

Lines & Points
P.O. Box 904
Casper, WY 82602

JOEL T. EBNER
3224 WATSABAUGH DRIVE
GILLETTE WY 82716

BULK RATE
U.S. POSTAGE
PAID
CASPER, WY
PERMIT NO. 208

HIXON Mfg. & Supply Co.

SAFETY SPECIALS

A shower of savings !!

	Regularly Priced	Special Price
VEST, w/ Lime Reflective Stripe	\$11.00	\$8.95
CONES, 18" HD	\$7.30	\$4.97
CONES, 28" HD	\$13.78	\$9.93
SIGNS, Roll Up 36" w/ Ribs	\$57.00	\$42.95
COMPLETE SIGNS, w/ A-Frame Stand	\$155.00	\$112.95
COMPLETE SIGNS, w/ Aluminum Fold Up Base	\$250.00	\$179.95
STROBE LIGHT, Quartz w/ Magnetic Base	\$79.33	\$69.95
BARRICADE FENCE, 4' x 100'	\$75.12	\$49.95
CAUTION FLAGGING, 3" x 1000' 4 Mil. HD	\$17.00	\$11.33

(303) 482-0111 * 1001 Smithfield Dr. Ft. Collins, CO * (800) 762-5252



THE EQUALITY STATE SURVEYOR

LINES & POINTS



PROFESSIONAL LAND SURVEYORS OF WYOMING
AFFILIATE — AMERICAN CONGRESS ON SURVEYING AND MAPPING
MEMBER — WESTERN FEDERATION OF PROFESSIONAL SURVEYORS

JAMES CLAFLIN, VICE-PRESIDENT
VOLUME 6, NO. 3

CHRIS HAMILTON, PRESIDENT

RICK HUDSON, SEC.-TREAS.
OCTOBER 1994





SOKKIA

SPECIALS

SET4B_{II} Electronic Total Station

- 5-second display
- fast, accurate distance measurement
- increased productivity
- advanced on-board software
- dual-axis compensator

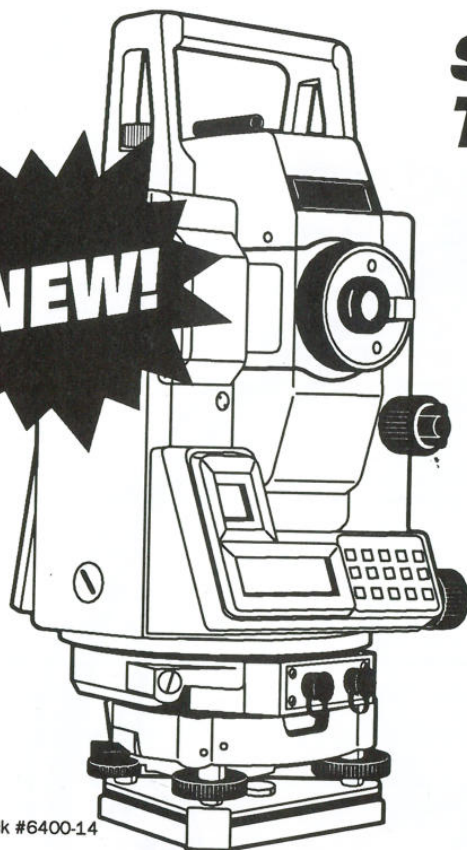


Suggested List \$10,995

**LEASE IT FOR JUST
\$236³⁹/MO***

Low, low lease rates on other SETs.

Item	Stock#	Rate/mo
SET2B _{II}	6400-12	\$322.39*
SET3B _{II}	6400-13	\$279.39*



Stock #6400-14

NEW 5.0 SOFTWARE SPECIALS



Sokkia Software 5.0 MAP Kit

Includes the three most popular modules - MAP, CALC & CONTOUR.

Only \$2,995

Regularly \$3,585

Stock #5187-00

Sokkia Software 5.0 ROADING Kit

Includes MAP, CALC CONTOUR and ROADING.

Only \$4,995

Regularly \$6,075

Stock #5188-00



HORIZONS, INC.®

Aerial Mapping Professionals

GIS, Topographic & Volumetric Mapping
Aerial Photography • Digital Orthophotos
GPS • Photo Lab Services • Custom Color

605-343-0280

P.O. Box 3134

Rapid City, SD 57709-3134

Regional Offices in Minnesota, Arizona & Colorado



Gard Talbot
Home 234-0632

Drafting and Engineering Supplies
Complete Reproduction Service

145 North Durbin
Casper, Wyoming 82602

P.O. Box 1276
Phone 265-2990

In State WATS 800-231-9743

☐ APPROVED ☐ REJECTED DATE _____

MEMBERSHIP APPLICATION

NAME _____ WY REG. NO. _____

(Please indicate preferred mailing address)

DATE _____

HOME ADDRESS: _____

STREET OR BOX: _____

CITY/STATE/ZIP: _____

TELEPHONE: _____

BUSINESS ADDRESS: _____

STREET OR BOX: _____

CITY/STATE/ZIP: _____

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 in Wyoming.)

AFFILIATE MEMBERSHIPS

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

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

☐ **Special Member, Student**, annual dues \$15. (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 CONSTITUTION AND BY-LAWS OF THE PROFESSIONAL LAND SURVEYORS OF WYOMING AND THE CHAPTER 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. Chapter dues or assessments may vary in amount. Applications are considered by the board of Directors at quarterly meetings. Send completed application to PLSW, 145 North Durbin, Casper, WY 82602.



2895 W. 8th Ave. • Denver, CO 80204

SOKKIA™

AMERICAN CONGRESS on SURVEYING and MAPPING
National Society of Professional Surveyors, Inc.

Annual Map/Plat Competition
Charlotte, NC, April 21, 1995
OFFICIAL ENTRY FORM

The 1995 ACSM/NSPS Map/Plat Design
Competition is now open for entries.

This will be a juried contest. A maximum of five maps per style and category will be selected and exhibited at the 54th Annual Conference in Charlotte, North Carolina. Entries must be submitted by the state surveyor association affiliates of the National Society of Professional Surveyors, Inc. (NSPS). Entrants need not be members of the NSPS. A member of the NSPS must sponsor the map, plat, or project under consideration and their name must be so noted on the nomination form. The entry must have been completed after June 30, 1992 and may not have previously been entered in this contest. The entry may be freehand or machine drafted.

by 12" envelope. Submissions must be a single drawing: it may originate as part of a set of drawings, however, it must be entered as a single sheet. All entries must be received by December 12, 1994. Use one entry form per document submitted. An entry fee of \$20.00 must accompany each form.

All entries will be judged on adherence to the minimum standards as set forth by the NSPS. The judges will consider interperatability, content and layout of data shown, presentation, innovation, applicability to typical client or persons using this type of map, and correctness. Neatness and accuracy of scale shall also be considered. Prizes will be given in categories where three or more entries are received. The decisions of the judges are final.

Submit six prints for each entry with a maximum map size of 34" by 44". All entries must be folded to fit in a 9"

Categories

- 1. Subdivision Plats
- 2. Boundary/Cadastral Maps
- 3. Topographical Maps
- 4. ALTA/NSPS Survey Maps
- 5. Miscellaneous Maps

(Only one Category may be checked)

Submit entries with this to:
NSPS Map/Plat Contest
ACSM
Attn: Patricia Canfield
5410 Grosvenor Lane
Bethesda, MD, 20814-2122

(Use one entry form per document submitted)

This form may be reproduced for use
in submitting additional entries

I give my permission for this entry to be placed on display at any ACSM or NSPS sanctioned exhibit on cartography or map design. Also, I understand that entries may be reproduced in any ACSM or NSPS sanctioned publications that winning entries may be photographed and sold by ACSM or NSPS in 35mm slides and that the winning contest entries may be placed in the map collection of the National Society of Professional Surveyors at the Michigan State Museum. No entries will be returned. The decisions of the judges are final.

Signature: _____ Date: _____

State Affiliate entering Map: _____
Entrant's Name: _____
Company or Institution: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: (work)(____) _____ (home)(____) _____

An entry fee of \$20.00 must accompany this form.
(Make checks payable to NSPS, Inc.)

Title of Entry: _____
Description of Project: _____

Name and address of Nominator if other than entrant.
Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: (work)(____) _____ (home)(____) _____

EDITORIAL POTPOURRI

• NEW PLSW MEMBER - Congratulations to Roger H. Krum for becoming the newest member of PLSW. Roger is from Cheyenne, Wyoming.

• PLSW MEMBERSHIP - If you are not a member of PLSW, join now. We need your support. An application is included in this issue. If you are a member, recruit a new member.

• SUPPORT OUR ADVERTISERS - Advertisers fees help make this publication possible. Please support them.

• LOCAL PLSW NEWS - Send us a summary of your chapters activities or other related activities for publication. The deadline for the next issue of Lines and Points will be 16 DEC 1994.

• PLSW BOARD MEETINGS - The next meeting of the Board of Directors will held at Lander on January 15, 1995. Contact your director for the time and place. All members are welcome.

• BRONZE RAFFLE - The Board of Director's decided to purchase the bronze statue "Mapping the Frontier" by Ken Payne. A photo of the statue was presented in the last issue of Lines & Points. The Board will decide the cost of raffle tickets at the next Board meeting.

• LINES AND POINTS FAX - The Lines and Points fax number is 307-235-5604.

• WES PROJECT OF THE YEAR - A traveling display of WES Project of the Year is presently in Lander and Riverton at various locations. See Jim Gores for the itinerary. In November, it will be displayed in Casper. Phil Stuckert will coordinate the display.

• 53rd WYOMING LEGISLATURE - The Wyoming Legislature will convene on 10 JAN 95 and is scheduled to adjourn on 6 MAR 95. The issue of interest to surveyors is the repeal of certain sales tax exemptions. If passed, surveying services could be subject to sales tax. In addition, the PLSW Legislative committee is working toward passage of the Record of Survey Bill.

Front Cover Artwork
by
Ray Blaha
Casper, Wyoming

Lines and Points is published by the Professional Land Surveyors of Wyoming. Lines and Points is not copyrighted and permission is hereby granted to reprint articles with appropriate credit. The Professional Land Surveyors of Wyoming assumes no responsibility for statements made or opinions expressed in this publication.

PLSW (Professional Land Surveyors of Wyoming) is a statewide organization of Registered Land Surveyors licensed to practice in the Equality State of Wyoming. PLSW is dedicated to improving the technical, legal, and business aspects of surveying in the State of Wyoming. PLSW is affiliated with the American Congress on Surveying and Mapping and the Western Federation of Professional Land Surveyors.

Editorial Staff: John Hibsman, Steve Strang, Don Davis.

Lines and Points subscription \$50/year

Advertising Information

Camera ready advertisements with payment should be mailed to Lines & Points, PLSW, Box 904, Casper, WY 82602

Advertising rates are as follows:

	Year	Issue
Full page	\$300	\$80
Half page	\$175	\$50
Quarter page	\$100	\$30
Business card	\$ 30	\$10
Classified	40¢ per word/issue	
Employment	Free	

Special Rates for PLSW Chapters

Deadline for next issue — 16 DEC 1994

ATLAS
REPRODUCTION
AUTHORIZED AGENT FOR

XEROX®

USWEST
CELLULAR

Free Pick-Up & Delivery
Complete Reproduction Services

800 East "A" Street Casper, WY
237-9523 or 800-372-3837 In State

President’s Message

Hopefully all of your have recovered from the nature hike up to the northwest corner of the state and the tri-corner. I apologize for missing such a great outing. It sounds like everything went well as we have another event in PLSW history to be proud of. I was spending my time in the Wind River Mountains attempting to be a successful Mountain Sheep hunter. I was one of these extremely lucky souls that drew a sheep license. No, I have not found that monster ram, yet. But believe me, I truly know how you felt after climbing to those corner dedications.

I have tabulated the results of the questionnaire that was handed out this past convention. The results are as follows:

Question 1. The Handbook priority is: 1) Guidelines for Surveying Procedures; 2) Wyoming State Plane Coordinates; 3) Global Position System (GPS); 4) list of Resources & Publications; 5) GIS-LIS; 6) Photogrammetric Surveying; 7) Associated Organizations; 8) History of PLSW.

Question 2. The response to have the PLSW continue assisting or directing seminars was a unanimous YES!

Question 3. The response to the satisfaction of the 1994 seminar was yes with two somewhat’s.

Question 4. Everyone was willing to pay for these seminars with the majority wanting the price range from \$10 to \$50.

Question 5. We had 36% prefer an education only convention and 63% desire both social and educational.

Question 6. Approximately 75% do want to continue our association with the Wyoming Engineering Society convention. Even though it was unanimous to stay with the WES, the comments were all similar “the members want equal educational opportunities from WES”.

Question 7. Many comments stated that the PLSW should attempt to have a banquet/annual evening meeting.

Question 8. This seemed to be mostly towards two problems. One, the desire to involve more of the general membership. Two, end the bickering and backstabbing within the PLSW.

Please refer to the attached questionnaire for the wording of the questions. I want to thank everyone that returned this questionnaire to me. This is what we need from our members to move towards a growing successful organization. Thank you.

Recently John Steil, Pete Hutchison, Paul Scherbel and I met with the First American Title Company of Wyoming. We again are attempting to ask the legislature to approve our Record of Survey bill. The title companies have some problems with this bill and we hoped to solve those at this meeting. The meeting ended with First American Title Company explaining that they do not support anything that involves land surveying because it can create a delay in the fast pace of land transaction and banking. Interestingly they do not care if there are boundary problems it is not insured anyway. So we will have a fight to prove that honesty and public welfare will benefit the public more than cost of interest rates from a survey boundary delay. Paul Scherbel stated it best “survey boundary problems will not go away, eventually you will have to deal with them, and the longer you wait the more it will cost”.

I hope that all of the members have given their vote to their director concerning the purchase of the bronze sculpture named “Mapping the Frontier”. This is a remarkable art piece that honors the surveying profession. Hopefully you had the opportunity to see the video that was made with the sculpture. If the purchase for this sculpture has the membership approval, for our scholarship program, I would like to see it at the convention.

have the sculpture on display with the video playing and have the pros and cons of our Record of Survey bill. Maybe this would help our representatives understand the bill prior to the floor debates. I am hoping to also sell raffle tickets to the public this way as well.

Our convention agenda is coming along and we are still working with the Wyoming Engineering Society to confirm our rooms and time slots. I believe this will be a great educational convention as well as an entertaining social event, for both of our professions.

I will close this message with a word of warning. Please conduct your responses to the public and/or other professionals that involve personal comments as personal. Do not leave any possibility that you are acting on behalf of the PLSW. Our organization has had many problems with misrepresentation. We need to work together to represent the PLSW as a group of professionals, lets work towards our goals and not divide our membership. Hope you all have enjoyed an excellent summer and lets work to increase our PLSW membership and support upcoming events.

Sincerely, Chris Hamilton

PLSW Membership /Questionnaire

1. Indicate your priorities for the PLSW Handbook Chapters by numbering the items below according to your preference. Number first choice with No. 1 and continue through No. 9.
- History of PLSW No. _____
- Associated Organizations No. _____
- List of Resources & Publications No. _____
- Guidelines for Survey Procedures No. _____
- Photogrammetric Surveying No. _____
- GIS-LIS AM/FM No. _____
- Global Position System (GPS) No. _____
- Wyoming State Plane Coordinates No. _____
- Other No. _____

- Please describe if other is used above
Comment: _____
2. Do you prefer the PLSW continuing to assist or direct seminars similar to the 1994 convention program?
Yes_____ No_____
- Comment: _____
3. Are you satisfied with the seminar program that was presented at the 1994 convention?
Yes_____ No_____ Somewhat_____
- Comment: _____
4. Are you willing to pay a fee for these seminars and if so what range?
Yes_____ No_____
- ☐ \$10-\$50 ☐ \$50-\$90 ☐ \$90-\$100.
(Please remember good programs are expensive.)
5. Should the convention by an educational or social function?
Educational_____ Social_____ Both_____
6. Should the PLSW continue our association with the Wyoming Engineering Society by having conventions with the W.E.S.?
Yes_____ No_____
- Comment: _____
7. Please describe changes you would favor during our conventions.

8. Please describe problems you find with our PLSW organization and solutions you may have.

Metric News Corner • The Construction Trades

Here are the metric units that will be used by the construction trades. The term “length” includes all linear measurements – length, width, height, thickness, diameter, and circumference.

	Quantity	Unit	Symbol
Surveying	length	kilometer, meter	km, m
	area	square kilometer	km2
		hectare (10,000m²)	ha
		square meter	m²
	plane angle	degree (non-metric)	°
		minute (non-metric)	'
		second (non-metric)	"
Excavating	length	meter, millimeter	m, mm
	volume	cubic meter	m
Trucking	distance	kilometer	km
	volume	cubic meter	m³
	mass	metric ton (1000 kg)	t
Paving	length	meter, millimeter	m, mm
	area	square meter	m²
Concrete	length	meter, millimeter	m, mm
	area	square meter	m²
	volume	cubic meter	m³
	temperature	degree Celsius	°C
	water capacity	liter (1000 cm³)	L
	mass (weight)	kilogram, gram	kg, g
Masonry	cross-sectional area	square millimeter	mm²
	length	meter, millimeter	m, mm
	area	square meter	m²
	mortar volume	cubic meter	m³
Steel	length	meter, millimeter	m, mm
	mass	metric ton (1000 kg)	t
		kilogram, gram	kg, g
Carpentry	length	meter, millimeter	m, mm
Plastering	length	meter, millimeter	m, mm
	area	square meter	m²
	water capacity	liter (1000 cm³)	L
Glazing	length	meter, millimeter	m, mm
	area	square meter	m²
Painting	length	meter, millimeter	m, mm
	area	square meter	m²
	capacity	liter (1000 cm³)	L
		milliliter (cm³)	mL
Roofing	length	meter, millimeter	m, mm
	area	square meter	m²
	slope	millimeter/meter	mm/m
Plumbing	length	meter, millimeter	m, mm
	mass	kilogram, gram	kg, g
	capacity	liter (1000 cm³)	L
	pressure	kilopascal	kPa
Drainage	length	meter, millimeter	m, mm
	area	hectare (1,000 m²)	ha
		square meter	m²
	volume	cubic meter	m³
	slope	millimeter/meter	mm/m

Herb's Corner

THE CURVATURE CORRECTION

I was recently reading an elementary surveying textbook. In the chapter on leveling, the subjects curvature and refraction were presented. In this particular work, and other works I have read, the authors state that the curvature and the curvature and refraction is the product of a constant times the square of the distance between the two points. This equation about curvature is devoid of mathematical substantiation, and raised my intellectual curiosity as to the formula's origin.

My initial research was to review the technical literature. Review of Taylor-Brinker-Wolf, Breed & Hosmer, et al., Bouchard & Moffitt, and others revealed a pragmatic statement of the formula. The curvature correction in feet (for distances in feet) is:

$$C = k F^2$$

where k is a "number" and F is the distance in thousands of feet (kilofeet).

The figure depicts the problem. The angle at the earth's center is θ , and the arc distance AB is the surveyed distance S. The radius of the earth is OA (R). Then:

$$\theta'' = \frac{S}{R \text{ arc } 1''} \text{ (in arc seconds)}$$

$$R \text{ arc } 1''$$

$$\text{arc } 1'' = 4.848136811 \dots \times 10^{-6}$$

The distance $\overline{AC}$ (tangent) is:

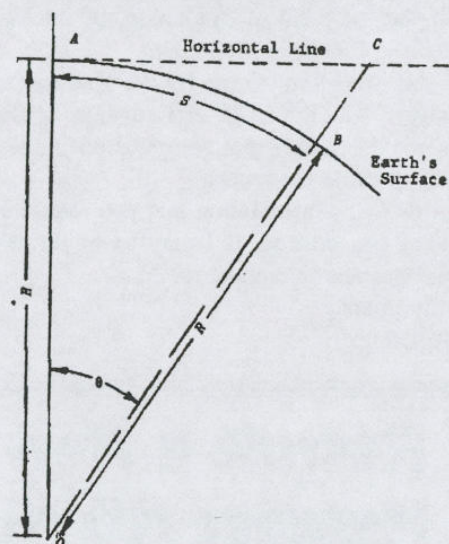
$$T = R \tan \theta$$

$$\overline{OC} = (R^2 + T^2)^{1/2}$$

Finally, the curvature is:

$$c = \overline{OC} - R$$

At 45° latitude employing GRS80 (NAD83), the mean radius is 6,378,101.03 meters (20,925,486.46 feet). In *The Theory and Practice of Surveying* . . . , 16th ed. by John Butler Johnson, curvature is discussed in the section "Heights of Stations" (pp 480-483). Johnson transcribed all of p. 154 and part of p. 155 of Appendix No. 9 of *Report of the Superintendent of the U.S. Coast and Geodetic Survey . . . Fiscal Year Ending June, 1882*. In these writings, curvature is defined as:



$$\text{Curvature} = \frac{\text{square of distance}}{\text{mean diameter of earth}}$$

This formula fails to clarify the matter. However, recall the series:

$$(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + \frac{n(n-1)(n-2)}{3!}x^3 + \dots$$

From above:

$$\overline{OC} = (R^2 + T^2)^{1/2} = R \left(1 + \frac{T^2}{R^2} \right)^{1/2}$$

Then:

$$\begin{aligned} \overline{OC} &= R \left[1 + \left[\frac{1}{2} \right] \frac{T^2}{R^2} + \frac{1}{2} \left[\frac{-1}{2} \right] \frac{T^4}{2R^4} + \frac{1}{2} \left[\frac{-1}{2} \right] \left[\frac{-3}{2} \right] \frac{T^6}{6R^6} + \dots \right] \\ &= R + \frac{T^2}{2R} - \frac{T^4}{8R^3} + \frac{T^6}{16R^5} - \dots \end{aligned}$$

Retaining only the first two terms, the curvature is:

$$\begin{aligned} C &= \overline{OC} - R \\ &= \left[R + \frac{T^2}{2R} \right] - R \\ &= \frac{T^2}{2R} \end{aligned}$$

But T nearly equals S, the distance, and at 66 miles the difference is 4.04 feet.

The question has been answered concerning the "form" of the formula. The constant in the formula is the reciprocal of the diameter of the earth. The following coefficients apply for various length units.

Distance	Coefficient
units	
Kilometers	0.078393
Miles	0.666135
Kilofeet	0.023894

The values are based on the mean radius at 45° for GRS80 (NAD83) reference ellipsoid.

A second approach, which yields the same results, appears in *A Treatise on the Principles and Practice of Levelling* . . . by Frederick Walter Simms (third edition; London: John Weale, 1846; p. 5). Substituting for OC in the Pythagorean theorem:

$$(R + C)^2 = R^2 + T^2$$

Expanding:

$$R^2 + 2RC + R^2 + T^2$$

Simplifying:

$$2RC + C^2 = T^2$$

$$(2R + C)C = T^2$$

Because 2R (the earth's diameter) is very large compared to the curvature, C, then we can say:

$$2R + C \sim 2R$$

Then:

$$2RC = T^2$$

$$C = \frac{T^2}{2R}$$

$$\frac{T^2}{2R}$$

Board of Directors Meeting Summary

Board members and other PLSW members traveled to South Dakota for the summer meeting on Friday, July 15, 1994. The meetings was held at the Brady Ranch northwest of Spearfish and was hosted by the Northeast Chapter, Don and Ann Brady having made the arrangements for the meeting, refreshments, barbecue and camping. Thank you both on behalf of PLSW. This was the first "official" meeting of PLSW outside the state of Wyoming (four miles east of the state line).

The meeting was called to order by President Chris Hamilton at 2:35 P.M., followed by a brief but lively thunderstorm — the tent held and the meeting continued. Nine members of the board were present, as were five other members and two guests.

Secretary Rick Hudson presented the minutes of the two board meetings in Riverton and the one in Rawlins, stating that the minutes of the annual meeting were not complete and will be submitted at the November board meeting. The minutes of all three board meetings were approved.

The Treasurer's Report was presented in the usual format and consisted of the June statement from Hilltop National Bank and Itemized Expenses and Balance Sheet for the year. Following a general discussion concerning accounting procedures, the board voted to segregate the "SOS" Honorarium in the 1995 Budget into "award" and "administration" categories. The report was then accepted as presented.

The NSPS report was presented by Herb Stoughton on behalf of Governor Becky Braman; Herb stating that there hasn't been much activity since our last board meeting. The "WestFed" (WFPS) report of delegate Paul Reid was presented by Director Pete Hutchison and was much the same as the NSPS report, little activity since May.

Committee reports were presented by Herb Stoughton for Professional Practice and Bylaws Committees. Herb's reports addressed the availability of the "Corner Record" form on floppy disk, the proposed Bylaws amendment regarding formation of new chapters, history of the GLO surveys, an update on HARN activities, professional conduct matters, a request from board of registration member Ralph Goodson, discussion of the Attorney General's opinion regarding professional corporations, and an update regarding the 1995 Wyoming Engineering Society convention.

Old business, carried over from the May meeting at Rawlins, began with the distribution of Herb's report concerning the teleconference course he completed on behalf of PLSW through the University of Wyoming. Chris discussed the response letter to Dick Stapp's request concerning PLSW input on the matter of qualifying experience for LSIT and PLS testing. Honorary member Paul Scherbel, also a member of the state board of registration (SBREPLS), read the official board decision on the matter, purchase of the statue "Mapping the Frontier" by Ken Payne. Chris stated he had met with the owner of Eagle Bronze, of Lander, and PLSW can purchase one for \$4,800. Following a general discussion, the board voted to have each director discuss this matter at chapter level, poll the members, and respond back to Secretary Hudson by October 1st with a yes or no vote authorizing purchase. Details are to be worked out at the November meeting.

The first item of new business was the application of Roger Krum as a member - welcome to PLSW Roger as our newest member.

surveys legislation. It was agreed that John Steil's Legislative Committee should meet with representatives of the title industry and legislature as soon as possible.

The final matter of new business was presented by Herb and addressed the topic of metrification. He indicated that no action had taken place to date.

Dennis Bland, Cadastral Surveyor with the Bureau of Land Management announced the planned activities for the dedication of the corner common to Wyoming and South Dakota on the Montana boundary (the northeast corner of Wyoming). He gave directions to reach the site, approximately 30 miles northwest of Belle Fourche, and said the ceremonies will begin at 10 a.m., tomorrow, July 15th.

The next meeting of the Board of Directors will be on Saturday, November 5th, in Cody and will be hosted by the Northwest Chapter.

The meeting was adjourned at 4:43 P.M.

Dated this 1st day of October, 1994.

R. L. Hudson, Secretary/Treasurer

BLM NEWS

Mr. Don Brady, President - NE Chapter
Professional Land Surveyors of Wyoming
Land Surveying, Inc.

P.O. Box 475, Gillette, Wyoming 82718

Dear Mr. Brady:

On behalf of the Bureau of Land Management, it is my pleasure to commend the Professional Land Surveyors of Wyoming - Northeast Chapter for involvement in the dedication held July 16, 1994, at the "Tri-State Corner".

We are extremely proud of the legacy of marking the lands for settlement inherited from our predecessor, the General Land Office. It is important that we not forget the hardships endured and sacrifices made by our forefathers in surveying and settling the western frontier. The corner dedication afforded an excellent opportunity for the surveying community to relay this message to the general public. Throughout the project, the Northeast Chapter of the Professional Land Surveyors of Wyoming was at the forefront in planning, organizing, and assigning tasks to chapter members. The excellent coordination performed by the membership resulted in numerous complimentary remarks voiced by the attendees.

Please accept our sincere appreciation for the excellent coordination and time contributed by your chapter to ensure the success of this historic event.

Sincerely,

Robert A. Bennett, Acting State Director

This letter is to inform you of official cadastral surveys in Wyoming that have been accepted from April 1, 1994 through June 30, 1994, and are now available in the Survey Records Office, Wyoming State Office, Bureau of Land Management, 2515 Warren Avenue, Cheyenne, Wyoming 82001.

SIXTH PRINCIPAL MERIDIAN, WYOMING

Township and Range	Type of Survey	Meridian	Accepted
T. 49 N., R. 62 W.	Dep. Res. & Subd.	6 P.M.	06/29/1994
T. 38 N., R. 64 W.	Dep. Res. & Subd.	6 P.M.	06/29/1994
T. 41 N., R. 81 W.	Dep. Res. & Subd.	6 P.M.	06/29/1994
T. 50 N., R. 105 W.	Dep. Res. & Subd.	6 P.M.	06/29/1994
T. 58 N., R. 60 W.	Dep. Res.	6 P.M.	07/16/1994
T. 31 N., R. 4 W.	Dep. Res. & Subd.	6 P.M.	07/16/1994
T. 22 N., R. 6 W.	Dep. Res. & Subd.	6 P.M.	07/16/1994

WESTFED MEETING REPORT

The Board of Directors meeting of the Western Federation of Professional Land Surveyors was called to order on August 27, 1994 at 9:05 a.m. in Denver, Colorado by chairman John Abenroth.

Delegates in attendance: Charles Paddock, secretary, Arizona; Jim Botsford, New Mexico; Harry Campbell, Alaska; G. Best, Alaska; Patrick Mercado, California; Susan Jensen, California; Robert Chichester, Colorado; Dave Difulvio, Colorado; Stewart Nash, Montana; Barry Hickerson, Nevada; Charles Pearson, Oregon; Brian Weigart, Oregon; Ron Whitehead, Utah; Paul Reid, Wyoming.

Agenda revisions and adoption was made.

Approval of the April 23, 1994 meeting minutes were made.

Chairman's report was verbally given by John Abenroth, (Washington delegate). John stated that things appear quiet and that members should capitalize on proactive situations and continue to be active in education of active and new surveyors (ie. schools, scholarships, etc.) He also suggested and challenged each delegate to find something to do towards education, such as the trig star program or giving presentations to students on a career in surveying. He noted that Richard Lomax had a massive heart attack August 21, and passed away. Bonnie Atwell had also passed away last month. John also noted that Washington, Idaho and Montana just finished their tri-state conference with 315 attenders and a net profit of \$37,000, with proceeds going back to the different state and chapter organizations.

Secretary Chuck Paddock gave a verbal report mentioning him being new and still learning the ropes.

Treasurer Jerry Tippin was not able to attend the meeting due to previous commitments. A written report was presented by Jerry stating WestFed currently has \$56,687.75 on hand with \$619.78 in the checking account; \$3,879.39 in the money market and \$52,188.58 in the time certificate of which \$14,354.26 is marked for scholarships. Conference flyers for exhibitors has been mailed as well as the application to U.S. Bank for a visa/mastercharge account.

Chuck Pearson, conference committee chairman, reported that the 1997 conference site is still under the selection process. The 1997 sites being considered are Laughlin, Nevada in conjunction with the Arizona Professional Land Surveyors state convention and a Westfed meeting in Salt Lake City, Utah in conjunction with Utah's state convention. The 1999 convention will be a joint conference with the Oregon and Washington state organizations in Portland, Oregon. The 1995 convention site has been selected and a contract signed with the Radisson Hotel in Denver, Colorado during the week of September 24. Some of the programs planned are the B.L.M. Advanced Cadastral Survey course. Chuck also mentioned that the conference committee is looking for suggested programs or speakers that have been successful in other state conventions such as subjects on autocad or mineral surveys. Anyone having any suggestions should contact either Chuck Pearson or Chic Chichester.

Brian Weigart, scholarship committee chairman, reported that one application was received from Robert Wilder, a student at New Mexico State University. The scholarship was approved for the amount of \$600.

Sam Best, NCEES liaison committee chairman reported

General discussion on the Texas Society of Professional Surveyors strategic plan was made. It was deleted from the action list.

There was general discussion on issues to be brought up for the NSPS Board of Governors meeting.

Discussion on the B.L.M. Cadastral budget was held.

The WestFed budget for September 1, 1994 through August 31, 1995 was hashed out, finalized and approved.

There is a vacancy on the NSPS-ACSM Survey technician Certification Board. Anyone interested in the position should contact a member of the board of governors of NSPS.

State activity reports were reviewed and discussed. Some of the highlights are as noted:

Alaska - the University of Alaska is in the process of applying to ABET for accreditation for their survey science program. ASPLS endorses the action and has committed \$8,000 to assist with funding of the accreditation process.

Arizona - APLS is having their annual meeting during the last two weeks in January in Tucson, Arizona.

California - the state association has been involved in numerous administrative items and improvements to organizational structure. There has been an additional chapter added (Palm Springs, Desert Chapter) to the organization.

Colorado - the directors of Professional Land Surveyors of Colorado are excited to have Western Federation of Professional Surveyors hold their ninth biennial conference in Denver during the last week of September, 1995. Each chapter of PLSC puts together it's own workshops and education programs including the PLSC annual meeting and PLSC's fall workshop. There are six chances each year for the surveyor to get continuing education.

Montana - five state chapters conducted trig-star programs during the spring months with the Southeast Chapter leading the pack with seven high schools participating. Jason Reno, a student at billings senior high school had the winning time of 13 min. 22 sec's. He won an HP calculator, plaque and \$50. He also went on to win the state wide contest in 9 min. 7 Sec's., And walked away with the \$500.00 grand prize.

New Mexico - Jim Reilly graduated a class of 18 "Native American" survey students in the BIA survey program with WestFed providing a certificate for each. A plaque was presented to WestFed for their involvement and the students gained good exposure into the surveying profession along with some front page newspaper coverage.

Oregon - The 1994 annual convention will be held in

(Continued on Page 7, Column 1)



SCHERBEL ON SURVEYING A compilation of parts of the WYOMING STATUTES

and others items of interest to
PROFESSIONAL LAND SURVEYORS

Order from
SURVEYOR SCHERBEL, LTD.

Box 4296

Big Piney - Marbleton, Wyoming 83113

Sixth P.M. News

You will remember that the survey of the initial point for the Sixth Principal meridian began at the monument on the west bank of the Missouri River. Then the line was run westerly to the initial point near Mahuska, Kansas, a distance of 108 miles.

Enclosed is some GPS data which indicates to me a little long chaining of about five feet per mile.

Interesting?

Very sincerely yours,

Paul N. Scherbel, Professional Land Surveyor, Registration No. 164

On April 29, 1993 Bill Haverkamp, Ed Goff, and I, Larry Moore, all from KDOT, and Monroe Rivers, from the National Geodetic Survey, went to White Cloud, KS to pinpoint the latitude and longitude of the monument on the west bank of the Missouri River where the 40th Parallel crosses it. To do this, we sat two traverse points on a levee directly east of the monument. We then used three Trimble 4000SST GPS receivers, one on each of the two traverse points and one on NGS station White Cloud, to determine the position of the two traverse points. We then sat on traverse point number 1 and used a Wild T2 theodolite to sight traverse point number 2 and turn a 4 position angle to the monument. We also used an AGA Model 112 EDM to measure a distance from traverse point number 1 to the monument. This concluded the field portion of the process.

On April 30, 1993 I processed the raw GPS data and established state plane coordinates for the traverse points using the published coordinates for station White Cloud.

These coordinates were:

TP#1 N= 618,077.8058

E= 2,060,600.0300

TP#2 N= 618,109.5892

E= 2,061,820.0364

Then, using the average latitude (40 degrees) and elevation (846 feet) of the two traverse points, I calculated a C.A.F. (Combined Adjustment Factor) of 1.00000666. Using this C.A.F., project coordinates were figured for the two traverse points.

These coordinates were:

TP#1 N= 618,073.6895

E= 2,060,586.3065

TP#2 N= 618,105.4726

E= 2,061,806.3048

I then figured, using the angle and distance mentioned earlier, project coordinates for the monument.

These coordinates were:

N= 618,025.0761

E= 2,059,697.7644

Then, using the same C.A.F., state plane coordinates were figured for the monument.

These coordinates were:

N= 618,029.1921

E= 2,059,711.4819

To figure the distance from the monument on the Missouri River to the monument at the crossing of the 40th Parallel and the Sixth Principal meridian, or P.O.B., I used the average latitude of both points (40 degrees) and the average elevation of both points (1,400 feet) and figured a C.A.F. of .99998016. I used this C.A.F. to convert the published state plane coordinates of the

P.O.B. (which are N=608,386.6802 E=1,489,061.2476) and the above mentioned state plane coordinates of the river monument to project coordinates.

These coordinates were:

P.O.B. N= 608,398.7508

E= 1,489,090.7911

River Monument N= 618,041.4540

E= 2,059,752.3474

I then inverted between these two sets of coordinates to get the chord distance between the two monuments. This distance is 570,743.019 feet or 108.095 miles.

3.28083333 CONVERSION FACTOR

1.00000666 C.A.F.

40 00 00 AVERAGE LATITUDE

846 AVERAGE ELEVATION

-100 GEOID HEIGHT

ALL COORDINATES ARE NAD-83

STATE PLANE COORDS. (METERS)

NORTH EAST

1 188,390.49200 629,072.14530 TP#1

2 188,400.17960 628,444.00400 TP#2

3 188,327.37310 625,378.94250 White Cloud

STATE PLANE COORDS. (FEET)

NORTH EAST

1 618,077.80583 2,060,600.03000 TP#1

2 618,109.58923 2,061,820.03640 TP#2

3 617,870.72324 2,051,764.08050 White Cloud

PROJECT COORDINATES

NORTH EAST

1 618,073.68946 2,060,586.30650 TP#1

2 618,105.47265 2,061,806.30480 TP#2

3 617,866.60825 2,051,750.41580 White Cloud

AZIMUTH DISTANCE

1-2 88.30276 1,220.41223 TP#1-TP#2

NAME INPUT OUTPUT

River Monument 618029.19210 N 39 59 59.67193 N

2059711.48190 E 095 19 55.47319 W

Convergence 01 41 16.72447

Scale Factor 1.000042316

Dear Mr. Rynearson,

Enclosed, please find the coordinate values and an inverse computation for the point of Beginning, on the Sixth Principal meridian and the Cast Iron Monument.

These data were sent to me by the Kansas Department of Transportation, Mr. Ed Goff. All surveys at the Cast Iron Monument and the subsequent computations were done by the personnel, as given in the report.

I trust this is the information that you requested of me and that it is what you desired. If I may be of further assistance, please do not hesitate to contact me.

Sincerely yours,

Jerry A. Odum

**Recruit a New
Member NOW!**

Letter to the Editor

September 20, 1994

Editors

Lines and Points

Sirs:

In the interest of keeping our members of PLSW informed and after reading different articles and letters concerning continuing education in this publication I have the following comments.

Terry W. McHenry, the Nevada delegate to the Western Federation of Professional Surveyors and Committee Chairman of the Continuing Education Committee, did a extensive study on professional competency/continuing education for land surveyors. The summary of the study is as follows:

17 States have mandatory CE requirements enacted by legislation.

9 States have voluntary CE programs in place

2 States are not proposing CE at this time

20 States are proposing/discussing CE requirements

2 States have not reported their status (Pennsylvania being one)

As you can see, contrary to your editorial "Kontinuing Edukation Kitty Litter", there are not "only three states" that have mandatory continuing education. Furthermore, there are an additional 20 states proposing/discussing continuing education requirements.

In my discussions and perambulations around the Western United States it appears the pressure concerning continuing education is not coming from the "educator types" but from consumer advocacy groups. Consumers are fed up with Boards, Commissions and regulatory agencies that control the licensing or "picket fences" set up to allow only certain individuals to practice to the public. The public has been burned a few times. They have begun to question the regulatory agencies on what they do to insure a registrant maintains their adequacy and competency to practice. The regulatory agencies are discovering a mere entrance examination to test the minimum requirements for licensure is not going to be sufficient anymore. There must be some institution of requirements that protects the public from the incompetent. Continuing professional competency appears to be where we are headed whether we like it or not.

Since I have registrations in a few states the question is not even arguable. Depending on the state specified regulations, statutes and their definitions, I must maintain continuing education and professional development requirements. What I foresee taking place today, it behooves us in the profession to become actively involved in the formulation of continuing competency requirements. If we don't become active, in formulating rules and regulations concerning professional development and competency, we will be subjected to some of the asinine rules I presently must adhere to.

I would like to see rules and regulations which involve participation in the profession rather than attendance to subjective lecture seminars by "educator types".

In summary whether you like it or not, it's coming and we must get involved with our State Board so we can have some positive input into making a better profession and professionals of us all.

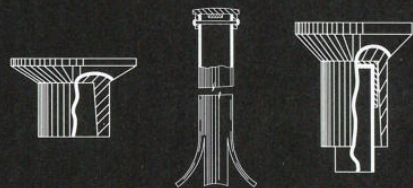
Sincerely,

Paul A Reid PI S

"WHAT Survey Marker...?" "WHERE??"



SURVEY MARKERS MONUMENTS REBAR CAPS PIPE CAPS BENCH MARKS & ACCESSORIES



FOR CATALOG CALL
(602) 882-7363 or 1-800-323-4578
OR WRITE:



SURVEY MARKERS & MONUMENTS

A Division of Desert Engineering Group, Inc.
3162 E. 46th Street, Tucson, Arizona, 85713

—WESTFED

(Continued from Page 6)

Southern Oregon the first part of December.

Utah - The UCLS has hired an executive secretary to help the council with it's business. A newsletter is going to be issued on a quarterly basis for the council. The UCLS annual convention is being planned for January 19 and 20, 1995 at the Airport Hilton Hotel in Salt Lake City.

A \$250 donation was approved to be given to the Michigan Historical Surveyors museum in the memory of Richard Lomax.

Next meeting will be either January 21, in Salt Lake City or January 28, in Tucson, depending on travel/cost analysis by John Abenroth.

Meeting was adjourned at 1:10 p.m.

Respectfully submitted,

PAUL A. REID, P.L.S., Wyoming Delegate

PLSW Acquires T. H. Baldwin, Jr. Maps

In August Mrs. Malcolm D. Martin donated to the Professional Land Surveyors of Wyoming the survey map files from the office of her late brother Thane H. Baldwin, Jr. the maps included over 175 maps of 110 water projects. All but one of the projects were located in the Big Horn Basin. The collection has been catalogued by Herb Stoughton. The maps and the catalog are now in the possession of Rick Hudson, PLS, Thermopolis. The maps date from 1904 through 1958.

Also included in the Baldwin files were about 200 GLO plats, mostly for the Big Horn Basin. These plats have been added to the collection purchased by PLSW in 1993.

4708 SOUTH COLLEGE AVE.
FORT COLLINS, COLORADO • 80525



Aero-metric
ENGINEERING, INC.
PHOTOGRAMMETRIC ENGINEERS

Aerial Photography • GPS Surveys
Precision Digital Mapping

TEL 303-226-2883
FAX 303-226-2965

SURVEY SUPPLY SERVICE COMPANY

MANUFACTURER CUSTOM
SURVEY STAKES, LATH, & BRASS CAPS
FLAGGING - PIN FLAGS - FLUORESCENT PAINT

ROBERT C. SHOOK

P.O. Box 90009
Casper, WY 82609
307-234-9856

P.O. Box 758
Newcastle, WY 82701
307-746-4113



Idaho-Montana Corner on West Boundary of Wyoming Revisited

On August 20, 1994, a group of approximately 25 people, mostly land surveyors from the U.S. Forest Service, Bureau of Land Management, and the private sector assembled on a logging road near the continental divide between Idaho and Montana some three miles westerly of their destination. Most of the individuals had participated in the remonumentation of the Northwest Corner of Wyoming the previous day, requiring an arduous hike of 1,700 feet elevation above the Gallatin River, which left legs weary. Their mission was to recover the monument set by Howard B. Carpenter in 1907 for the corner common to the states of Idaho and Montana on the west boundary of Wyoming, where he set an iron post and marked four bearing trees.

Carpenter determined the true continental divide to be 321.33 chains south of the point established by A. V. Richards in 1874. A. V. Richards' brother William, stated in his diary "The ascent was so gradual it was difficult to find the summit."

After hiking for approximately two hours over endless charred and fallen timber from the ravaging fires of 1988 they arrived in the general search area, assisted by GPS navigation using scaled coordinates taken from an erroneous quadrangle map. After a couple of hours of searching and finding other monuments of the Carpenter survey the corner was zeroed in on and recovered. The monument was found to be in good condition, with its bearing tree accessories standing, but charred and dead. A mound of stone was constructed and GPS coordinates collected. It was decided that a new description of the monument be recorded in the official records, and that Paul Scherbel's grandchildren could check on it sometime in the later part of the next century.

The walk out made for a long day, but the successful adventure and recovery was deemed worthwhile.

(Submitted by the BLM)



NW Corner of Wyoming Remonumentation

On August 19, 1994, a group of 35 hardy individuals braved an arduous climb to reach the northwest corner of Wyoming. Some of the people participated in the reconnaissance trek last year. Others were experiencing for the first time the spectacular scenery from the high country of Yellowstone National Park. There were individuals from the Bureau of Land Management, U.S. Forest Service, National Park Service, and the private sector of land surveying. All shared a common interest in the historical significance of the corner position being remonumented.

The corner position was identified from remaining accessories during last year's trek, although the original wood post marking the position was gone. The missing post is attributed to the fire of 1988 which swept the area in a raging inferno. Upon reaching the corner site, remonumentation efforts were soon underway.

A special cast brass capped monument was set in concrete at the corner point, with a bronze interpretive plaque anchored alongside. The plaque details the original establishment the date of the remonumentation, and the logos of the Professional Land Surveyors of Wyoming, Montana Association of Registered Land Surveyors, National Park Service, and the Bureau of Land Management. A treated wood post replicating the original corner was set north of the monument along with added inscriptions of

the organizations participating in the project.

Special recognition goes to Hofland Survey Monuments and Portland Foundry for the design and construction of the monument and to those who contributed toward the purchase of the plaque. The National Park Service deserves recognition for providing the concrete, water, and wood post and transporting the materials to the corner site. Finally, a special thanks goes to those 53 hardy individuals who braved the climb and accomplished the onsite work, resulting in yet another successful venture for the surveying profession.

(Submitted by BLM)



JOINT DEDICATION OF RESTORED MONUMENTS - SOUTH DAKOTA-WYOMING CORNER AND SOUTHEAST CORNER OF MONTANA

Saturday, July 16, 1994, dawned a balmy morning in Belle Fourche, South Dakota. People were gathering in the Chamber of Commerce parking lot by 8:00 A.M. to participate in the convoy to the South Dakota-Wyoming corner site. The convoy was soon on U.S. Highway No. 85, heading in a northerly direction to the corner site approximately 30 miles distant. Arriving at the site, workers could be seen going about their assigned tasks in a jubilant manner.

At 10:00 A.M. the dedication began with a welcome from the Mayor of Belle Fourche, Clark Sowers. The Honor Guard posted the colors and Doug Dick, from Gillette, Wyoming, sang the National Anthem. The Master of Ceremonies, Warren Fisk, from Rapid City, commented on the various territorial governments which had been associated with this area. Dennis Bland, BLM Wyoming, presented a history of the Dakota-Wyoming Survey. A history of the Dakota-Montana Survey was presented by Dan Mates, BLM Montana. Francis Eickbush, Chief of Cadastral Survey, administered a signing of the field notes and plat. Mr. Eickbush also presented the keynote address by speaking on the importance of corner preservation and the land tenure system. An interesting account on early settlement in the area was presented by Leo Giacometto, Executive Director of the High Plains Heritage Center in Spearfish, South Dakota. Prints of the painting "Surveying in the Sandhills in 1904" donated by Rollin Curd, Chadron, Nebraska, were presented to selected individuals. Approximately 190 people were in attendance to the enjoyable event. Immediately afterward, many of the attendees traveled nearly one mile east to view the southeast corner of Montana monument. The final stop was at Herrmann Park in Belle Fourche where the Chamber of Commerce sponsored an enjoyable luncheon. Old friendships renewed and new friendships made were the order of the afternoon.

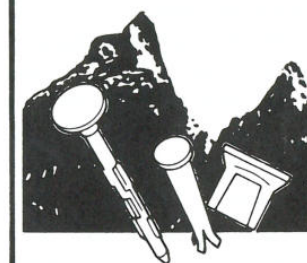
This is not the end, merely the successful completion of yet another chapter in the continuing and interesting saga of state corner remonumentations.

Prepared by *Dennis D. Bland*
July 18, 1994

SOS HONORARIUM
Corner Recordation Forms
must be submitted to
Rick Hudson
by December 31, 1994



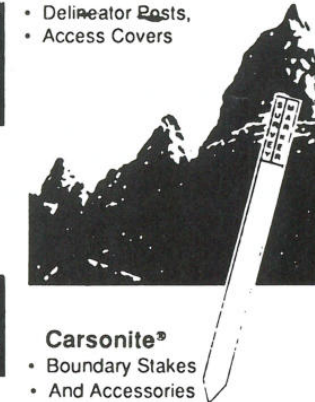
SURV-KAP® LANDMARK DISCOVERIES



Aluminum
• Survey Markers for Rebar,
• Concrete and Pipe,
• Monuments, Fluted Stakes,
• Delineator Posts,
• Access Covers



Brass
• Concrete Markers
• Cast Brass
Permamark®
• Plastic Markers



Carsonite®
• Boundary Stakes
• And Accessories

Stainless Steel
• Monuments
• Stakes

**FREE
CATALOG
AND PRICE LIST**

CALL
(602) 622-6011
1-800-445-5320
FAX (602) 792-2030

or **WRITE:**
SURV-KAP
P.O. BOX 27367
TUCSON, ARIZONA 85726