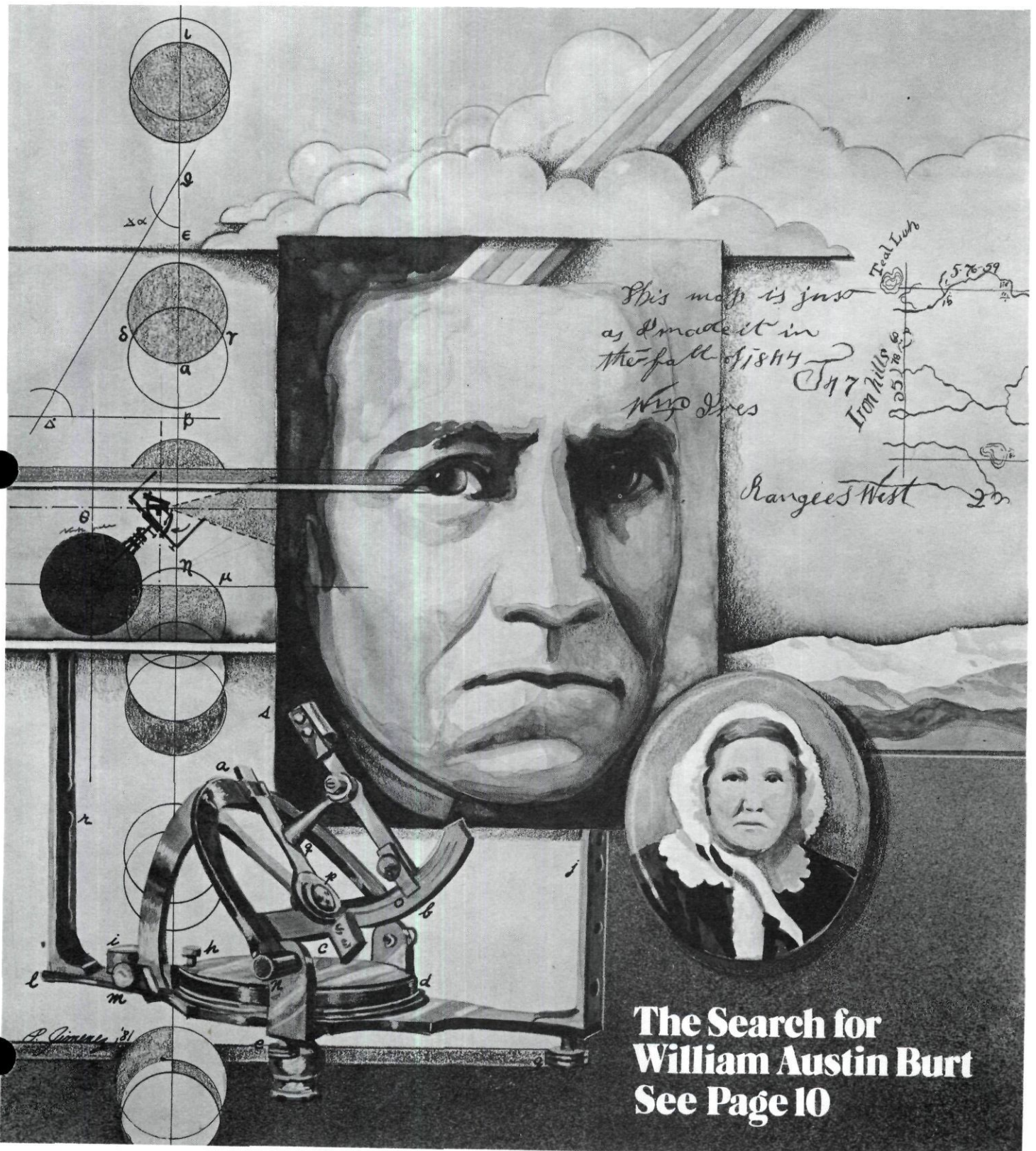


The California Surveyor

No. 65

The Voice of the Land Surveyors of California

Summer 1981



**The Search for
William Austin Burt
See Page 10**

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F.D. "Bud" Uzes (left) and John S. Burt pose with a Burt's Solar Compass at the WFPLS Conference in February 1981. John, great-great-great grandson of inventor/surveyor William Austin Burt, and Bud have teamed up in this edition to bring readers the story of the man, his work and his inventions. See Cover Story and Perspectives.

On the Cover: "William A. Burt: Inventor, Surveyor, Dreamer."

Cover Illustration: Pat Jimenez, Target Studios.

The California Surveyor

is the quarterly publication of The California Land Surveyors Association and is published as a service to the Land Surveying profession of California. It is mailed to all Licensed Land Surveyors and Land Surveyors in Training in the state of California as well as to all members of California Land Surveyors Association. *The California Surveyor* is an open forum for all surveyors, with an editorial policy predicated on the preamble to the constitution of the California Land Surveyors Association and its stated aims and objectives, which read:

"Recognizing that the true merit of a profession is determined by the value of its services to society, the 'California Land Surveyors Association' does hereby dedicate itself to the promotion and protection of the profession of Land Surveying as a social and economic influence vital to the welfare of society, community, and state."

"The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of Land Surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in the Land Surveyors and their work."

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Sustaining Membership

Membership in the California Land Surveyors Association as a sustaining member is open to any individual, company or corporation who, by their interest in the Land Surveying profession, is desirous of supporting the purposes and objectives of this association. For information regarding sustaining membership, contact the Editor of *The California Surveyor*.

Editorial Material.

All articles, reports, letters and contributions are accepted and will be considered for publication regardless of the author's affiliation with the California Land Surveyors Association. Material should be sent to *The California Surveyor*.

Unless indicated, all articles in this publication are prepared by the editor

EDITOR: R. E. Baldwin, L.S.
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DEADLINE DATES FOR THE CALIFORNIA SURVEYOR

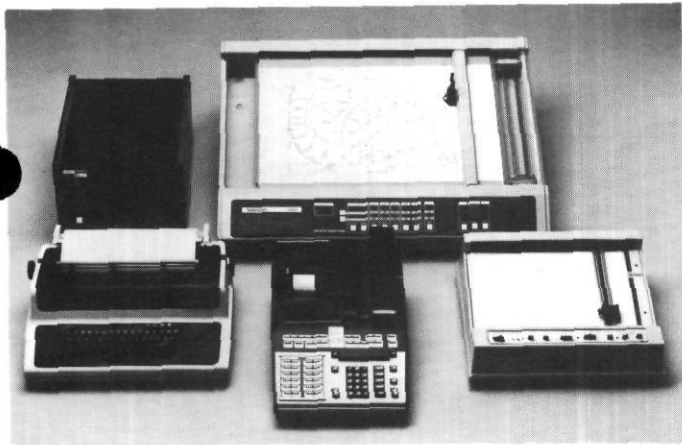
FALL AUGUST 17, 1981
 WINTER/CONFERENCE ... NOVEMBER 20, 1981

Articles, Reports, Letters, etc., received after the above mentioned date will be placed in the next edition.

Editor

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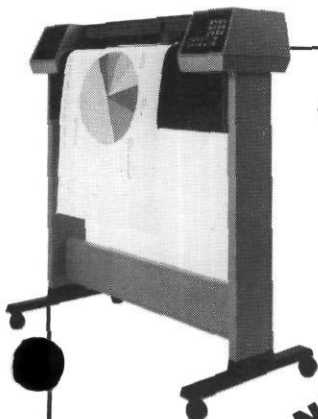
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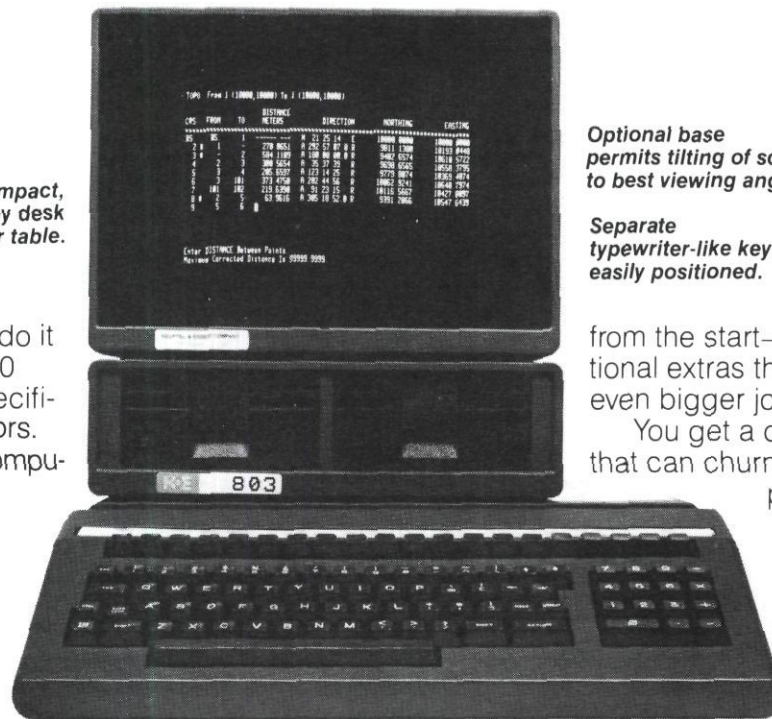
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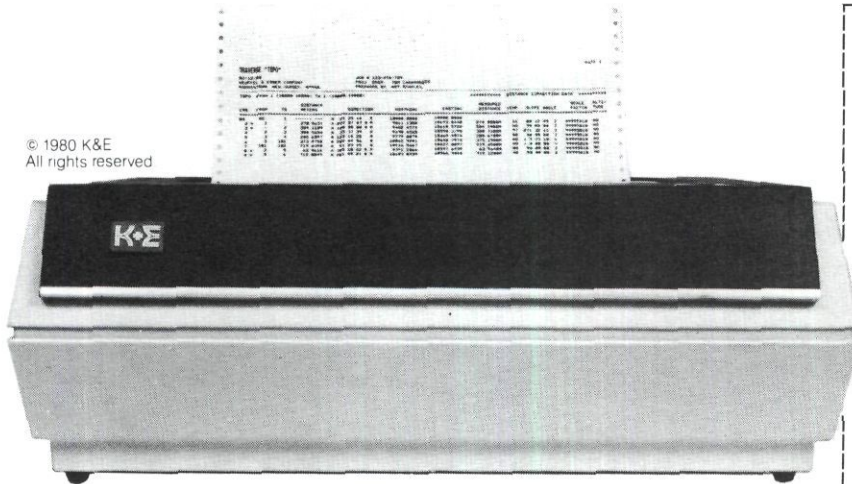
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Most men and women seriously interested in starting their own business are eligible to apply — including those who already own a business and need capital fast for expansion...or to stay afloat...even if they've been flatly refused by banks and turned down elsewhere! Yet, too, many never qualify, simply because they do not know how to “properly” prepare the loan application...

In order to help those people applying for these guaranteed and direct loans fill out their loan applications the “right way,” ICC Business Research, through its diligent compilation and research efforts, has successfully assembled and published a comprehensive, easy-to-follow seminar manual: The Money Raiser's Guaranteed and Direct Loans Manual, that will quickly show you practically everything you'll need to know to prepare a loan application to get federally Guaranteed and Direct Loans.

Here are just some of the many important benefits the Money Raiser's Guaranteed and Direct Loans Manual provides you with:

- a completely filled in sample set of actual SBA loan application forms, all properly filled in for you to easily follow—helps you in quickly preparing your own loan application the right way. Each line on the sample application forms is explained and illustrated in easy-to-understand language.
- fast application preparation procedures for getting loans for both new start up business ventures and established firms.
- advises you on how to properly answer key questions necessary for loan approval and in order to help avoid having your application turned down—gives you advice on what you should not do under any circumstances.
- what simple steps you take to guarantee eligibility—no matter if you do not presently qualify.
- where you can file your application for fastest processing.

At this point the most important question you want answered is: Just where is all this loan money coming from? Incredible as it may sound—these Guaranteed Loans, Direct Loans...and Immediate Loans are indeed available right now — from the best, and yet, the most overlooked and frequently the most ignored and sometimes outright ridiculed...“made-fun-of” source of ready money...fast capital, in America — THE UNITED STATES GOVERNMENT

Of course, there are those who upon hearing the words “UNITED STATES GOVERNMENT” will instantly freeze up and frown and say:

“...only minorities can get small business loan money from the government!”

Yet, on the other hand (and most puzzling) others will rant on and on and on that:

“...don't even try, it's just impossible — all those Business Loans Programs are strictly for the Chryslers, the Lockheeds, the big corporations...not for the little guy or small companies” etc

Still there are those who declare:

“...I need money right now...and small business government loans take too darn long. It's impossible to qualify. No one ever gets one of those loans.”

Or you may hear these comments:

“...My accountant's junior assistant says he thinks it might be a waste of my time!” “Heck, there's too much worrisome paperwork and red tape to wade through!”

Frankly — such rantings and ravings are just a lot of “bull” without any real basis — and only serve to clearly show that lack of knowledge...misinformation...and not quite fully understanding the UNITED STATES GOVERNMENT'S Small Business Administration's (SBA) Programs have unfortunately caused a lot of people to ignore what is without a doubt — not only the most important and generous source of financing for new business start ups and existing business expansions in this country — but of the entire world!

Now that you've heard the “bull” about the United States Government's SBA Loan Program — take a few more moments and read the following facts:

- Only 9.6% of approved loans were actually made to minorities last year
- What SBA recognizes as a “small business” actually applies to 97% of all the companies in the nation
- Red tape comes about only when the loan application is sent back due to applicant not providing the requested information...or providing the wrong information
- The SBA is required by Congress to provide a minimum dollar amount in business loans each fiscal year in order to lawfully comply with strict quotas. (Almost 5 billion this year)

Yet, despite the millions who miss out — there are still literally thousands of ambitious men and women nationwide who are properly applying — being approved — and obtaining sufficient funds to either start a new business, a franchise, or buy out or expand an existing one. Mostly, they are all just typical Americans with no fancy titles, who used essentially the same effective know-how to fill out their applications that you'll find in the Money Raiser's Guaranteed and Direct Loans Manual.

So don't you dare be shy about applying for and accepting these guaranteed and direct government loans. Curiously enough, the government is actually very much

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interested in helping you start a business that will make a lot of money. It's to their advantage — the more money you make the more they stand to collect in taxes. In fiscal 1981, our nation's good old generous “uncle” will either lend directly or guarantee billions of dollars in loan requests, along with technical assistance and even sales procurement assistance. Remember, if you don't apply for these available SBA funds somebody else certainly will.

Don't lose out — now is the best time to place your order for this comprehensive manual. It is not sold in stores. Available only by mail through this ad, directly from ICC Business Research, the exclusive publisher, at just a small fraction of what it would cost for the services of a private loan advisor or to attend a seminar.

For example: Initially, this amazing Guaranteed and Direct Loans Manual was specially designed to be the basis of a Small Business Loan Seminar — where each registrant would pay an admission fee of \$450. But our company felt that since the manual's quality instructions were so exceptionally crystal-clear that anyone who could read, could successfully use its techniques without having to attend a seminar or pay for costly private loan advisory assistance services.

Therefore, for those purchasing the manual by mail, no 3 day class, no course and accommodations are required. And rather than \$450 we could slash the price all the way down to just a mere \$35 — a small portion of a typical seminar attendance fee — providing you promptly fill in and mail coupon below with fee while this special “seminar-in-print” manual offer is still available by mail at this relatively low price!

Remember, this most unique manual quickly provides you with actual sample copies of SBA Loan application and all other required forms—already properly filled in for you to easily use as reliably accurate step-by-step guides—thus offering you complete assurance that your application will be properly prepared and thereby immediately putting you on the right road to obtaining fast, no red-tape loan approval

GUARANTEE #2
Even after 15 days — here's how you are still strongly protected — if you decide to keep the manual — and you apply for an SBA Loan anytime within 1 year...your loan must be approved and you must actually receive the funds or your money will be refunded in full

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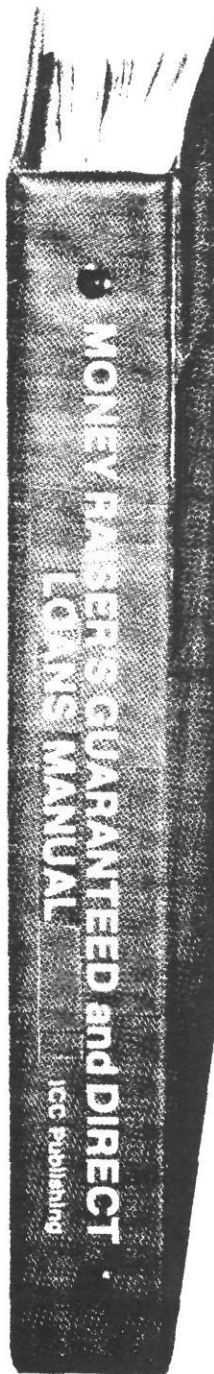
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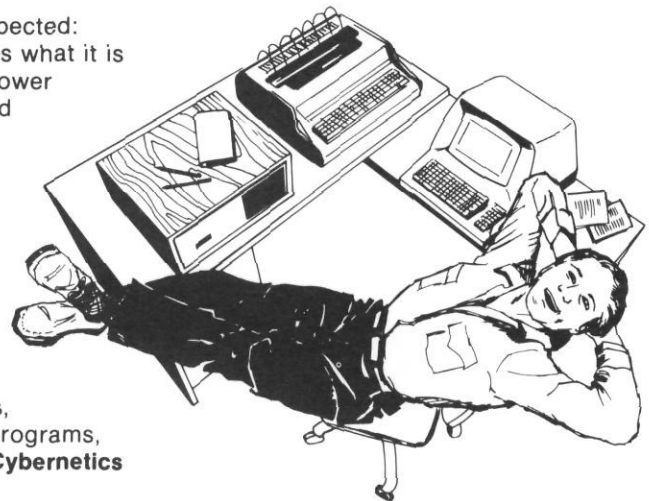
If you buy the H-P 85, you may find the available memory too small to fit many larger programs that are developed for special applications. You may tire of a screen that does not have enough columns to show a complete letter or form. You may be appalled at the cost of extra equipment you may want in the future, and the lack of incompatibility with equipment developed by other manufacturers. And, most of all, you may be disappointed because you cannot change any of the programs for your particular application or surveying style.

If you buy one of the "fly by night" systems, you may find that the programs run like they were written by an amateur programmer, or someone who does not think like a surveyor. You will probably find the supplier is selling a hobby-grade computer, and not a business grade computer. You may find the printer is a cheapo one, that takes special paper, or prints out unreadable text.

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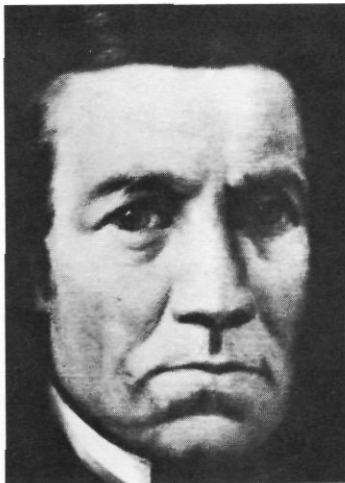


Photo from a portrait of William A. Burt in Michigan Historical Society Museum, Lansing Michigan (by J. S. Burt).

THE SEARCH FOR AN ANCESTOR: PIONEER SURVEYOR WILLIAM A. BURT

By John S. Burt

When California's Gold Rush of '49 created an urgent need for surveys in the West, William Burt's solar compass became the required instrument for running the lines. The Commissioner of the U.S. General Land Office called it the only instrument that could be depended upon in California and Oregon to ensure accurate results at a moderate cost. So why did its inventor allow his patent rights to expire or fail to patent its many improvements?

William Burt also invented America's first typewriter, in 1829, but what recognition is given today to this historical achievement? And why didn't Burt and the members of his surveying party get rich from their discovery of the Marquette iron range in Upper Michigan?

These were just a few of the questions that occurred to me when the Bicentennial arrived a few years ago. At that time my ancestor was as unfamiliar to me as the surveying profession, but today I have great appreciation for both his profession and the contributions he made to it. As youths, my brothers and I had heard about this man who had invented a compass and a writing machine, although nothing really registered ex-

cept the knowledge we weren't independently wealthy from his efforts. But during this period when many Americans were caught up in the "Spirit of '76", I pulled down from above the rafters in our garage a dust-covered box containing old family records. Two frail notebooks, the pages bound with string, were filled with genealogical data compiled by my grandparents. It appeared that much of the information I sought was here all along, waiting to be discovered. There were family trees, recollections of relatives, war records and tombstone markings all dutifully copied down. There were biographical sketches on William Austin Burt, one written by my great-grandfather, Horace Burt, in connection with Burt's nomination into New York University's Hall of Fame. Before I knew it, several hours had passed in reading through the books, but several questions remained to be answered. The decision was made to add to the items in the box and compile a collection of material to form the basis for a complete story about William Austin Burt. The search was on.

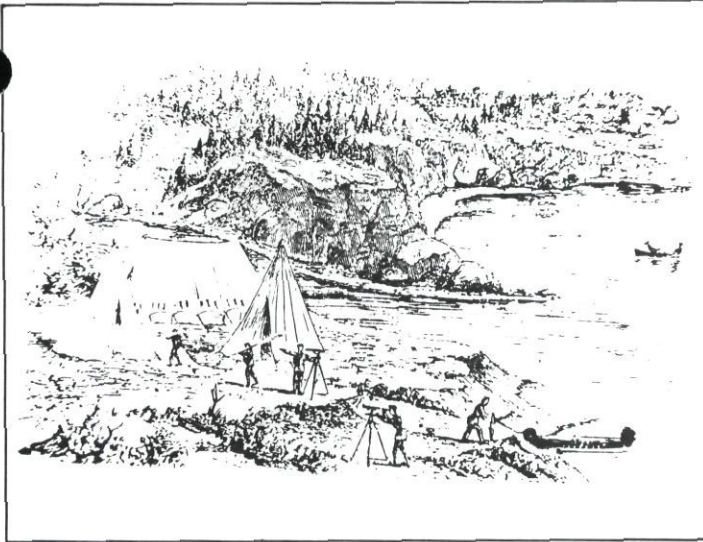
I found that this line of Burts had been in Massachusetts over 150 years when William Austin was born in Petersham in 1792. Richard Burt had sailed with his father from England about 1635, settled near Taunton and later became a local surveyor. By the age of 14, young William had taught himself the principles of mathematics, astronomy and navigation. Like many children of that era, he received limited formal education. At night he studied by the light of a burning pine knot, and during the day he often read from books set in a special holder he devised to read and work at the same time. He dreamed of being a sea captain, but discovered his knowledge could be applied to the land as well. With a quadrant he had built, he determined the latitude of his father's farm. At the age of 18, he bought a broken compass, repaired it and made his first survey near East Aurora, New York.

Just before the War of 1812, in which Burt had served two tours of duty, the General Land Office was established within the U.S. Treasury Department to coordinate all public

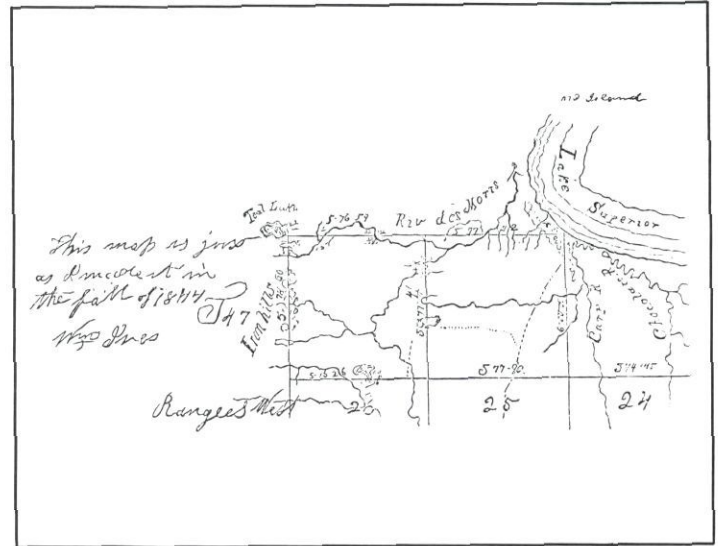
land transactions. In later years William Burt became well-known to the personnel of this office.

On the 4th of July, 1813, Burt married Phebe Cole, a former neighbor from Broadalbin, New York. He served as a Justice of the Peace and a school inspector, but when a business partnership with his father-in-law failed, he became restless. In 1817, he took a two month trip into the Midwest, as far as St. Louis, and returned home through Michigan territory. One section, which he described in his diary as "poor land", had been abandoned by surveyors attempting to establish the southern point of the Michigan Meridian the year before. Edward Tiffen, then in charge of surveying the two million acre tract, reported that the land was not worth the expense of surveying it. Burt could not have imagined that 23 years later he would establish the northern tip of that same meridian. When he returned to the Michigan Territory in 1822, looking for a job in the U.S. public land surveys, there were already more applicants than jobs available. But he purchased land and, in 1824, moved his growing family to a small settlement in Macomb County.

He continued to build mills, a trade begun in New York, and soon became well-known in the community. In 1826, his neighbors elected him to serve on the Michigan Territorial Legislature, but he soon found the heavy burden of correspondence more than he could keep up with. To solve the problem he conceived the idea of a writing machine. With parts forged in his workshop and type supplied by the editor of a Detroit newspaper, he built America's first typewriter and received a U.S. patent for it in 1829. The mechanism was housed in a rectangular wooden box, about one foot deep, and was the first of the type-sector design, similar to the toy typewriters of this era. Although the process was painfully slow, their promotional efforts generated some interest. Attempts to sell out the patent rights were unsuccessful, and there was neither sufficient capital nor facilities to manufacture the machine. As a result, the project was dropped, and Burt turned his attention to supporting his



1873 illustration of Burt's surveying party camped on the shore of Lake Superior in upper Michigan in 1844. (From C. Tuttle, *General History of the State of Michigan*), Ros Tyler & Co., 1873.



William Ives map showing the location of the Iron Hills, where Burt's surveying party discovered the rich Marquette iron range in upper Michigan in 1844. (From the *Geological Survey of Michigan* 1873)

wife and five boys. He was already 38 years old, and had yet to establish his career.

There were as many as 80 applicants for the few surveying jobs available in 1831, but Burt was elected Macomb County surveyor, and later appointed district surveyor by the territorial governor. In his spare time he served as postmaster and Macomb County Circuit Court Judge, and throughout his life he was referred to as "Judge Burt." He soon gained a reputation with the U.S. Surveyor General as "honest and intelligent" and "well acquainted with surveying." On November 23, 1833, he was appointed a U.S. Deputy Surveyor, and given a contract with instructions that better work was expected of him than "was heretofore practised in the north part of Michigan." It was an unpleasant beginning and a financial loss for Burt, as heavy snow, mosquitoes, and swamps delayed completion until the following season. But he had proven his capabilities, and the Surveyor General wrote the Land Commissioner that, "Your friend, Mr. Burt, proves to be an excellent surveyor. For the first contract he has returned the most satisfactory work I have yet met with."

His contract in Wisconsin territory was even more challenging, but his solution to the problems encountered brought him fame as an inventor and

a surveyor whose accurate work became a standard for others to follow. Perplexed by the fluctuating needle in his compass, Burt reported that "intersections varied as much as 100 links." He wrote to his wife, Phebe, in May, 1835, that "it is most annoying, this inability as yet to discover a method for doing away

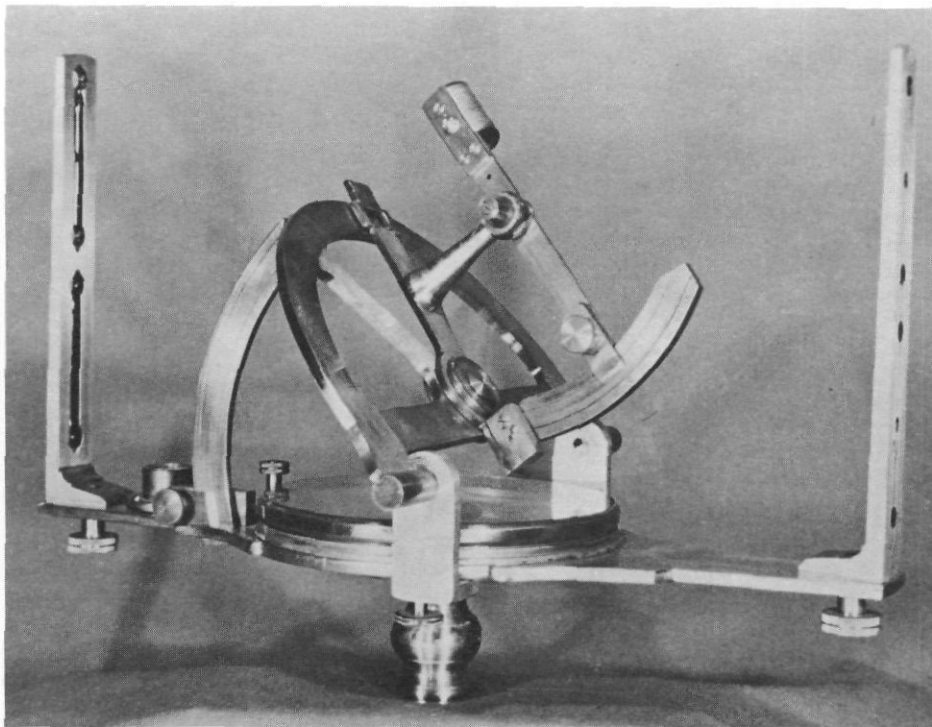


Phebe Cole Burt, 1792-1864, wife of William Austin Burt. His "Dear Companion."

with this difficulty or the cause thereof." But that summer, by applying his scientific knowledge and creative mind, he conceived a working model

of a solar compass that used the sun as a fixed reference. The first model was built for \$25 by William J. Young of Philadelphia, who continued to manufacture the solar compass for many years. It was originally called a "variation compass," since Burt thought its main purpose would be to locate the true meridian and determine the variation of the magnetic needle. Burt soon discovered the lines could be run quicker and more accurately with the solar compass. Its principles and merits were tested by a committee of the Franklin Institute, in Philadelphia, and Burt was awarded a Scott's Legacy Medal and premium of twenty dollars. The new invention was first used by his son, Alvin, near Milwaukee and, on February 26, 1836, it received a U.S. patent.

During the next twenty years, William Burt and his five sons (who all became U.S. Deputy Surveyors) established a reputation for their accurate work on the U.S. public land surveys. Burt's survey of the Fifth Principal Meridian, in 1836, became the basis for all of Iowa's maps and land descriptions. When the Upper Peninsula was added to Michigan, following a boundary dispute, Burt was sent into this dense wilderness to conduct the linear surveys. In 1840, he extended the Michigan Meridian north of the Straits of Mackinac, and established the northern point. (To-



One of the two replicas of Burt's original 1836 model solar compass, manufactured by Gurley in 1961 for the Smithsonian Institution.

day, on this site, a monument honors the event and, just below the Straits in Lower Michigan, Burt Lake State Park bears his name.)

In 1841, Burt carried out an experiment under Geologist Douglass Houghton's contract that combined both the linear and geological portions of the Upper Michigan surveys at considerable savings. Houghton's Geological Report noted the existence of iron ore did not appear to be of practical importance, but Burt's surveying party proved his assumption grossly inaccurate. In September, 1844, while attempting to close some township lines in Marquette County, they made a discovery that would have a significant impact on the economic development of Michigan and the nation. While using the solar compass, Burt noticed the needle spinning wildly in all directions, "nearly destitute of magnetism." When he called out, "Boys, look around and see what you can find," they each brought back large chunks of iron ore. They had found the rich Marquette iron range, but Burt simply recorded "spathic and hematite iron ore abound on this line," and went on surveying. More important than the wealth that lay in the ground, the discovery had confirmed to Burt the value of his solar

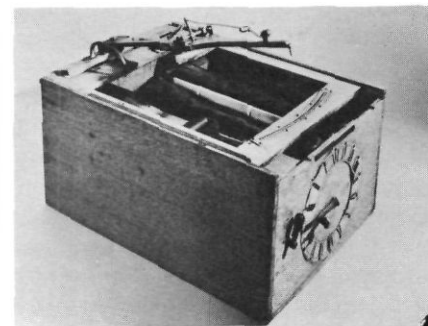
compass. It is surprising that none of the surveyors ever attempted to stake a claim, although it was more than a decade before any profits were realized from the mining operations that first began in 1845.

William Ives, compassman in Burt's surveying party in Upper Michigan, took the solar compass to Oregon in 1851, when he initiated the survey of the Willamette Base Line. Burt's invention was required on all of the lines and was, according to the Surveyor General, "the only one that can be used to advantage in the surveys on this coast." Ives had also been with Burt when he completed the northern section of the Michigan-Wisconsin border in 1847. Burt received \$18.00 per mile, a record payment in the Michigan public land surveys. The line was resurveyed more than 80 years later by a cadastral engineer who located a bearing tree with Burt's name and marking still inscribed. He credited Burt's original line with being one of the best of the early surveys.

As early as 1842, William Burt was called on to check the work of other surveyors when fraud or inaccuracies were suspected. Sometimes it meant reporting errors in work performed by his friends, but his integrity was never questioned. In one incident,

Burt had been surety for work he was later asked to inspect. When the examination uncovered evidence of fraud, Burt honored his bond by making a correctional survey at a personal loss of \$3,000. On another occasion, Burt found that fraud had been performed by a former chief topographer for the state geological survey team. By the time it was discovered, however, the surveyor had gone off to California, in search of a fortune in gold that never materialized.

The discovery of gold in California accelerated the need for government surveys between the frontier settlements and the Pacific Coast. Much of the area contained mineral lands, particularly in California and Oregon, and Burt's solar compass would become indispensable for running the lines. The patent on his invention was about to expire when Burt went to Washington, D.C., in December, 1849. He planned to obtain a patent on the many improvements made since 1836, and anticipated "no difficulty" in doing so. Unfortunately, Land Office officials and several congressmen had other ideas. They urged him to "sell out" his patent rights by petitioning Congress for compensation, while allowing his patent to expire. He was asked to write out his views on the best method of conducting surveys and preventing fraud in the future, and he knew full well the important role his solar compass would play. He was also aware that the \$350 pricetag had already limited sales to those surveyors who couldn't do the job without it. Since its use would be largely confined to the Government surveys, the Land Commissioner no doubt



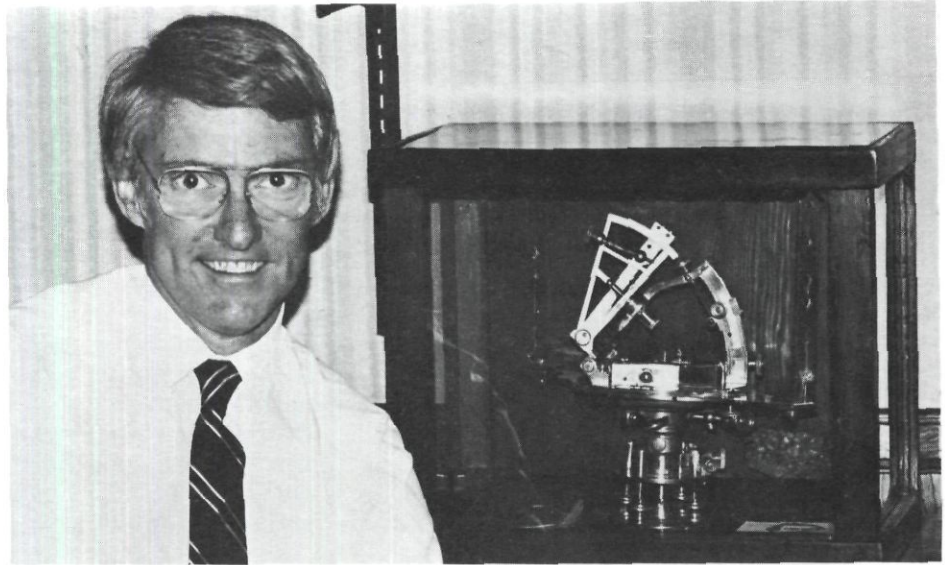
Replica of W. A. Burt's typographer, America's first typewriter, built by Austin Burt in 1893, displayed in Smithsonian Institution.

reasoned that future sales of the instrument depended on their regulations, and therefore their control should be free of royalty payments to the patentee. To a man of Burt's dedication, this appeal must have sounded convincing, particularly since the assurance that Congress would approve his petition came from men he knew and trusted. Unfortunately, the precedent of awarding compensation to a patentee for the use of his invention in Government work had not been established. Burt left Washington without taking action on his patent, in exchange for the assurance he would be compensated by Congressional action and the understanding that the solar compass would be used on all the U.S. public land surveys.

The Commissioner of the General Land Office was anxious to test Burt's solar compass, in 1852, and selected James Marsh to use it on the 260 mile Iowa-Minnesota boundary line. Marsh would run the preliminary line ahead of Captain Andrew Talcott of the Topographical Bureau, and their results would be compared. Burt's solar compass "stood the test most admirably," according to the Surveyor General, and Marsh's line was virtually identical to Talcott's, but at a cost of \$6,500 instead of the \$32,000 spent by the government surveyors.

So the solar compass was adopted for general use in the U.S. public surveys, but the \$20,000 compensation for the inventor never materialized. Several times either the House or Senate passed a bill recommending this action, but they never concurred during the same session. In 1857, a disappointed William Burt again petitioned Congress to at least grant him a patent for the improvements he made to his compass. When it was introduced in the House in February, 1858, but not acted upon, it was the final blow to Burt's long battle for a just compensation. Within three weeks he suffered a severe heart attack from which he never fully recovered. He died August 18, 1858. His heirs continued to petition Congress for compensation until 1900, but their efforts were unsuccessful.

In his final years, Burt added to his accomplishments. In 1851, he ex-



Author John S. Burt, great-great-great grandson of William Austin Burt, shown with an improved Burt solar, manufactured by W. & L. E. Gurley, and loaned to the Burt collection by the BLM from their supply of solars in the Portland, Oregon office.

hibited his solar compass at the London World's Fair and received a prize medal and certificate from Prince Albert for his unique invention. In 1852, he helped survey the route of the Soo Canal and, as Chairman of the Soo Canal Committee in the Michigan Legislature, he led the fight to ensure passage of the bill authorizing construction of the canal. In 1855, he authored "A Key to the Solar Compass and Surveyor's Companion" that contained a wealth of practical information to help a surveyor use the solar compass and prepare for a long survey into the wilderness. He also invented an Equatorial Sextant, patented in 1856, that incorporated the principle of his solar compass into an instrument for use on ships.

In an unfinished autobiography, Burt wrote that he had resolved at an early age to use his abilities to render something profitable to the world or mankind, while it afforded him a decent living. Unquestionably, he succeeded in this goal, but it is a sad conclusion that he was never compensated by the Federal Government for use of his solar compass in the public land surveys.

It is with considerable pride that I have continued to research the life and accomplishments of William Burt, in hopes that a book will someday be written. The Burt collection has grown, thanks to the generous assistance and contributions from

relatives, surveyors and historians. It includes a Burt solar compass, manufactured by Gurley, that is on loan from the Bureau of Land Management. Material found in museums and libraries throughout California, Iowa, and Michigan has uncovered much of the story. But I welcome any historical information about William Burt that readers may wish to share, particularly personal recollections in using the solar compass. There has been little written about the early government land surveyors, and the story of William Austin Burt, as a distinguished example, is long overdue.

*Editor's Note: Appearing in this edition of **The California Surveyor** are two articles related to this cover story. Under **Perspectives** is a description by F.D. Uzes of the operating principles of the Solar Compass, and under **Techniques** is Bert Mason's discussion of the applications of solar observations in modern surveys.*

John S. Burt, author of this cover story, welcomes information from readers regarding W.A. Burt and the Solar Compass, and encourages reprinting of this article in other publications. Readers wishing to share information with Mr. Burt may contact him at 1519 E. Concord Ave., Orange, CA 92667.

Perspectives

OPERATING PRINCIPLES OF A BURT'S SOLAR COMPASS

by F.D. Uzes

About the Author: F.D. "Bud" Uzes is employed by the California State Lands Commission, where he is in charge of surveying, mapping and related boundary determination work. He is the author of *Chaining the Land*, a book on California's surveying history, and is co-author of part of Curtis Brown's *Boundary Control and and Legal Principles*. He is also author of a recently published price guide for antique surveying instruments and books.

Mr. Uzes is a licensed land surveyor, Chairman of the Surveyors' Historical Society and an avid collector of historic surveying artifacts.

The Burt Solar Compass, invented nearly a century-and-a-half ago, was for several decades the most important surveying instrument used in subdividing government lands. Its mechanism functions somewhat on the same principle as the much older equinoctial sundial, except the meridian is the component desired

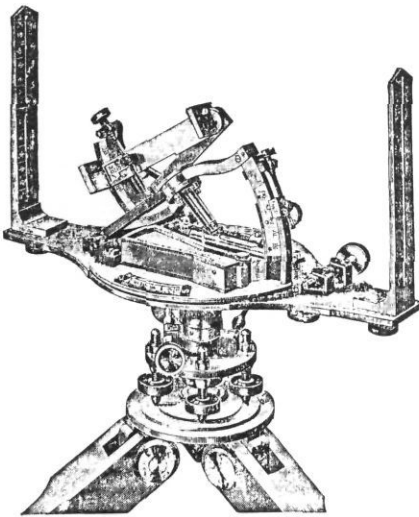


Illustration A.

rather than time. Through use of its simple yet ingenious principles, the solar compass short-cuts the inconveniences of other methods by solving the PZS astronomical triangle mechanically. Finding north with William Burt's device is almost as simple as lighting a match with a

magnifying glass.

The solar compass (Illustration "A") is similar in appearance to a large surveyor's compass to which has been added the Burt's solar mechanism. One key element of the solar unit is a small SPINDLE which, when the instrument's horizontal circle (similar to a transit's) is set at $0^{\circ}00'$, lies in the same vertical plane as the upright sighting vanes. Connected to the spindle is a revolving limb to which is hinged a moveable bar for sighting the sun. The sighting bar is adjusted by a slow-motion screw, and can move within the limits of $+23\frac{1}{2}^{\circ}$ to $-23\frac{1}{2}^{\circ}$, relative to the equator. This is the range of declination through which the sun varies during each year.

Before proceeding further into the operation of the instrument, it should be mentioned that although the instrument is set up on the earth's surface, its principles of operation are treated as if it were located at the earth's center.

Shown in Illustration "B" is a partial Burt solar mechanism located at the earth's center. Note that with the spindle directed in a north-south alignment along the earth's axis, the connected limb revolves in the equatorial plane, and the sighting bar is adjusted to follow the path of the sun at any value of declination.

When the instrument's sights become aligned on the meridian, the following three elements must also be accurately positioned as to their respective settings:

1. The **LATITUDE ARC**, which is set to the co-latitude of the observer. The graduations are reversed, however, so that the value of the observer's latitude is the apparent setting made.

2. The **DECLINATION ARC**, which is set according to values given in an ephemeris, according to the date and time of the observation.

3. The **HOUR CIRCLE**, which requires no accurate presetting as do the other two arcs. Merely pointing the lens bar at the sun sets the hour circle, which is graduated in units of time.

Note in Illustration "C", the latitude arc is set so as to bring the

spindle parallel to the earth's axis. Correspondingly, the limb attached at right angles to the spindle revolves parallel to the equatorial plane.

While the unit is obviously offset from its considered position at the center of the earth, no correction is necessary because the eccentric reduction is insignificant considering the accuracy capabilities of the instrument. As the value of the sun's declination (taken from an ephemeris) is set on the declination arc, the sighting bar is correspondingly brought to a position pointing directly at the sun, provided the bar is rotated to correspond with the correct value of sidereal time as indicated on the hour circle. This last setting is simply done by turning the

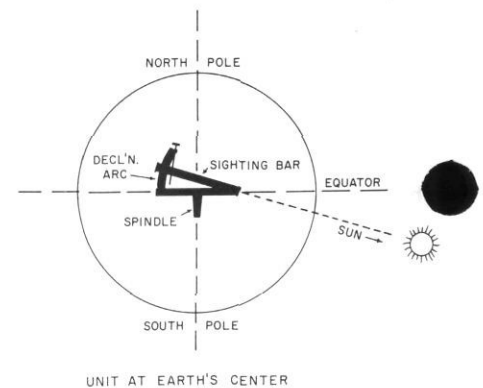


Illustration B.

sighting unit until the sun's image focuses through a small lens onto a silver target.

In actual operation, the latitude and declination values are predetermined and set on their respective arcs. Aligning the instrument to the meridian is accomplished by alternately rotating the combined revolving limb and sighting bar, and the alignment of the instrument's sights. Both of these components can be very closely preset using an approximation of sidereal time, and the magnetic needle. Turning the instrument as a unit causes a raising or lowering of the sun's image on the target, as well as a sideways movement. If the focused dot of light fall off the side of the target when turning the instrument, the sighting limb is rotated so as to again pick up the image. Once the sun's image is cor-

rectly located onto the target, the instrument's sight will be correspondingly located in a true north-south alignment. Any additional rotation of the instrument will result in the sun's image moving off target.

Care must be taken in manipulating the revolving limb so that the image of the sun appearing on the target results from a direct line of sight, and is not reflected off the sighting bar. The latter will happen on occasion, and leads to slightly erroneous results. Also, correct adjustment of the unit is very important and must be regularly checked. There are prescribed procedures for this, which include comparison against a true meridian determined by observations on the pole star.

One other factor of concern during operation of the instrument is the time the observations are made. This element has a detrimental affect upon the instrument's accuracy during both very early and late hours through increased refraction, and during midday by an unfavorable rate-of-change condition.

At midday the sun's relative change in azimuth is much greater than the rate-of-change in altitude, and any small errors either in adjustment or in setting the arcs are greatly multiplied. It is best not to use the solar mechanism for about a three-

hour period, straddling the noon hour. As for early and late hours, refraction varies from almost 34 minutes at the horizon, to zero at the zenith. Halfway between, the correction is about one minute. Generally,

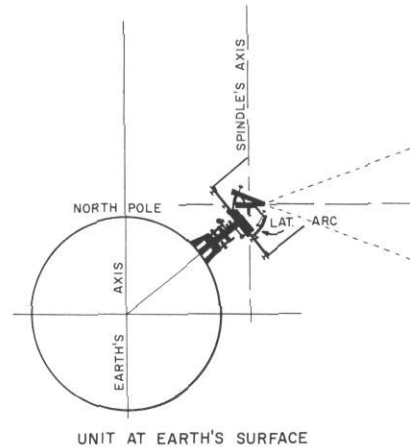


Illustration C.

it is not considered wise to work when the correction is more than 10 minutes. Taking the correction into account is a simple matter, however. The target on the sighting bar is a square, silver plate with double crossed lines engraved in the familiar form of a tic-tac-toe game. Two or three additional horizontal lines are added below the lower horizontal line, separated from one another by the equivalent of 5 minutes of angle.

These lower lines enable a surveyor to compensate for the effect of refraction by interpolating the sun's position relative to the lines to correspond with the determined value of refraction.

In the solar transit, unlike the compass, the value of refraction correction must be figured into the basic setting of the declination arc.

While BLM's current Manual of Surveying Instructions describes the technique of plotting a graph to figure the refraction correction, the old timers didn't bother with such elaborate means. Most undoubtedly just "allowed-a-little," while others would refer to a simplified table, one of the best appearing in James Underhill's, "Mineral Land Surveying."

Evaluations have been made from time to time on the accuracy of the Burt solar unit. When the instrument is in good adjustment, tests show any single observation has an uncertainty of about one or one-and-a-half minutes of angle.

Operating one of the old "Northfinders" is a unique and rewarding experience, instilling in the user a greater understanding of outmoded surveying techniques, and an appreciation of William Burt's ingenuity.

Calendar

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| July 25 | CALIFORNIA LAND SURVEYORS ASSOCIATION quarterly Board of Directors meeting to be held at the Grosvenor Airport Inn, 380 South Airport Blvd., So. San Francisco, CA 94080. |
| August 9 - 12 | NATIONAL COUNCIL OF ENGINEERING EXAMINERS (NCEE) Annual meeting to be held at Williams Plaza, Tulsa, OK. |
| September 8 - 12 | ASP/ACSM FALL 1981 CONFERENCE to be held at the San Francisco Hilton, San Francisco, CA. For further information contact Lee W. Aggers, USGS, 345 Middlefield Road, MS 31, Menlo Park, CA 94025 - 415/323-8111, Ext. 2426. |
| October 17 | CALIFORNIA LAND SURVEYORS ASSOCIATION quarterly Board of Directors meeting to be held at the Grosvenor Airport Inn, 380 South Airport Blvd., So. San Francisco, CA 94080. |

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| March 17 - 19 | CLSA ANNUAL CONFERENCE, Town & Country Hotel, San Diego, CA. |
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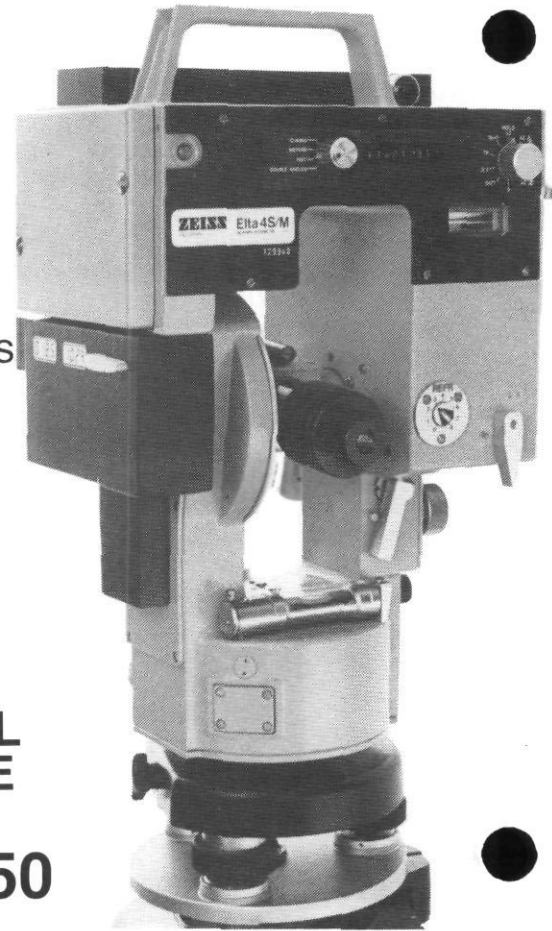
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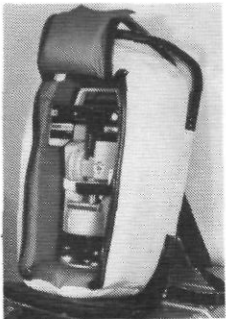
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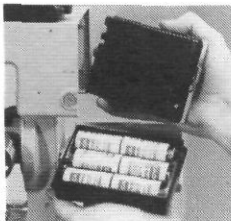


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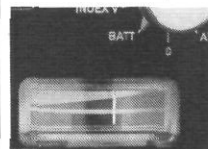
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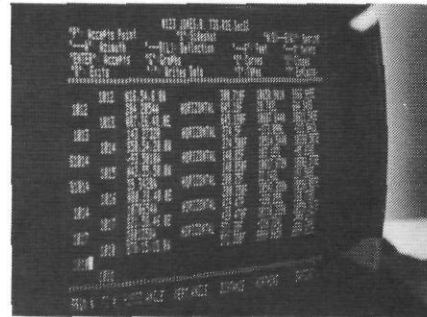
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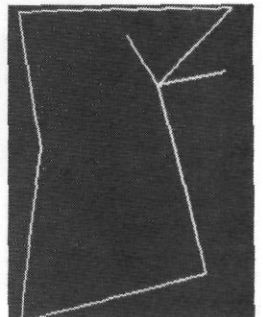
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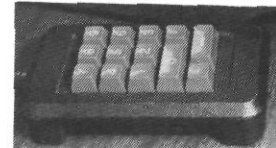
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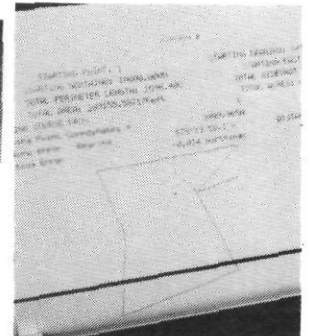
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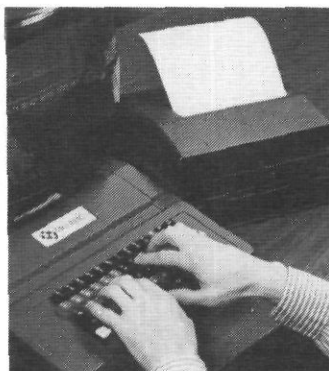
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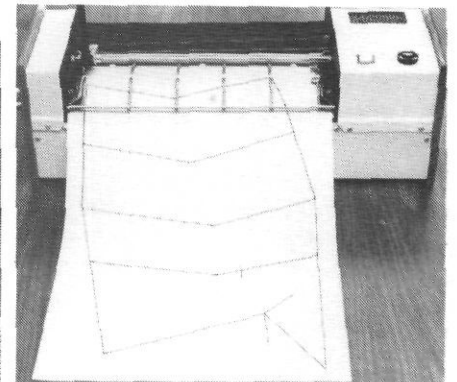
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Techniques

SUN SHOTS

— by BERT MASON JR., P.L.S.

Editor's note: Bert Mason Jr. was, in 1959, one of the Charter Members and instrumental in the forming of P.L.S.O. He was also the first editor of the "Oregon Surveyor." Bert heads his own surveying business in Oregon City.

Reprinted from Vol. 3, No. 1 of the Gem State Surveyor.

Let's talk about sun shots for a minute. Or, if you want to be formal, we can call them solar observations. Whenever the subject comes up, the surveying profession—especially the younger segment—seems to be scared to death of sun shots. When asked why they avoid sun shots, surveyors have more answers than a dog has fleas: they're not accurate enough; they take too long; they're too complicated; they didn't teach them in school; we don't have tables; we can't carry accurate time; we use assumed bearings; with modern instruments we don't make mistakes, so we don't need checks.

Let's take these excuses in order. What kind of accuracy do we need in the environment where solars are most useful—rural and woods surveys? A minute of arc subtends 1.5 feet per mile. The books tell us that solars are accurate to ± 2 minutes—but read on. They then say that multiple observations will increase the accuracy considerably. The ± 2 -minute figure is based on a single D/R observation with a one-minute transit. Accuracy varies with the number of observations, the care taken, the time of day and time of year. Repeatability of results is what counts. In our own practice, we observe three direct followed by three reverse with the sun in diagonally opposite quadrants of the field, using an instrument with a vertical circle bubble and a micrometer reading to either one or ten seconds. Our experience indicates a repeatability of about 20 seconds, with occasional variations of up to one minute. Over the years, in woods traversing, we have found that we measured about 40 courses per mile, with spongy

setups, courses as short as 40 feet, wind, rain, sleet, widowmakers, yellowjackets and other natural obstacles contributing to angular misclosures. A solar, accurate to the nearest minute, every half mile has contributed much to our peace of mind.

Do solars take too long? Assuming he is already set up, a very ordinary transitman, keeping his own notes, should complete six observations in less than ten minutes. With a little practice and a notekeeper, he should be finished in five minutes. The computations, using logs, used to require from 15 to 30 minutes; but now, once the observations have been reduced to mean angles and the declination of the sun has been taken from the ephemeris, most electronic calculators will yield an azimuth in less than a minute.

As for complexity, any ordinary transitman can master the field procedure in a couple of dry runs. The solar observation is in reality one of the simplest problems in surveying. Solars should be taught in school; but if they're not, no sweat. The K & E pocket ephemeris has complete instructions for the observation and the computation on just six small pages.

Not having tables is no excuse. The K & E pocket ephemeris is available for one dollar from any K & E dealer. It fits in a shirt pocket and contains complete instructions and tables for any celestial observation the land surveyor will ever encounter.

The accurate time excuse is a real thigh slapper. I once knew a very bright and reputable logging engineer who told me that he never used solars to control his woods traverses because he had no means of carrying accurate time—that his only chronometer was a \$5 alarm clock in his tent. Since he was ten years my senior (and my boss), I didn't tell him what I thought of his technique; but I will remind you of Si The Surveyors's comment some years ago in The Oregon Surveyor that in June and

December a good calendar is sufficient for timing solars. A quick look at the formula for reduction of solars will reveal that the ONLY use of time is to obtain the declination of the sun at the time of observation. During 1980, at no time of the year will the declination change more than 59 seconds per hour. On the 21st of June and December there is no change whatsoever; and for 5 days each side of those dates the change per hour does not exceed six seconds. How important is accurate time? Having a computer handy which zapped out the results in seconds, I ran the same observations through for February 5, 1980, March 20, June 21, June 30, August 5, and September 22. I then ran the same data through using an error of ONE HOUR in the time of the observation. The errors induced by the ONE HOUR ERROR were:

February 5	0°01'43"	March 20	0°01'35"
June 21	0°00'00"	June 30	0°00'13"
August 5	0°00'00"	September	0°01'33"

So much for the accurate time myth! Then why do I observe the time of each pointing of the sun to the nearest second? To check the QUALITY of the observations! Besides, this LCD electronic watch reads that close. Let's take the four intervals between the three direct observations and the three indirect observations:

	H angle change	V angle change	Time change
1	0°16'41"	0°09'16"	0 ^h 01 ^m 14 ^s
2	0°17'17"	0°09'28"	0 ^h 01 ^m 20 ^s
3	0°12'01"	0°07'01"	0 ^h 00 ^m 53 ^s
4	0°11'16"	0°05'27"	0 ^h 00 ^m 49 ^s

Note that in every case both the horizontal change and the vertical change are directly proportional to the time change — there are no blunders. Note also that this inexperienced observer was speeding up considerably in the course of his first solar. It would have been better to have maintained equal intervals, even at the expense of speed. There is no need to hurry in shooting a solar unless the sun is about to pass out of the only hole in the woods.

Continued on Page 30

News from the Board of Registration

CORNER RECORD NO SUBSTITUTE FOR RECORD OF SURVEY

EDITOR'S NOTE: The following is excerpted from the recent opinion of the Attorney General regarding the filing of Corner Records and Record of Survey maps. Due to space limitations we are unable to print the entire text of the opinion.

OFFICE OF THE ATTORNEY GENERAL STATE OF CALIFORNIA

*OPINION OF GEORGE DEUK-
MEJIAN, Attorney General,
RODNEY O. LILYQUIST, Deputy
Attorney General, No. 81-103,
MARCH, 1981.*

THE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS has requested an opinion on the following question:

Does the filing of a corner record pursuant to the Business and Professions Code section 8773 eliminate the need to file a record of survey after the establishment of points or lines pursuant to Business and Professions Code section 8762?

CONCLUSION

The filing of a corner record pursuant to Business and Professions Code section 8773 does not eliminate the need to file a record of survey after the establishment of points or lines pursuant to Business and Professions Code section 8762.

ANALYSIS

The question presented for analysis concerns the relationship between the filing of a "corner record" and of a "record of survey" under the provisions of the Land Surveyors Act (Bus. & Prof. Code §§ 8700-8805).¹ Specifically, we are asked whether the filing of the former obviates the need for filing the latter where "points" or "lines" are newly established. We conclude that under such circumstances, a corner record is not an alternative to the express requirement for filing a record of survey.

A "corner record" is "a written record of corner establishment or restoration" which a "licensed land surveyor or registered civil engineer shall complete, sign, and stamp with

his seal," where the corner has been "found, set, reset, or used as control in any survey by such land surveyor or civil engineer." (§ 8773.)

Significant to our discussion is the fact that not all corner records need to be filed. (Section 8773).

Accordingly, for these specified corners (i.e., public land survey corners), a corner record must generally be filed whenever such corner "is found, set, reset, or used as control in any survey." (§ 8773, subd. (a).)

All other property corners, however, need not have a corner record filed when found, set, reset, or used as control in a survey.²

Additionally, subdivision (b) of section 8773.4 expressly provides [that] no corner record need be filed when [certain circumstances exist].

The statutory scheme for the filing of records of survey is similar to that for the filing of corner records. A record of survey is "a map, legibly drawn, printed, or reproduced by a process guaranteeing a permanent record in black or tracing cloth, or polyester base film, 18 by 26 inches." (§ 8763.)

It is to be particularly noted, however, that not all records of survey need be filed. (Section 8762).

It is thus apparent that only where points or lines are newly established need a record of survey be filed.

Additionally, section 8765 expressly provides that a record of survey need not be filed in [certain] circumstances.

Finally, the Board's rule 465 allows a surveyor or civil engineer to omit filing a record of survey even where the lines are newly established, as long as the "newly established lines can be determined by inspection of a map of record without the use of trigonometric calculations." (Cal. Admin. Code, tit. 16, § 465, subd. (b).)

In construing these statutes, especially sections 8762 and 8773, in order to determine whether a corner record may be filed as an alternative to a record of survey, we are guided by several well recognized rules of statutory construction. Fundamentally, statutes dealing with the same subject matter should be read to-

gether and harmonized so as to carry out the intent of the statutory scheme as a whole. Another principle relevant to our discussion was stated by the Supreme Court as follows: "Under the familiar rule of construction, *expressio unius est exclusio alterius*, where exceptions to a general rule are specified by statute, other exceptions are not to be implied or presumed." Moreover, the Supreme Court reaffirmed the principle that "Where a statute, with reference to one subject contains a given provision, the omission of such provision from a similar statute concerning a related subject . . . is significant to show that a different intention existed."

Applying these rules, we note first that, although somewhat similar in nature, a corner record and a record of survey are not equivalent in scope or significance. Nevertheless, the Legislature has provided for their use as alternatives under expressly limited circumstances. A corner record need not be filed if a proper record of survey is filed and other conditions are met. (§ 8773.4, subd. (b).) On the other hand, a record of survey need not be filed if a corner record is filed (where property corners are reset) and if "the survey is a retracement of lines shown on a subdivision map or parcel map of record, where no material discrepancies with such records are found and sufficient monumentation is found to establish the precise location of property corners thereon." (§ 8765, subd. (d).)

We believe that the Legislature's intent is clearly discernible from the plain language it has used in the statutory scheme. It has provided for corner records and records of survey to be filed as alternatives but only in narrowly defined situations. The factual setting presented for analysis does not come within the legislative enactments allowing for the filing of a corner record as a substitute for a record of survey. Here we do not have the retracement of lines previously established; rather, we have newly established points and lines.

Continued on Page 28

Services

PROPRIETOR'S COUNCIL

The California Land Surveyors' Association has established a PROPRIETOR'S COUNCIL, designed to meet the needs of the private surveying practitioner by providing business education, specialized services, and State and local influences on regulatory agencies.

Among the benefits derived from the PROPRIETOR'S COUNCIL will be a monthly newsletter, modeled upon the needs of the proprietor. This letter is to cover information such as liability, ethics, finance, credit, tax benefits, client relations, business practices, billings, economic trends, contractual practices, accounting, legal, collections, etc.

Specialty speakers such as attorneys, accountants, business consultants, insurance consultants, investment consultants, corporation tax consultants, etc. will be available at quarterly meetings and at training workshops.

Benefits of the PROPRIETOR'S COUNCIL, other than the monthly newsletters and workshops already mentioned, are anticipated to be: Create standard work order form; set up Bureau of Land Management ac-

count; provide a collection service; monitor and lobby for professional business legislation; publish or purchase copies of the Land Surveyors Act; develop a group health program; examine and analyze software of various computers; allow group purchase; advertise used equipment; monitor employment situations; create a hotsheet; provide local liaison or monitoring of regional or local problems by chapters; develop standards of procedures; develop standards of accuracy; provide lobby for local or regional agencies; provide liaison with the Board of Registration regarding disciplinary proceedings; provide accounting consultants, legal consultants, and tax consultants; monitor case law; and many other services as the membership may from time to time direct.

The initiation fee is \$100 and the monthly dues are \$10. Each member will be assigned to one of five regional chapters in the State, by preference. These chapters will have at least one quarterly meeting and one general yearly meeting. The meetings will normally be conducted

on a Saturday so that a brief business discussion can be followed with intensive training by specialists in areas of interest. The chapter's representative shall preside at the meeting and shall constitute one of the five member Board of Directors, which conducts the business of the PROPRIETOR'S COUNCIL. A paid Executive Secretary will execute the direction of the Board.

A copy of the first PROPRIETOR'S COUNCIL NEWSLETTER was mailed to all members of CLSA. If you are not a member of CLSA and would like a complimentary copy of this first newsletter, or if you are a member and did not receive your copy, write to CLSA CENTRAL OFFICE, P.O. Box 9098, Santa Rosa, CA 95405.

In order to become a member of the PROPRIETOR'S COUNCIL, fill out the application form, submit the initiation fee and first year's dues for 1981, and return to the address provided on the membership application form. You will be contacted within a short time as to your chapter meeting location.



CALIFORNIA LAND SURVEYORS ASSOCIATION

CENTRAL OFFICE: P.O. BOX 9098 / SANTA ROSA, CA 95405
PHONE (707) 539-3633

PROPRIETOR'S COUNCIL Membership Application

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City _____ State _____
CLSA Chapter _____
Sponsor's Signature _____

II. FIRM

Name _____
Address _____
City _____
Telephone () _____
County _____
State _____ Zip _____

III. DUES

Initial Membership Charge \$100.00
* 1981 Dues/\$120.00/year _____

TOTAL \$ _____

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 Please bill me Bill my Visa
Credit Card No. _____

Exp. Date _____ Signature _____

*First year's annual dues are prorated from the date of application.

Licensing

MORE ON U.S. GOVERNMENT SURVEYS

Editor's Note: In our Winter Edition (#63) we ran an article entitled "Non-Professionals to Set USFS Boundaries," which describes WFPLS opposition to the U.S. Forest Service's proposal to use non-licensed surveyors to set boundaries separating federal from privately-held land. Directly related to this issue, the following is excerpted from an opinion outlining BLM survey authority. Of particular interest is footnote number 1. Due to space limitations we are unable to print the entire text of the memorandum.

MEMORANDUM

TO: Director, Bureau of Land Management (720)

FROM: Assistant Solicitor, Branch of Realty (DER)

SUBJECT: BLM's Survey Authority with respect to Acquired Lands

This is in reply to your September 5, 1980 memorandum requesting our opinion with regard to the following questions: (1) Under what conditions does the Bureau of Land Management (BLM) have the authority to resurvey federal acquired land; (2) Does state law govern the execution of field and office work pertinent to the resurvey by BLM of the acquired land?

We are of the opinion that BLM may resurvey federal acquired land under the following conditions: (1) If a federal statute authorizes or directs BLM, or the Secretary of the Interior (hereinafter the "Secretary") acting through BLM, to resurvey the acquired land; (2) If the acquired land is, by law, denominated public land under the management of BLM when title to the land is vested or re-vested in the United States; (3) If the Secretary lawfully delegates to BLM the authority of the Secretary to resurvey acquired land under the Secretary's jurisdiction; or (4) If another federal agency having management authority over acquired land, requests BLM to resurvey the land.

We are also of the opinion that BLM surveyors are not required to follow survey standards prescribed by state law, so long as the BLM

resurvey will not affect the bonafide rights of adjacent property owners. If, on the other hand, the rights of adjacent property owners could be affected, the survey standards required by state law should be complied with in executing a resurvey of acquired land.

Turning to your second question, it is settled law that the United States may survey what it owns and thereby establish and reestablish boundaries, but what the government does in this regard is for its own information and cannot affect the rights of owners on the other side of an existing boundary. *United States v. State Investment Co.*, 264 U.S. 206, 212 (1924) (Corrective resurvey of public land boundary) citing *Lane v. Darlington*, 249 U.S. 331, 333 (1919). See, also, *United States v. Weyerhaeuser Co.*, 392 F.2d 448, 451-452 (9th Cir., 1967); *United States v. Reimann* 504 F.2d 135, 138 (10th Cir. 1974). The rule is firmly embedded in federal statutory law pertaining to the resurvey of the original boundaries of the remaining public lands:

The Secretary of the Interior may as of March 3, 1909, in his discretion cause to be made, as he may deem wise under the rectangular system on that date provided by law, such resurveys or retracements of the surveys of public lands as, after full investigation, he may deem essential to properly mark the boundaries of the public lands remaining undisposed of: *Provided*, That no such resurvey or retracement shall be so executed as to impair the bonafide rights or claims of any claimant, entryman or owner of lands affected by such resurvey or retracement. 43 U.S.C. §772.

This statute or, to be more precise, the proviso found in it, protecting private property rights that are governed by state law, implicitly recognizes that state law controls the manner in which BLM resurveys of original survey lines, established under the Public Land Survey System, are to be executed, albeit in instances only where the existing boundary line separates federally owned land from non-federal or privately owned land. *United States*

v. Doyle, 468 F.2d 633, 636 (10th Cir. 1972) (BLM dependent resurvey of national forest boundary in Colorado requiring restoration of a lost quarter corner).¹ However, in its review of the applicable law, the court in *Doyle* emphasized the importance of the BLM survey Manual and the fact that the Manual has been recognized in state court decisions as "a proper statement of surveying principles." *Id.*, at 636-637, n.4. It is also important to note that both the Ninth and Tenth Circuit Courts of Appeal have adopted the view, first enunciated in the state courts, that a resurvey is evidence, although not conclusive evidence, of the location of the original line being resurveyed and have expressly applied this generally accepted rule to the evidentiary status to be given to BLM dependent resurveys. *Id.* at 636; *United States v. Hudspeth*, 384 F.2d 683, 688 n.7 (9th Cir. 1967).

In the case of BLM resurveys of boundary lines originally established by private surveys in accordance with state law, this Department has held previously that a BLM resurvey must be executed in accordance with the survey standards required by state law. *The Indian Community*, 3 IBLA 285, 291 (1971).

In summary, then, as to your second question, we are of the opinion that federal (BLM) survey standards will apply to acquired land resurveys provided that the resurvey is made solely for the information of the United States, or an agency thereof, and is not intended to affect the valid existing rights of adjoining owners. If, on the other hand, an existing boundary is retraced, or is re-established by a resurvey, for the purpose of fixing geographically the legal boundary between federally acquired property and adjoining privately owned property, the survey standards recognized by state law will govern the execution by BLM of the requisite survey work.²

Since your questions were not posed in the context of given factual situations, we have responded in general terms. The particulars of a given situation might conceivably lead to a different legal analysis, although in all likelihood the result

Continued on Page 26

News Digest

BOOK REVIEW

Analysis and Adjustment of Survey Measurements by Edward M. Mikhail, Ph.D., and Gordon Gracie, Ph.D. 368 pages; 92 illustrations; 6" x 9"; Van Nostrand Reinhold; \$28.50.

This book is a modern, step-by-step guide to the process, analysis and adjustment of survey measurements. It begins by introducing the basic concepts of measurement and error, probability and reliability, and moves on through adjustment, probability theory and statistical analysis, including least squares adjustment and applications in state plane coordinate surveys. Of particular interest is a section covering *preanalysis* of survey measurements, which enables one to determine the accuracies required of component measurements in order to meet required tolerances—and thus choose both the equipment and methods to be used—prior to performing any field work.

The book also makes extensive use of matrix algebra, which simplifies calculations and is easily adaptable to computer programming. This book offers a logical, orderly approach to the subject matter, and goes a long way toward taking the mystery out of an often perplexing subject.

MAGNETIC DECLINATION

From The Benchmark, Journal of the New Hampshire Land Surveyors Association

Information about past and present magnetic declination is available from the NOAA. This information includes:

(a) The present declination and annual change (please provide the name of the city or point of interest, and latitude and longitude);

(b) tables of magnetic declination in past years available for each state (the user would then interpolate for a given locality). The information is given at 10-yr. intervals up to 1900 and 5-yr. intervals after that date. These cost \$4.50 for the state or \$60.00 for the entire coterminus 48 states.

(c) tables like the above for specific locations are also produced upon request for \$10.00. Please specify the city or point of interest, and also latitude and longitude. Cer-

tified copies for court presentation can be made.

(d) Site Descriptions of Magnetic Stations (specific locations where magnetic and true meridians have been determined). The descriptions tell where the sites are, how they are marked, and true azimuths to several prominent features. Specify the location of interest and the NOAA will provide the description of the nearest station. The fee is \$2.00.

Make all checks or money orders payable to the U.S. Department of Commerce, NOAA/NGSDC and mail request to:

National Geophysical and Solar-Terrestrial Data Center
EDS/NOAA
Boulder, Colorado 80302
(303) 499-1000, ext. 6521 or
ext. 6478.

UNSTABLE DRAFTING FILM

From the Ohio Surveying News, December, 1980

If you have used drafting film for plan preparation, you should be alerted that certain brands of this film used during the middle 60's are unstable. It has been reported that the matte surface is showing a tendency to chip and flake off, in many cases eliminating critical plan data thereon.

If you were using drafting film during this era, it would be advisable for you to check your files to see if you have defective film. Some firms have reported all that they have found was a clear sheet of plastic with no images left. Manufacturer of this defective film is not known at this time.

If you have had similar experience with drafting film or can pin-point the manufacturer, the possibility of saving many plans and plats would be greatly enhanced by alerting the profession.

A COMMON LAW

From the Hoosier Surveyor, Spring, 1980

It's unwise to pay too much, but it's worse to pay too little. When you pay too much, you lose a little money—that is all.

When you pay too little you sometimes lose everything, because the thing you bought was incapable of doing things it was bought to do.

The common law of business balance prohibits paying a little and getting a lot—it can't be done.

If you deal with the lowest bidder, it is well to add something for the risk you run, and if you do that you will have enough to pay for something better.

John Ruskin, 1819-1900

ON LEGAL DESCRIPTIONS

From Random Lines, Spring, 1981, Newsletter of the Society of Land Surveyors of Iowa

The minute you read a description and you can't understand it, you can almost be sure that it was written up by a lawyer. Then if you give it to another lawyer and he doesn't know just what it means, why then you can be *sure* it was written up by a lawyer. If it's in a few words and is plain and understandable only one way, it was written by a surveyor.

PROFESSIONALISM

In New Jersey, it seems that our fellow professionals are being recognized as such. On October 4, 1980, the New Jersey State Board of Professional Engineers and Land Surveyors adopted a policy permitting that State's Licensed Land Surveyors to designate themselves as "Professional Land Surveyors".

NOTICE OF AWARDS

The National Society of Professional Surveyors (NSPS) is sponsoring four awards to be given for excellence in the surveying profession this year. The awards are:

1. **LAND SURVEYING EXCELLENCE AWARD.** Chairman: Lou Shafer, 520 Loretto Drive, Roseville, CA 95678

Anyone who makes or has made an outstanding contribution to the field of land surveying is eligible for this award. This award includes an engraved plaque and a \$500 honorarium contributed by Technical Advisors, Inc., Wayne, Michigan.

2. **SURVEYOR PROJECT OF THE YEAR AWARD.** Chairman: James P. Weidener, 40 Galesi Drive, Wayne, NJ 07470

This award is open to members of NSP or an affiliated society. The writer must have been either a participant or in charge of the project.

3. STUDENT PROJECT OF THE YEAR AWARD. Chairman: David R. Knowles, 2448 Elaine, Fayetteville, AR 72701

This award is open to any student who has undertaken or been a participant in a student surveying project. This award includes a \$100 honorarium contributed by Landmark Enterprises, Rancho Cordova, CA.

4. PROFESSIONAL JOURNALISM AWARD. Chairman: R.B. Buckner, 1958 Neil Avenue, Ohio State University, Dept. of Geodetic Science, Columbus, OH 43210

This award is offered for excellence in professional journalism. The award is presented to the society whose newsletter is judged the best as to professionalism for the year.

If you know someone or have completed a project you feel deserves to be recognized, contact the appropriate chairman for further information.

BY HOOK OR BY CROOK

From Minnesota Dis-Closures, August, 1977

The great fire in London, England in 1666 destroyed not only the ancient landmarks but all evidence of their former location. The only evidence of their former location was the memory of men still living and the measurements from objects whose location was known.

A man by the name of Crooke had been surveying so long in the city that he was supposed to know every cor-

ner in it. After the fire, the city council appointed city surveyor a man by the name of Robert Hooke who was esteemed the most profound mathematician and philosophical mechanic of his time. It is said that the wonderful sagacity, almost intuition he showed in deducing correct conclusions from meagre premises has never before nor since been equalled.

It was generally conceded that the location of any old corner could be correctly located by the memory of Crooke or the reasoning of Hooke. That is, either "by Hooke or by Crooke". Hence the expression we hear today. But in no case did they attempt to locate a corner without good evidence that it was where the old corner stood before the fire.

From **IMMOVABILITY OF GOVERNMENT CORNERS**,
By Nathan Butler

HOW TO KILL AN ASSOCIATION

From the International Right of Way Association - Garden State Chapter Newsletter

Don't participate beyond paying your dues — let "them" handle things. **THEN COMPLAIN THAT MEMBERS HAVE NO VOICE IN MANAGEMENT.**

Decline all offices and committee appointments — you're too busy. **THEN OFFER VOCIFEROUS ADVICE ON HOW THEY SHOULD DO THINGS.**

If appointed to a committee, don't work — it's a courtesy appointment. **THEN COMPLAIN BECAUSE THE ORGANIZATION HAS STAGNATED.**

If you do attend management meetings, don't initiate new ideas. **THEN YOU CAN PLAY "DEVIL'S ADVOCATE" TO THOSE SUBMITTED BY OTHERS.**

Don't rush to pay your dues — they're too high anyway. **THEN COMPLAIN ABOUT POOR FINANCIAL MANAGEMENT.**

Don't encourage others to become members — that's selling. **THEN COMPLAIN THAT MEMBERSHIP IS NOT GROWING.**

Don't read the mail from headquarters — it's not important. **THEN COMPLAIN THAT YOU'RE NOT KEPT INFORMED.**

Don't volunteer your talents — that's ego fulfillment. **THEN COMPLAIN THAT YOU'RE NEVER ASKED: NEVER APPRECIATED.**

And if by chance the organization grows in spite of your contributions, **GRASP EVERY OPPORTUNITY TO TELL THE YOUNGSTERS HOW TOUGH IT WAS; HOW HARD YOU WORKED IN THE OLD DAYS TO BRING THE ORGANIZATION TO ITS PRESENT LEVEL OF SUCCESS.**

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New Products

NEW MARKING PAINT

Fox Valley Marking Systems, Inc. has announced a new formula marking paint, in its patented "upside down" can, advertising 4800 to 5400 feet of free hand marking from one case. The paint is guaranteed for one year to empty completely and never clog, and comes in 13 colors. For further information telephone toll-free 800-323-4770.

NEW PLOTTER FROM H.P.

A large-format pen plotter capable of plotting on paper, vellum or polyester film, the HP 7580A, has been introduced by Hewlett-Packard. Described as half the size and cost of its competition, it features microprocessor control, high plotting speed and resolution, and automated selection of colors and line widths. The U.S. price is \$15,450 (U.S.) and current estimate for delivery is 8 to 15 weeks. For further information direct inquiries to the Hewlett-Packard Co., Inquiries Manager, Loveland Civil Engineering Division, P.O. Box 301-C, Loveland, Colorado, 85037.



HYDRO-PRODUCTS CATALOG

Hydro Products, Inc. has published a new 1981 product catalog detailing the company's line of off-shore and radiation-tolerant television and lighting systems, oceanographic instruments, and remote controlled vehicles.

A unique feature of the catalog is the inclusion of technical selection guides, explaining factors for users to consider in choosing the best equipment to fulfill specific job requirements.

Copies of the catalog are available free of charge by writing:

Irene Andersen, Dept. NR
Hydro Products, Inc.
P.O. Box 2528
San Diego, CA 92112

WARREN-KNIGHT ACQUIRES TELEDYNE GURLEY

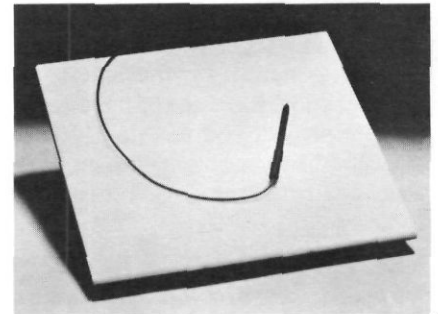
Warren-Knight Instrument Company announces the acquisition of Teledyne Gurley manufactured Surveying Instruments. Warren-Knight has acquired the manufacturing machinery and equipment, along with a supply of materials and parts for continued manufacturing of Gurley Transits, Levels, Alidades, Boards and Tripods.

The Gurley-type instruments will be essentially identical to the instruments previously manufactured by Teledyne Gurley. Warren-Knight Instrument Co. is now operated under its parent corporation WARREN INDUSTRIES, INC.

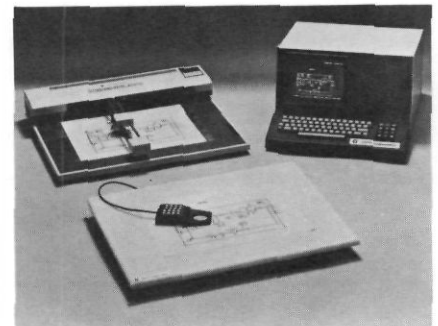
Warren-Knight Instrument Co. has agreed to continue supplying and servicing all old Gurley manufactured Instrument dealers and distributors.

NEW DIGITIZER FROM GTCO

GTCO Corporation has unveiled the *Demi Pad 5*, which it bills as the "world's lowest-cost digitizer" at the National Computer Conference in Chicago. The price of \$735 (quantity 1) is credited to the reduction of all parts to two printed circuit boards,



one of which is the grid itself. Features include 0.001 inch resolution, and no adjustments are required. It also offers flexible interfaces and can be used with many



computers with existing software. For full information on the *Demi Pad 5*, and GTCO's full line of digitizers, contact Joe Fadden of GTCO Corporation at (301) 279-9550, or Wes Thomas of Twenty-First Century Media at (516) 368-2609.

Book Nook

1. *Shore and Sea Boundaries* (1962) Reprint 1975—Aaron L. Shalowitz, U.S. Department of Commerce Publication No. 10-1
Vol. II—The Interpretation and Use of U.S. Coast and Geodetic Survey Data \$11.95 ea.
2. *Tide and Current Glossary*—U.S. Department of Commerce, N.O.A.A.—National Ocean Survey (1949) Revised 1975. Special Publication No. 228. . \$ 0.75 ea.
3. *Proceedings; Water and Water Related Boundaries Workshop II, May 20 & 21, 1977, Irvine, CA* (262 pages)
CLSA Members. . . \$15.00 ea.
Non-Members. . . \$20.00 ea.
4. *Coastal Zone Map #TP-00189—Florida, Palm Beach County, Lantana to Boynton Beach—1:10,000 (1970)*
An extremely interesting map format which contains detailed printed instructions to Surveyors on How to Locate a Mean High Water Line According to Law, adopted by the Florida State Legislature. A real collector's item \$ 2.50 ea.
5. *Restoration of Lost or Obliterated Corners & Subdivision of Sections*—a guide for surveyors—United State Department of the Interior, Bureau of Land Management—1974 Edition. . .75 ea.
6. *Metric Practice Guide for Surveying and Mapping*—American Congress on Surveying and Mapping. This Metric Practice Guide has been prepared to aid those engaged in surveying and mapping

in the use of the International System of Units (SI) in accordance with recommendations contained in the Metric Conversion Act of 1975, Public Law 94-168 . 1.50 ea.

7. *Cassette Tape Recordings of the CLSA Water & Water Related Boundaries Workshop II at Irvine, CA—May 25–26, 1977.*
Costs have been established as follows:
Complete 10 cassette set, including "Proceedings" (Item 3 above) (Over 8 hours of lecture and discussion)
CLSA Members. \$50.00
Non-Members. \$60.00
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 - c. *California Law Looks at the Water Boundary*—Peter H. F. Graber, Esq., Deputy Attorney General, Land Law Section, Department of Justice.
 - d. *The Ordinary High Water Mark – How Determined!*—Ned Washburn, Esq., Attorney at Law, Landes, Ripley & Diamond, San Francisco, CA
 - e. *To Insure or Not to Insure—That is the Exception!*—James R. Dorsey, L.S., Executive Vice President, Winter,

- Durnford, Dorsey and Associates, Land Consultants.
- f. *More Muddles in the Puddle—The Jurisdictional Aspects and Boundaries of the California Coastal Zone Commission and San Francisco Bay Conservation and Development Commission*—Raymond B. Thinggaard, L.S., Assistant Manager Real Property, Leslie Salt Co.
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- h. *The Restless Tides and the Marine Boundary Program of the National Ocean Survey*—Carrol I. Thurlow, Deputy Chief, Oceanographic Division, Office of Marine Surveys and Maps, N.O.S.
- i. *Slope and Undulations of Tidal Datum Planes and Quantification of Accuracy of Various Methods*—Cdr. A. Nicholas Bodnar, R.C.E. (California) Principal Engineer, Requirements and Facilities Section, Tides and Water Levels Branch, Oceanographic Division, Office of Marine Surveys and Maps, N.O.S.
- j. *Survey Procedures For Determination of Mean High Water*—Jack E. Guth, Capt. N.O.S. (Ret.), President of Coast Survey Limited, Herndon, VA.

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Licensing (Continued from Page 21)

would remain the same. See, for example, *Wilson v. Omaha Indian Tribe*, 442 U.S. 653 (1979).

If we may be of further assistance, kindly advise us accordingly.

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¹The conclusion that state law governs the survey standards which apply to the execution of federal resurveys of previously established private property boundary lines does not in any way alter our previous advice to the effect that BLM surveyors are not subject to state licensing requirements. See, Memorandum Opinion, dated September 27, 1977, from the Associate Solicitor, Division of Energy and Resources, to the Director, BLM.

²It is our understanding that the plats and field notes of acquired land surveys are retained by BLM or the federal managing agency and that none of these documents are filed with state or local land recording offices. Consequently,

we have not considered the question of the need to comply with state recording requirements in connection with the preparation of the resurvey documents.

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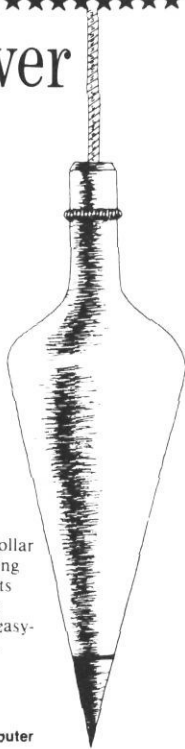
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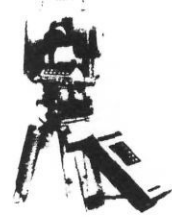
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We therefore conclude that the filing of a corner record pursuant to section 8773 does not eliminate the need to file a record of survey after the establishment of points or lines pursuant to section 8762.

¹ All section references hereafter are to the Business and Professions Code unless otherwise stated.

² Where the Legislature uses both the terms "shall" and "may" in the same statute, the former is reasonably construed as mandatory and the latter as permissive.



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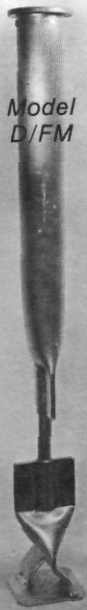

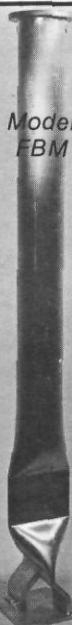


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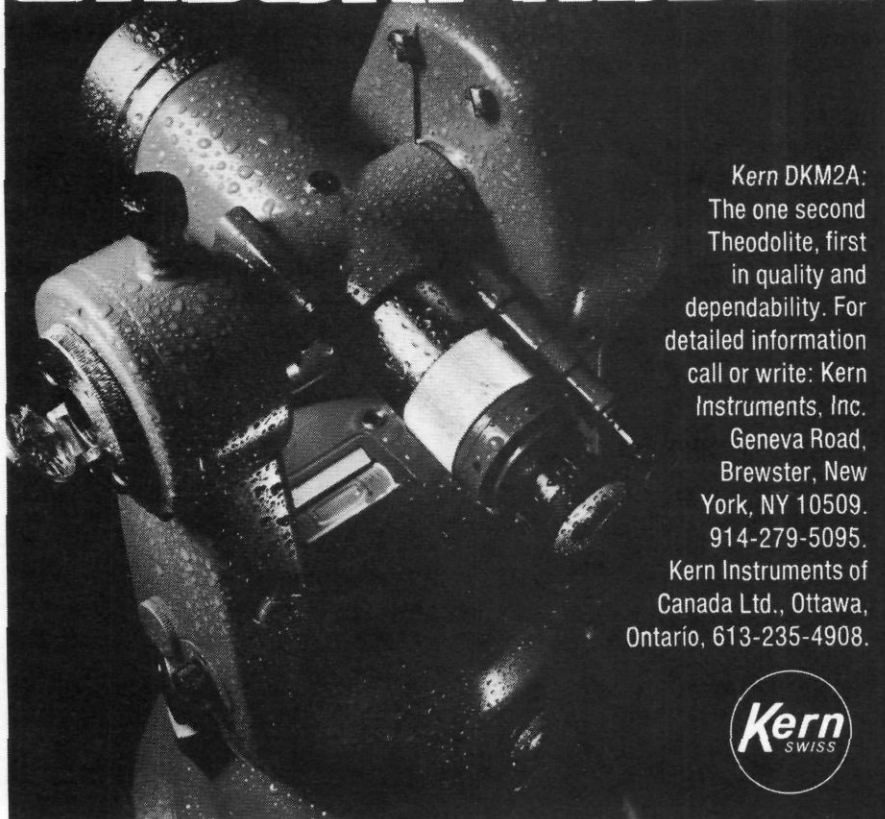
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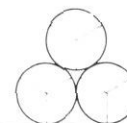
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