided indicating no activity during 2008 for this committee.

q) Trig-Star: Mark Corbridge – A written report was provided listing the Wyoming winner, Brian Lynch and his teacher Nanette Marchetti along with their addresses. They were each awarded \$300.00. Thanks for all the firms and Chapters which sponsor Trig-Star in many High Schools in Wyoming. There are still more High Schools, which could use a Trig-Star competition.

r) Website Committee: Will Dolinar/Craig Davis – A written report was provided. The website is being updated and continues to look good.



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Delegate Reports:

NSPS: Jeffrey B. Jones, Area 7 Director, - A verbal report was presented at the Annual meeting.

NSPS: Cotton Jones, Governor: A verbal report was presented at the Annual meeting.

Western Federation of Professional Surveyors: Paul A. Reid, Delegate: A written report was provided and Paul also gave a verbal report of WestFed activities at the Annual meeting.

Each delegate indicated that the ACSM/MARLS/UCLS convention to be held in Salt Lake City, Utah later this month would be worth attending and encouraged all PLSW members to participate.

Old Business:

Northwest Chapter request on Statute 18-3-704: Bruce Frederick indicated that no Attorney General opinion was obtained, but the Washakie County Attorney offered the following concerning the above stated Wyoming Statute:

"18-3-704. Establishment of lost corners.

Whenever the location of any monument which marks the corner of any tract or tracts of land is in dispute between the owners of the adjoining lands, the monument shall be established as follows:

(i) The county surveyor of the county in which the corner is located or any registered land surveyor employed by one of the landowners shall *immediately give notice in writing to all parties interested in the establishment of the corner, giving at least thirty (30) days notice and naming a day when he will make the necessary surveys to establish or restore the corner. If written notice cannot be made upon the owners or their agents because of nonresidence, then the notice shall be published once each week for four (4) consecutive weeks in a newspaper published in the county, or if there is no newspaper published in the county then in a newspaper of general circulation published nearest such county;*

(It appears that this wording has the effect of causing "any registered land surveyor" monetary harm by "sitting on" a job, without payment, but still paying wages, until the statutory notice time expires.)

Answer: This statute should be a reason for "any registered land surveyor" to not attempt to set disputed corners.

(ii) After the proper notice has been given the county surveyor or land surveyor shall on the day

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named in the notice proceed to reestablish or restore the corner *after having determined by careful surveys and investigations that the original corner cannot be recovered or identified*. He shall proceed in accordance with the surveying rules contained in the circular “Restoration of lost or obliterated corners” and the “manual of instructions for the survey of public lands”, issued by the general land office of the United States government. He shall firmly plant a suitable monument at the corner point or points so determined. He shall mark the same for the proper sections or tracts to which they refer and shall add a personal mark so the origin of the monument can be traced. He shall accurately take and note courses and distances referred to in the true meridian, and from the reestablished or restored points he shall record the bearing to one or more prominent objects of a permanent nature if any are in the vicinity;

(“Careful surveys and investigation” require access to possibly disputed land before “the day named in the notice”).

Answer: That is a correct statement.

(iii) He shall make a map or plat of the survey and record a copy of it together with a copy of the field notes, applications for survey, notice to and names of the interested parties and all other pertinent papers in the office of the county surveyor and county clerk in the county in which the land is located. He shall file a copy of the same papers in the public survey office, department of the interior, Cheyenne, Wyoming. The monument or monuments reestablished or restored shall be held to mark the original corner or corners and shall have the legal force and effect as stated in the original record of the survey;

(The filing requirements cited herein are above and beyond and therefore more costly than those “survey rules contained in the circular “Restoration of lost or obliterated corners” and the “manual of instructions for the survey of public lands.” I suppose those additional costs would become part of the “fees and incidental expenses” for the job.)

Answer: Yes, all additional costs are part of the “fees and incidental expenses”.

(iv) Any registered land surveyor rendering service under this section is entitled to fees and other incident expense to be collected equally from all interested parties.

(Does this mean that the land surveyor cannot charge his client the entire fee for reestablishing

a corner, and must collect “equally” from the adjoiner who did not hire the land surveyor and, more than likely, disputed the location of the corner, therefore incurring more time and money lost in a court battle?)

Answer: Yes, the land surveyor must collect equally from all parties effected by the location of the corner.”

Casino Night at annual WES conventions: Past President Kevin D. Jones indicated that the discussion about Casino night with WES has been clarified. If PLSW wants to have a Casino night at the annual WES convention, it is available as long as PLSW “plans it and mans it”.

CLSA DVD re-production cost: The cost to print the brochure/packet cover was obtained from Print Star of Afton, Wyoming. They can reproduce the brochure/packet cover for: 250 - \$1,213.38 (4.85 ea.) 500 – 1,385.00 (2.77 ea.). DVD cost is about \$.25 ea. A short discussion ensued. Kevin D. Jones moved to see if other PLSW directors would like a printer in their area to bid on the printing of the brochure/packet cover. Cotton Jones seconded. Motion carried unanimously. Each director interested should contact Secretary Scherbel. A vote will be taken at the May 2009 BOD meeting. Paul Reid indicated that CLSA spent approximately \$70,000.00 to produce the DVD and that PLSW should send a letter of thanks to the president of CLSA. President Rehwaldt will send a “thank you” letter.

Each PLSW director was reminded that they need to provide Wil Dolinar Chapter contact information to be put on the Website. The delegates to WestFed and NSPS have provided links to those association’s sites. It has been decided that other links to nearby State associations will also be added to the Website. If anyone has information on possible links, please contact Wil.

Lines and Points – It was decided that PLSW will continue to publish four (4) issues each year.

Presidential Citations: see annual meeting agenda.

Recess: [15 minutes] no recess was taken.

New Business:

New member applications were received from the following:

David C. Lee

Edward Reed

Scott Scherbel moved to approve the above listed new members. Cotton Jones seconded.

Motion carried unanimously.

Mike Flaim of the Southeast Chapter presented material about having a statewide deposit of corner records for inclusion into a web accessible database. A short discussion ensued. It was decided that the SE Chapter would follow up on the issues and ideas from the discussion and present findings at a later BOD meeting.

Chris Hamilton – Scholarship Fund and Committees discussion. It was decided to hold the discussion concerning the Scholarship Fund over to the May 2009 BOD meeting.

A discussion was had concerning the recommendations of the Investment Committee. It

was decided that this decision could be held over to the May meeting to see if market conditions improve.

FYI:

Museum of Surveying: The National Museum of Surveying has set an opening date of 12 February 2009 in conjunction with the Illinois society annual meeting. This will be held in Springfield, Illinois. All are encouraged to attend.

Announcements:

Next meeting: 8:00 a.m. 9 May 2009
teleconference

Adjournment:

Adjourned at 6:00 p.m.

A SPECIAL GIFT

In the late 1990s Mr. Bill Stengel, a Registered Land Surveyor in the State of Colorado, came across an old Transit and other surveying equipment that was owned by a friend of his from Eldora, Colorado. Upon purchasing this Transit and equipment, it was discovered that the original shipping tag was still in the Transit box. The tag read: "Atherly Engineering, Basin Wyoming", and had remained with the instrument, in the box since its purchase date in 1903.

Bill checked into the history of the owner of this equipment and found out some interesting facts. The instrument, a Young & Sons Transit with a Solar Attachment was owned by a Mr. Clyde W. Atherly. Clyde was the last Surveyor General of the State of Wyoming. After some deep thought, Bill decided that this equipment should be returned to the State of Wyoming.

In thanks to Mr. Bill Stengel for his generosity and thoughtfulness, on the 31st day of the month of March in the year 2009, the Governor of the State of Wyoming, the Secretary of State, Chief Cadastral Surveyor for the BLM in Wyoming and other dignitaries signed a certificate of appreciation and presented it to Bill. This presentation was per-

formed in the Governor's Office in the State Capitol Building, in Cheyenne, Wyoming.

Again, thank you Bill for returning a lasting legacy and a surveying and mapping icon.



Bill Stengel, left, receiving signed certificate from Governor Dave Freudenthal.

THE SURVEYOR'S CHAIN

To surveyors and collectors alike, the link chain symbolizes a rugged era, when surveying tools and techniques were literally defining America. The chain was a precision part of a surveyor's equipment and, as such, had to be calibrated and adjusted frequently, yet was sturdy enough to be dragged through rough terrain for years.

Owning a link chain now captures a bit of this glorious past; to heft it enhances the kinship one feels with the surveyor who toiled in the field long ago. As collectors, we need to identify the type of chain we own, in order to understand its history. Each chain bears the clues of its use, such as the wire gauge used, the materials and design used, the lengths of the whole and of each link, the manufacturer's stamps, the presence or absence of brazing, the tally-tags, and the presence or absence of linking rings. Noting these components will make it possible to approximate the date and purpose of your link chain with the aid of period manufacturer's catalogs. The following is a nicely detailed account from the 1910 *Manual of the Principal Instruments used in American Engineering and Surveying*, published by the W. & L. E. Gurley Company of Troy, New York.

Sizes of Wire - The sizes and diameters of iron and steel wire commonly used in making surveyor's and engineer's chains are as follows: No. 8, .162 inch; No. 10, .135 inch; No. 12, .105 inch; No. 15, .072 inch; and No. 18, .047 inch.

Land Surveyor's Chain - The ordinary Gunter's or surveyor's chain is sixty-six feet or four poles long, and is composed of one hundred links, connected each to each by two rings, and furnished with a tally mark at the end of every ten links. A link in measurement includes a ring at each end, and is seven and ninety two one hundredths inches long. In all the chains which we make the rings are oval and are sawed and well closed, the ends of the wire forming the hook being also filed and bent close to the link, to avoid kinking. The oval rings are about one third stronger than round ones.

Handles - The handles are of brass and form part of the end links, to which they are connected by a short link and jam nuts, by which the length of the chain is adjusted.

Tallies - The tallies are of brass, and have one, two, three or four notches, as they mark ten, twenty, thirty or forty links from either end. The fiftieth link is marked

by a rounded tally to distinguish it from the others.

Half Chains - In place of the four pole chain just described, many surveyors prefer a chain two rods or thirty three feet long, having only fifty links, which are counted by tallies from one end in a single direction.

Iron and Steel Wire - Our surveyors' chains are made of Nos. 8 and 10 refined iron wire, and of Nos. 8, 10, 12 and 15 best steel wire. Steel chains are preferred on account of their greater strength, although they are more expensive than those of iron.

Engineers' Chains - Engineers' chains differ from surveyors' chains, in that a link including a ring at each end is one foot long, and the wire is of steel Nos. 8, 10 and 12. They are either fifty or one hundred feet long, and are furnished with swivel handles and tallies like those just described.

Brazed Steel Chains - A very light and strong chain is made of No. 12 steel wire, the links and rings of which are securely brazed. The wire is of a low spring temper, and the chain, though light, is almost incapable of being broken or stretched in careful use.

Our brazed steel chains have been found exceedingly desirable for all kinds of measurement, and for the use of engineers upon railroads and canals have very generally superseded the heavier chains.

Vara Chains - The meter is used as a standard measure of length in many countries, and chains of ten and twenty meters are often ordered. The chains are made of iron or steel wire, each meter being divided into five links. As a meter is 39.371 inches long, a link, including a ring at each end, measures 7.874 inches.

A ten meter chain has fifty links and a twenty meter chain one hundred links. Each meter is marked with a round brass tally numbered from one to nine in the ten meter chain, and from one to nineteen in the twenty meter chain.

Marking Pins - In chaining, eleven marking pins are needed, made either of iron, steel or brass wire, as preferred. They are about fourteen inches long, pointed at one end to enter the ground, and formed into a ring at the other end for convenience in handling.

Marking pins are sometimes loaded with a little mass of lead around the lower end, to serve as a plumb when the pin is dropped to the ground from the suspended end of the chain.

Introduction

Invented by clergyman Edmund Gunter, the surveyor's chain made it possible to accurately measure distances and acreage in an era before global positioning satellites permitted mapping from space. The surveyor's chain made it possible for Lewis and Clark to map the Louisiana Purchase and lay out cities, townships and railroads. Here's an explanation of the measurements and how to use them.

Instructions

Difficulty: Moderately Challenging

Step One

Equate a standard surveyor's chain, or Gunter's chain, to 66 feet or 22 yards. There are also half-length chains of 33 feet. Equate an engineer's chain, or Ramsden's chain, to 100 feet.

Step Two

Divide a surveyor's chain into 100 links, equal to 0.66 feet, or 7.92 inches. Gunter's original chain was made with 100 links, a half-chain with 50. A Pennsylvania surveyor's chain, while 66 feet long, is made with only 80 links.

Step Three

Convert a measurement in surveyor's chains into rods by multiplying by 4, into furlongs by dividing by 10 and into miles by dividing by 80. Convert a length in surveyor's chains to meters by multiplying by 20.1168 and into kilometers by multiplying by 0.0201.

Tips & Warnings

- By 1785 law, only Gunter's 66-foot chain was allowed for land surveying work.

Making Measurements With Chains

Things You'll Need

- Surveyor's chain
- Circumferentor (compass)
- Espontoons (surveying pole)
- Marking pegs (10)
- Stakeman
- Chainmen (fore and hinder)

Step One

Place tallying tags in the chain to subdivide it into 10 equal lengths.

Step Two

Shoot a "line" from your starting point to the first visible object by sighting it with the circumferentor. If the object is indistinct, send a stakeman with an espontoons to the spot to provide a better sighting target.

Step Three

Stand both chainmen next to you.

Step Four

Send the fore chainman toward the object, pulling the chain to its full length. Signal the fore chainman to move left or right until he is precisely aligned with the sighting object.

Step Five

Deposit a marking peg at the fore chainman's position.

Step Six

Advance everyone toward the sighting object, keeping the chain taut. Stop at the site where the marking peg was laid. Repeat Steps 4 and 5, and then have the hinder chainman take up the peg at his position.

Step Seven

Repeat Step 6 until the hinder chainman has all the pegs or until the sighting object is reached. If the object is not reached, transfer the pegs to the fore chainman again. Repeat Steps 4 through 6 until the sighting object is reached. Record the distance in chains.

What to Measure With Chains

Step One

Mark the distance of railroad tracks, bridges and stations from a designated origin point in miles and chains. This is still done in Great Britain, despite the country's having gone metric, because the numbers generated are easier to remember.

Step Two

Measure land distances on American farms using wheels a tenth of a chain in diameter.

Step Three

Gauge the spread of wildfires in chains per hour.

Tips & Warnings

- An acre of land is equal to 10 square chains. A square mile is equal to 640 acres or 6,400 square chains (80 chains on each side, $80 \times 80 = 6,400$).

CHAIN MAKING

Jerold F. Penry, LS

The following tutorial is by no means intended to represent any sort of expert advice as to how to make a Gunter's chain. It will show you how I accomplished making my own chain that will hopefully be an heirloom for my family for many years. A few years ago I originally intended to buy an old chain just to have one around for historical discussions. I then decided I wanted something unique that would be more personal and not just something that was once mass-produced without any special significance.

The cost of constructing a chain is not cheap if you use high-quality materials, but it does bring a lot of satisfaction when completed, and of course it was fun making it.

I completed my chain in the fall of 2005.

Enjoy!

Jerry



chain. The individual chain rings or links seem to be about the same in length, but the links appeared to be somewhat thicker than 1/8" which might create a weird appearance with thicker connecting rings between the actual links. The below photo really doesn't show the slightly thicker chain, but it was evident when compared to the "Brass-Glo" chain. At \$1.79 per foot it would certainly be less expensive.

Catalog #536 5242 - 325 lb. rating.



Making the Connecting Rings

For the connecting rings between the links, I chose to use steel welded chain which can be found on the reels in the local hardware store.

The oval appearance of the welded chain links is similar



to the look on a vintage Ches-terman chain.

When I say "connecting rings" I am talking about the rings that connect the actual links to each other.

One advantage of using chain is that all of the connecting rings will look the same and will have the same length. The Campbell® brand #3 "Brass-Glo" chain appeared



to be about 1/8" thick which would match the same diameter as the links I would be making. The disadvantage is the price at \$2.49 per foot. The coating is what makes this chain so expensive. If this same type of chain can be found in regular galvanizing I am sure it would be cheaper.

Alternative Chain

I did find an alternative to the "Brass-Glo" chain which is the Campbell® #2 galvanized straight link

How much chain (connecting rings) is needed?

There are 200 connecting rings in a 66' chain. Remember that you will have to cut off every third link if you have two rings between each link, so that adds another 100 rings that are wasted. Each ring measures 0.8", so that makes 20' of chain. That put my cost at nearly \$50 just for the chain since I used the more expensive type.

Removing the Galvanizing

The shiny galvanized chain used for the connecting rings will certainly look odd, so you'll want to remove the galvanizing. The galvanizing can be removed from the chain very easily and quickly with Muriatic Acid which can be found at most hardware stores. You will need to use a plastic container since the acid will eat or corrode a metal container, but is harmless to the plastic. De-galvanizing occurs immediately.



WARNING: Extreme caution must be used when using Muriatic Acid. Wear protective eyewear and avoid getting it on your skin or breathing the fumes. This stuff is really powerful!

Secure a method of removing the chain from the acid by attaching a wire to the end of the chain.



When the acid removes the galvanizing it will bubble and foam. Use only in a well ventilated area which would be best done outside. Avoid having the acid near anything metal since the fumes alone can cause tools or other metal objects to loose their protective coatings and then rust. When finished, dilute the acid with plenty of water to neutralize it before disposal.

The de-galvanized chain will need to be immersed in water to neutralize the acid that is still on the metal. Wipe the excess water off with a towel and protect the chain from moisture since it will be highly sensitive to rust at this point and you may actually see rust form within a very short time.

Making the Links

I chose to make the links from 1/8" steel rod instead of coiled wire. Although wire would probably work, you must straighten it from the coiled



condition and you might always have sort of a slight bending look to the links. I found the steel rod to be high-tensile and not easily bendable like wire, so the rod gave a uniform look.

Most local hardware stores will have a small display area for the hobbyist where you can purchase various sizes and shapes of individual pieces of steel.



SteelWorkS® Weld Steel Round Rod

I have seen it available in both 3' and 4' lengths in the display sections. The 4' sections cost \$2.49 each.

1/8" – 3 FT

SKU #5079082 INV 450078

1/8" – 4 FT

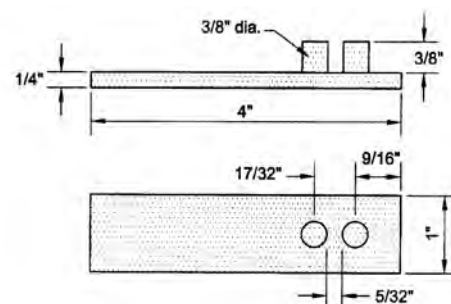
SKU #5014303 INV 455282

How much rod is needed?

My links were approximately 8³/₄" long each (before making the loops on the ends), so from a 4' section of rod I could get 5 pieces with long scrap piece on the end. Using the 3' section of rod I could get 4 pieces with a small scrap piece on the end. You'll need 100 links, so if you use the 4' sections of rod you'll need 20 pieces. At \$2.49 per piece the rod cost just about another \$50.

Link Jig

You'll need to have a jig made to make the loops at the ends of the links. I had a machinist make this jig with the specifications as shown below. The length of the jig can vary, but I made mine 4" long so it would be more secure when held in a vise. This is the only special tool that you will need.



The above drawing shows the dimensions of the jig I used. Two 3/8" bolts were tapped into the steel plate and then cut off above the threads. The critical dimensions are the 3/8" round studs and the spacing of 5/32" between them which allows just enough space for the 1/8" steel rods to be inserted between them.

Making the Links

The 1/8" diameter steel rod can be easily cut with a pair of bolt cutters. This will leave a sharp edge on the end which can be smoothed, and the edges rounded with a grinder.



Cutting the rod with
bolt cutters

Removing the sharp edges
with a grinder

Your goal is to cut the rod into lengths that will create a link that when added to the center of the double connecting ring on each end will add up to 7.92" or 0.66'. This will take some experimentation depending upon what you decide to use for the connecting rings. I found that by cutting the rods into 8 $\frac{3}{4}$ " lengths that was about the right amount to create the loops on each end and come out to 7.92" when using the Campbell® #3 "Brass-Glo" straight link chain for the connecting rings.

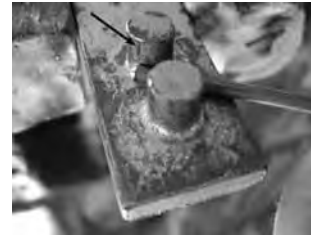
You'll quickly discover just how difficult it is to make each link exactly the same length after you have affixed the loops to each end. It is a matter of precision in bending the loops around the jig each time. If, for instance, each link was only 1/32" off, you would be off 5/16" by the end of constructing 10 links. I found that I was anywhere from right on to 3/32" off when creating each link.

To fix this situation I marked off the right distance on a flat hard surface floor with the steel tape that would equal 8 links (5.28'). After constructing 8 links I would compare it to the distance measured on the floor. Say I was 1/4" too long, I would cut the next four rods each 1/16" less to hopefully correct the situation in the next 8 links. It was always a check, and then correct the situation, but you really could not notice this small difference in lengths by looking at the individual links. I was always just a little short or long when checking, so it is important to not try to make an entire chain assuming everything will turn out okay at the end.

I continued this process and would occasionally measure off longer sections to check the overall length of the chain. At 50 links I would need to match 33.00' as measured on the floor with the steel tape. I did this process for all 98 links (minus the handles) and checked the distance of 64.68'. The steel tape distance measured on the floor was corrected for temperature.

The final distance of 0.66' on each end would be determined upon which type of handles I developed.

This called for shorter steel links than what the 98 links between the handles were made.



Start each rod bend in
the same location.



Begin the bend keeping
it tight against the post



Continue all the way
around the post.



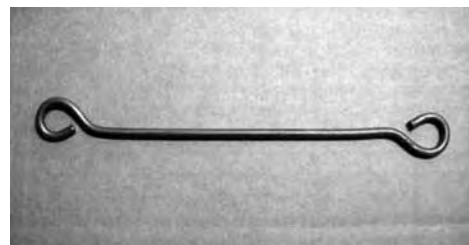
Place link on back post
to begin reverse kink.



Bend around until link is straight with loop.



Completed loop.



When making the loop on the other end of the link place it in the jig so open end of the completed loop faces away from you. This will create a reversed loop on the other end.



Connect the links with the connecting chain rings.

This will require using pliers to bend the loops completely around. Get the pliers right up to the end of the rod to bend that tip in close. File off any burrs made by the pliers.



The distance from the center of the connecting rings across the link should be 7.92" or 0.66'.

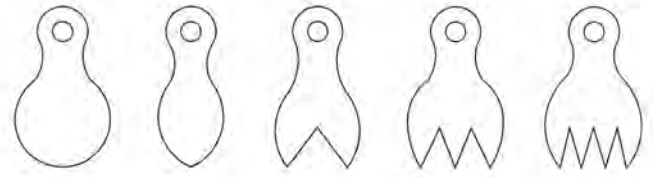
Making the Tallies

Some hardware stores will have display areas for hobby pieces of brass which works well for making the tallies.

K&S is a well known company that makes smaller brass items.



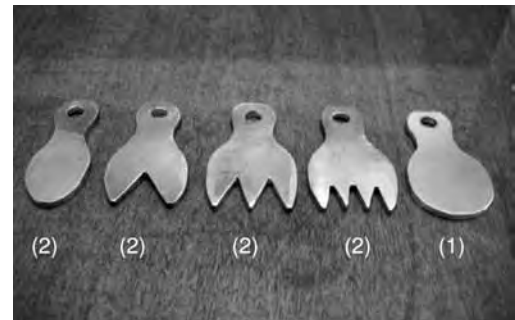
Use the flat brass that comes in the 0.093"x1"x12" size. This is thicker brass that will not bend.



The above tracing templates were made using CAD and then cut out.



After tracing the design with a permanent marking pen, a hacksaw will cut out the majority of the waste area. Use a grinder or hand file to shape the tally to its final shape, and then drill out the hole.



A total of 9 Tallies need to be made for a 66' chain. There will be two each of the 1 – 4 pointed Tallies, and one center round Tally.



The center tally at the 50-link mark can be custom lettered. Most trophy or awards shops will be able to do this for you.



I used a piece of smaller diameter rod to make connecting rings to attach the tallies.

Making the Handles

The handles are the toughest part. I have heard that some surveyors have been able to make sand castings and then pour molten brass into the molds to make handles. Unless you have some experience in doing this, most will have to resort to another means of making handles.

One idea that came to mind was having a skilled machinist cut out the handles on a CNC milling machine. The expensive part would be obtaining the thick piece of brass that would be needed for a handle. Aluminum could be used, but the look of having aluminum handles on your chain might not be too pleasing.

I was always looking for ideas for handles. While in a Goodwill store I noticed a section of brass candle holders and other brass items. The idea was born to make my handles out of two identical brass heart-shaped candle holders.



If you do need brass to melt for cast handles, this might be a good source to get it more cheaply.



Probably very few people would see two brass survey chain handles here!



After removing the top and bottom, I transformed this into.....



This!

I cut off the top bolt on the heart and then shaped the heart with a round file. The slight indentation of the top of the heart is my "zero" point of the chain. After cutting off the threaded part on the bottom end of the heart I drilled a hole up through the center of the remaining stud. I then used a piece of threaded brass rod and added a nut on one end, and a loop to the other end to connect to the chain. I rounded the edges of the brass nut inside the handle and set the threads in glue. The threaded brass connecting rod fully swivels inside the handle.



This is the trickiest part of making the chain exactly 66.00'. I first estimated how long of a piece of threaded rod I would need and carefully noted the measurement. I attached it to the chain and measured the small link and the handle to see if it was 7.92". Even if I was off 1/16" I could still make up the difference on the other handle end. The connection on the other end was trial and error after checking it against precisely made marks on the concrete floor with a steel tape. If I was off by 1/8", I cut a new piece of threaded brass rod by that much and remade the loops, attached it and then rechecked again to the marks on the floor.



Your final link on the ends will be short since the handle makes up the rest of the 7.92" for the link.



The end result.

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Please check this website (<http://www.wy.blm.gov/cadastral/surveydocs.php>) frequently for updates prior to ordering hard copies of the field notes from our Cheyenne BLM Office.

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LLOYD BAKER PROFILE

I was born on May 17, 1911 in Afton, Lincoln (then Uinta) County, Wyoming USA, then a free land, to William Alonzo and Blanche Mayberry Brawley Baker and grew up one and one-half miles South of Etna on an irrigated dairy farm, of 142 acres. My parents came from Northern Utah and Eastern Idaho. I have 5 brothers and two living sisters. Our names in order of birth are: Lloyd, Carl (deceased) Dennis, Margie, Wayne, Rex, Lester and Elcie. All five of my brothers and both of my brothers-in-law served in the armed services, in World War II, and subsequent occupations.

I attended school, church and most extra activities through the 9th grade in Etna. I began by riding a horse to and from school and sometimes walking. We eventually had wagons and sleighs with covered boxes to take us to school. My parents milked cows night and morning and my brother, Carl and I, were assigned 12 cows to milk, feed and clean after at about 11 or 12 years of age, before and after school. My father and the hired man had a barn full of 24 to milk night and morning by hand in addition to caring for all of the livestock in the winter and the crops in the summer.

I was a member of the 4H Club and raised a pig and some calves and a cow. Through the 4H, I earned a pig, a calf and a trip to the Utah State Fair in Salt Lake City in 1924 and again in 1926 and a scholarship from the Union Pacific Railroad for College. I still like the opportunities 4H gives young boys and girls to be responsible for the care of livestock and I support the program as I am able. My father was the 4H leader in Etna. My father and Grandfather built an irrigation ditch about 2 or 3 miles to Salt River to obtain water for irrigating their farms. They obtained water rights from the state of Wyoming water from Salt River; from the Baker Ditch so their land could be flood irrigated. I spent my early years working with my father and brother Carl.

I attended high school in Afton at Star Valley High School and participated in wrestling and track. Upon graduation, I received the scholarship for boys, which paid the tuition fees for my college schooling at the University of Wyoming. I was also runner-up for the 4H scholarship, given by the Union Pacific Railroad Company, which gave Agriculture students \$100 in cash and transportation to and from school from Kemmerer. The winner of the scholarship did

not want to attend college; so it was given to me.

I began my studies at the university in the fall of 1930 and finished two quarters before my money ran out. I came home in

April of 1931 and spent the next four and one-half years doing many odd jobs. I sold alfalfa seed for my father. I stacked hay.

I did carpenter work. I worked for a farmer in Freedom, Idaho for a year. I spent thirteen months in the Civilian Conservation Corps, building roads, Ranger stations water lines and fighting fires, in Wyoming and California, and drove truck hauling coal. During most of the summers from age 16, I played baseball in local leagues each Saturday afternoon, during the summer.

One day during the summer of 1935, I was walking to my father's store, and the Etna post office, when Wilford Burton, an older neighbor, stopped me and said "I had hoped that you would go back and finish your college". That seemed like a good idea to me. I wrote two letters to Utah colleges and one to the University of Wyoming stating that I wanted to attend college in the fall and would have less than \$100 to start, asking if I could make it financially. The two Utah schools responded positively, advising me to come early and find a job, and that a job with the National Youth Administration would allow me to earn \$20.00 per month at \$.25 per hour. The University of Wyoming responded that if I didn't have \$900 to \$1,000 I could not make it there. I was stacking hay for \$2.00 per day at the time, and after reading the letter, told the employer that I was going to the University of Wyoming this fall.

I read an article about the Navy seeking recruits for the naval Air Corps. I hitch hiked to Seattle, Washington, to take the physical examination. I was rejected because I had lost too many teeth. I came back and settled up my bills, having \$9.06 remaining. My father gave me a ride to Afton. I paid Ruel Call \$1.00 for a ride from Afton to Kemmerer, WY. I expressed my foot locker to Laramie and caught a freight train to Laramie. I rode on top of the train and arrived late at night, covered with black soot from the train. I met some Star Valley boys who offered to take me to their home where their parents had rooms to rent to students. I rented the two bedrooms upstairs and a small room under the dormer. I sublet the two bedrooms for enough to pay the rent and occupied

the small dormer room.

The next day was Sunday and I went to church where the contractor for the new LDS Institute was the speaker. After church I asked him for a job as did some of the other boys from Star Valley. He told us to come to his work trailer on the construction site on Monday, which we did. The other boys went to the trailer and I saw an empty wheel barrow, where they were pouring concrete for the foundation, and went to work. The contractor came out and saw me working with the wheel barrow and told the other boys, "I only needed one man and it looks like I have him." I worked part-time on that project, at \$.50 per hour until the building was completed. I also worked for the NYA, for \$.25 an hour, planting trees and constructing sidewalks around Prexie's Pasture, earning \$20.00 per month. In the spring, I was given Bert Despain to help me with the landscaping for the Institute. Bert told me he was working at the Railway Express and that they needed another man. I applied for, and got, the job and earned \$.75 per hour, working at the mail and express nights and mornings. I worked there 4 years until graduating from the University of Wyoming, with a BS in Civil Engineering. I lettered in wrestling while at the

university.

I became registered a Civil Engineer number 7848 in California in 1950.

I returned to Wyoming in 1973 and took the exam for surveyor. I obtained my license PE/LS 698 in February, 1974.

Incidentally, I finished college debt free, having sent some money home to help the family, when my father was out of work.

PRACTICE HISTORY

I obtained my survey schooling during the 1936-37 school year, and took a job with the Lincoln County Conservation District as Plane Table Operator and crew chief mapping fields of farms in the Cokeville, Wyoming, area for the US government payment for not growing crops. This work continued in the fall as I worked in the state office in Laramie, measuring fields previously mapped with planimeters. Also while attending school I worked for the WPA Program correlating records of Wyoming river runoffs for verification of Wyoming Water Rights under the direction of Professor H.T. Person.

In 1940, following graduation, I worked for the US Bureau of Reclamation as an Engineering Aid. The first project was at Farson, Wyoming locating

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The advertisement includes illustrations of various surveying equipment: a tripod-mounted plane table, two circular markers, a rebar cap, and several bench marks. At the bottom, a black and white illustration depicts a group of surveyors in traditional attire using long poles and tools to mark a field.

materials and sampling foundation materials for the proposed dam site on the Big Sandy River, near Farson, Wyoming. When winter came, I was transferred to Show Low, Arizona, where I worked on surveys and design of dams, reservoirs and canals in connection with the Salt River Project.

In the spring of 1941, I received my appointment as Junior Engineer, assigned to the construction department to work on surveys for the Friant Dam on the San Joaquin River in Friant, California. I was later transferred to the office in Fresno, where I worked on a study for the California Water Resources, correlating water rights for the 17 water districts seeking water from the proposed project.

In 1942, with the United States at war, I joined the W. A. Bechtel Company, working under the direction of Dwight K. Bruner, Production Engineer, building a shipyard at Sau Salito, California. I was responsible for inspection and daily progress reports on five buildings, including the ship way. The shipyard was built to construct Liberty ships, for the war.

In 1943, with the shipyard complete, I moved to Clearfield, Utah, where I worked as a builder for the Smith Canning Company, the Navy Supply Depot and Hill Field.

In the fall of 1943, I moved to Logan, Utah and accepted the position of Physics Instructor. The U.S. Air Force was offering opportunity for army veterans who had obtained enough points, by their military service, to enter training toward getting commissions in the Air Force. Utah State Agriculture College was selected to provide a part of that training program.

During the summer of 1944, I worked as an auto mechanic in Logan, Utah and as an Instructor of Aircraft inspection at Hill Field Air Force Base in Clearfield, Utah.

In September, 1944, I was hired by Boise Junior College to head and teach in the Engineering and Physics departments and teach a course in mathematics. The head of that department was called into the armed services.

In 1945, I joined the Soil Conservation Service as Work Unit Engineer for the Montpelier and Grace, Idaho Districts. I resigned from the SCS in the spring of 1946 and hired with the San Francisco Chemical Co. to prepare a three-dimensional map of the phosphate beds in their open pit mine East of Montpelier, Idaho, using the logs of the borings of the mine area. This allowed them to determine the amount of overburden that was necessary to be

removed to obtain the phosphate. When this map was complete, I applied at the mine, with Mr. John Kobe, mine Superintendent, for a job as Cat Skinner, to remove the overburden and cap rock from the phosphate. I worked here until the mine closed in December for the winter.

In January, of 1947, I went back to San Rafael, California and worked for my friends, Dwight K. Bruner and Art Smothers, who were building subdivisions and houses. One of these subdivisions was at San Rafael. I was assigned to supervise the construction and do the necessary surveys for the work. I hired my brother Rex to help with the surveys. When this was complete, I hired out to Smith Builders, who were starting pre-fab home building at Mill Valley, California.

In the summer of 1947, Mr. Bruner hired me to go to El Segundo, California, where he was Superintendent for Humistan and Rosendahl, to construct pitch-burning facilities in the Standard Oil Refinery. I was responsible to take care of the plans, the necessary surveys, daily reports and payroll for about 40 employees. Work slowed for the H-R company and they required Dwight to replace me

Survey Video Tapes Available

TAPE ONE

1. *Professional Land Surveyors & GIS; Mapping the Future*; New Jersey Society of Professional Land Surveyors.
2. *Professional Land Surveying: A Career Without Boundaries*; New Jersey Society of Professional Land Surveyors.
3. *A Matter of Degrees*; American Congress on Surveying and Mapping, National Society of Professional Surveyors (1986)
4. *Surveyors of the Sixth Principal Meridian*; Bureau of Land Management

TAPE TWO

1. Wyoming T2 Center: *Surveying Crew Orientation: Surveying Options, Part I.*
2. Wyoming T2 Center: *Surveying Crew Orientation: Surveying Options, Part II.*

TAPE THREE

1. *Introduction to Legal Research*; by West Publishing (nine chapters).

Contact South Central Chapter, P.O. Box 904, Casper, WY 82601. E-mail: mblum@wlcwyo.com

with one of their unemployed superintendents. I joined the County of Los Angeles, Assessment Division, to prepare descriptions for properties benefiting from new sewers in the Districts. I lived in Hawthorne, California. In January, 1948, I hired out to the City of Hawthorne as Assistant City Engineer. The City Engineer, C. Harlan Ray, had designed a new water treatment plant and let the contract for construction. He soon left the employ of the city and the city hired a registered consultant, Don Davis, to handle official business, with me to take charge of the local operations.

In 1950, I obtained my registration as a Civil Engineer, number 7848, and returned to the County of Los Angeles as Design Engineer of roads and streets. I designed one of the highways from the Long Beach area to the South area of Los Angeles city limits and one of the local streets, sidewalks and curbs and gutters, for an assessment district.

In August, 1950, I was hired as, as the first City Engineer of Mountain View, California, under the supervision of Jim Thomas, City Administrator, a long time construction superintendent. In my two and one-half years with the City of Mountain View, we

designed construction standards and specifications for streets, lighting, sewers and storm drainage. We built a new Police and Fire Department building, sewage treatment plant, outfall sewer, storm drain, and numerous local projects. In addition to engineering, I was Planner and responsible for the design of subdivision streets within the city. I was also a voting member of the planning commission. During my tenure with the city, it grew from 6548 (1950 census) to 16,000 (special census of 1953).

Early in 1953, I left the City of Mountain View employment and began private practice, with offices, first in San Jose, then Palo Alto and finally back in Mountain View.

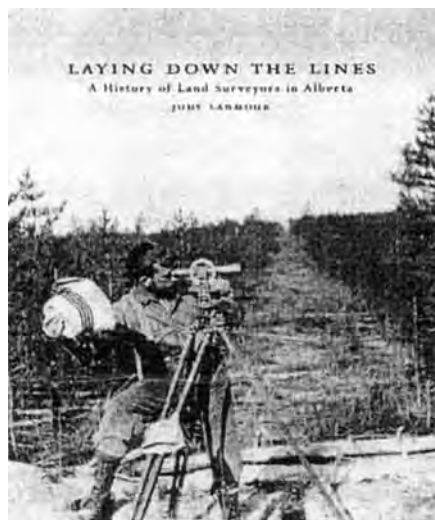
During slow times, I worked full time with different firms, and worked at my practice nights and Saturdays. I worked for Utah Construction Company and designed the Site Plan and streets for Lucky Mac Uranium Mine in Wyoming. I worked for Oddstad Homes designing subdivisions in Oakland hills, San Carlos, Linda Mar (now Pacifica), and Mountain View.

In 1962, I joined the Bechtel Corporation, in San Francisco, and worked on several projects as follows:
I - Prepared a Site Plan, designed the conveyor and

LAYING DOWN THE LINES

A HISTORY OF LAND SURVEYING IN ALBERTA

BY JUDY LARMOUR



Between the Fourth Meridian and the Continental Divide is a vast land with some of the most varied landscapes, difficult terrain, and treacherous climates in Canada.

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Chapters include Mastering A Dry Land: Land Surveyors and Irrigation (Chapter 4), The Challenge of Surveying Alberta's North (Chapter 6), and Urban Provincial and Professional Affairs in the Glory Days to World War I (Chapter 8)

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the fire protection system for the Carlin (Nevada) Gold mine for Newmont Mining.

2- Did runoff studies and Site plan and piping design for 6 million gallon per day water treatment plant for North Las Vegas, Nevada.

3 – Supervised surveys for Bechtel's portion of the grade design of the Bay Area Rapid Transit (BART).

4 – Checked embankment plans for the BART system.

5 – Designed (set line and grade) for first 22 miles of track and accumulated plans (210 drawings) for BART from Oakland to Hayward. I signed these plans as the designer.

In June 1967, Bechtel sent me to Plymouth, Massachusetts to supervise the surveys for Pilgrim No. 1 nuclear power plant. They had already spent the entire 27,000 man hour budget and construction of the plant had only begun.

On completion of the surveys, I was transferred to the Lusby, Maryland to assist with the surveys for construction of that 1600 megawatt plant.

After a year, I was transferred to the Waterford, Connecticut plant to supervise the surveys for the second unit of a nuclear power plant.

In April of 1973, I retired from Bechtel and moved back to Wyoming. I became licensed as a civil engineer in 1973, but had to take the examination for the surveyor's license. I obtained my PE/LS 698 number in February, 1974. In the meantime, I built a building for my brother, Wayne, in Freedom and remodeled a home in Afton and winterized a building in the Narrows.

I began surveying in Wyoming early in 1974 with headquarters at Box 210 Thayne, Wyoming 83127. My brother, Lester is registered in Utah and Idaho and I have worked with him on many projects. I joined PLSW, as a Charter Member, when it was organized.

For many years, I worked with transit and chain with a part time field helper. Then obtained a one-second theodolite and Red 2L distance meter, doing calculations on a Frieden calculator and drafting maps by hand. Finally we obtained a computer to help with the calculations.

In 1998, we went into debt for \$38,000 for gps field equipment. We were later able to get computer programs to do most of the calculations and plotters and printers to make the maps. Some of our equipment still needs updating, but it makes jobs

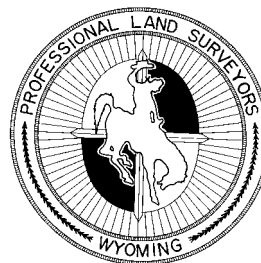
a lot easier than 35 years ago,

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2009 PLSW MEMBERSHIP APPLICATION

PROFESSIONAL LAND SURVEYORS OF WYOMING

AFFILIATE - AMERICAN CONGRESS ON SURVEYING AND MAPPING
MEMBER - WESTERN FEDERATION OF PROFESSIONAL SURVEYORS



NAME _____ DATE _____

(Please indicate preferred mailing address)

WYOMING REG NO. ☐ PLS _____

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☐ PE/LS _____

STREET OR BOX _____

CITY/STATE/ZIP _____

TELEPHONE _____

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TELEPHONE _____ FAX _____ MOBILE _____

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EMPLOYER _____ YOUR TITLE _____

States other than Wyoming in which you are registered: _____

Additional information or comments (optional): _____

CLASS OF MEMBERSHIP APPLIED FOR: (Check one only and please submit dues with application, prorated for the remainder of the calendar year.)

☐ **MEMBER**, ANNUAL DUES \$75. (Persons duly registered, PLS or PE&LS, Wyoming.)

AFFILIATE MEMBERSHIPS

☐ **Associate Member**, annual dues \$50. (Persons employed under the direction of a PLS and toward PLS registration in Wyoming.)

☐ **Special Member**, annual dues \$50. (Persons not meeting above qualifications but with a particular interest in, or association with, the profession of land surveying.)

☐ **Special Member**, Student, annual dues \$15. (Persons pursuing a post secondary academic course of study, and currently enrolled.)

☐ **Sustaining Member**, annual dues \$100. (Persons, institutions or corporations desiring to assist PLSW financially.)

I AGREE TO OBSERVE THE BY-LAWS OF THE PROFESSIONAL LAND SURVEYORS OF WYOMING AND THE CHAPTER THEREOF TO WHICH I WILL BELONG AND TO SUPPORT SAID ORGANIZATIONS IN THEIR ENDEAVORS.

APPLICANT'S SIGNATURE

SPONSOR'S SIGNATURE
(For Affiliate Member applicants only.)

NOTE: All portions of the state have chapters. See map for specific boundaries. Chapter dues or assessments may vary in amount. Applications are considered by the Board of Directors at quarterly meetings. Send completed application to PLSW, c/o Marlowe Scherbel, Sec./Treas., P.O. Box 725, Afton, Wyoming 83110

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