



# The Baseline

The Newsletter of the Alberta Geomatics Historical Society  
Collecting, Preserving and Sharing the History of Land Surveying in Alberta  
Vol. 2 No. 4  
June, 2026

## Message from the President

I am pleased to share an update following the Third Annual General Meeting of the Alberta Geomatics Historical Society held on March 25, 2026.

Over the past year, the AGHS has continued to grow and mature as an organization. What began as a response to preserving historical surveying artifacts and Alberta's land surveying history has developed into a Society with active membership, governance, and a clear mission. This is an achievement we can all take pride in.

Our efforts to acquire, preserve, and catalogue survey artifacts have continued. Notable additions this year include a 1910 Topley transit, an engineer's chain, and a Gunter's chain. These artifacts help illustrate how surveying was conducted over a century ago. We have also expanded our outreach through presentations at museums and post-secondary institutions, and through upcoming exhibits at the University of Calgary and SAIT. These initiatives, along with ongoing website updates, continue to strengthen our visibility.

None of this work would be possible without the support of our members, sponsors, and donors. I would like to sincerely thank those organizations and individuals who have contributed financially and through their time and expertise. Your support enables our preservation work, educational presentations, and exhibits.

At the AGM, all current Board members were re-elected, providing important continuity as we move forward with our long-term initiatives. In addition, the proposed Sustainability Fund Policy was approved. This is an important step in securing the Society's financial future. By establishing a dedicated reserve, the AGHS is better positioned to manage uncertainty, support strategic initiatives, and plan beyond annual funding cycles. This reflects our commitment to responsible governance and long-term stability.

Looking ahead, sustainability also applies to leadership. This coming year will be a transition period, with a focus on strengthening governance and preparing future leadership. For the AGHS to continue to grow, broader member involvement will be essential.

I encourage all members to consider how they might contribute. This can be through projects, writing, committees, or future leadership roles. I invite any members who may be considering a greater level of involvement to reach out. Early conversations and mentorship will be an important part of ensuring a smooth transition.

Please feel free to contact me at: [president@albertalandsurveyhistory.ca](mailto:president@albertalandsurveyhistory.ca)

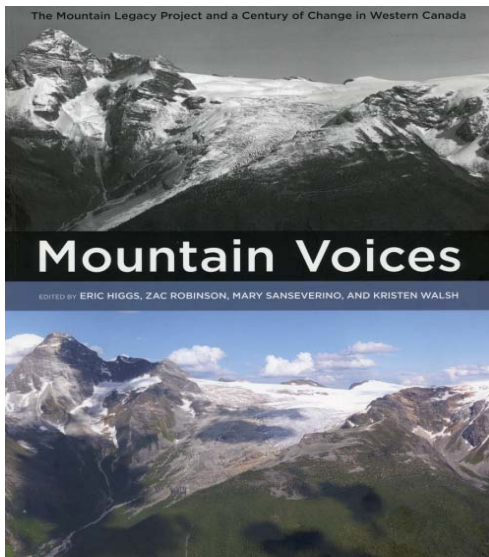
The AGHS has built a strong foundation, and with continued support, we are well positioned to create a lasting organization.

Thank you for your continued commitment to preserving Alberta's surveying history.

*Les Frederick, AGHS President*

## Book Review: *Mountain Voices: The Mountain Legacy Project and a Century of Change in Western Canada*

Edited by Eric Higgs, Zac Robinson, Mary Sanseverino, and Kristen Walsh  
University of Calgary Press, 2025



Mountain Voices has two main themes. Of particular interest to surveyors, it describes the Mountain Legacy Project (MLP), an initiative that compares historical photographs taken by early topographical surveyors with modern images to analyze long-term landscape change. The genesis of the MLP occurred in 1996 when the University of Alberta examined the relationship between cultural history and ecological restoration of Jasper National Park. Secondly, the book presents fifty short testimonials from a diverse group of contributors, all of whom have an affinity for the mountains.

The MLP is introduced through the cover images of the book: a photograph taken by A.O. Wheeler of Mt. Sir Donald and the Illecillewaet Glacier in Glacier National Park in 1901 and a corresponding image captured by the MLP in 2011. The differences between the images demonstrate the purpose of the project — comparing historical phototopographical images with recent

photographs taken from the same position to better understand changes in the landscape. The original photographs were taken by several topographical surveyors over many years as part of a method refined in the late 1880s by Édouard Deville, Surveyor General of Canada, enabling the mapping of mountainous terrain where plane table methods were impractical. This method was eventually replaced by aerial photography and digital mapping technologies. One wonders whether anyone at the time imagined that these historical photographs would, over a hundred years later, become invaluable tools for environmental research.

The second theme of the book is its collection of fifty one-page testimonials contributed by mountaineers, artists, Indigenous voices, scientists, historians, and others, each expressing a personal connection to the mountains. I enjoyed reading these unique and diverse perspectives and often found myself wanting to know more about the contributors. Including the brief biographical notes alongside each testimonial would have avoided the need to flip to the back of the book.

One particularly engaging anecdote, recounted by well-known mountain writer Graeme Pole, describes his first attempt to climb Mount Stephen in 1965, when he was turned back by snow, followed by a successful summit three months later. Pole later climbed the mountain again in 1987, on the centennial of the mountain's first ascent in 1887 by J.J. McArthur, a topographical surveyor. McArthur's ascent was the first of any peak over 10,000 feet in the British Commonwealth. Pole notes that McArthur wrote in his reports that after reaching the summit in 1887, he was unable to complete his "readings" because "the smoke prevented the taking of views." McArthur returned in 1893 to finish the work, "lugging similar equipment and, for good measure ... adding to the load a St. George's Cross and a fifteen-foot length of pine on which to loft it."

As a surveyor, I appreciated the recognition given to early topographical survey work, especially the contributions of McArthur and W.S. Drewry. They were the first to apply the phototopographical method in the field, yet they are often overshadowed by A.O. Wheeler and M.P. Bridgland. Between 1887 and 1892, McArthur climbed nineteen mountains over nine thousand feet, including four over ten thousand feet. Of sixteen first ascents during the same period, fourteen were made by McArthur.<sup>1</sup>

In the introduction, there is a reference to the use of the plane table for the Dominion Land Survey. That survey was conducted over a period of sixty years and, when completed, covered nearly all of the arable land in the Prairies. In practice, however, the survey was executed using transit-and-chain methods, later supplemented by measuring tapes. While this detail will likely go unnoticed by most readers, it will stand out to surveyors.

Mountain Voices depicts the importance of the work of the early topographical surveyors whose photographs, taken for mapping the Rocky Mountains, are now used for documenting long-term environmental change, the knowledge of which can now be applied for water management and other climate adaptation policies. Overall, the book is a compelling blend of science, history, and personal reflection. It should appeal particularly to surveyors and to anyone with an affinity for the mountains.

**Gord Olsson, ALS (Hon. Life), CLS (Retired), St. Albert**

<sup>1</sup> Walter Wilcox, (1900), pages 238, 301

## Recent Acquisitions to the AGHS Artifact Collection

### Warren-Knight Transit, AGHS 2026.03.01



The “Sterling” transit manufactured by Warren-Knight Instrument Company of Philadelphia, U.S.A., was a precision surveying instrument widely used during the early twentieth century for land surveying, engineering, and construction work. Warren-Knight had a long history of producing surveying and optical instruments, with the company tracing its roots to the early 1900s.

This transit was designed to measure both horizontal and vertical angles. The telescope can rotate horizontally through a full circle and “transit,” or flip vertically, allowing surveyors to establish straight lines, grades, and boundary measurements with considerable accuracy. Instruments of this type were commonly used in railway surveys, road construction, subdivision layout, and municipal engineering projects throughout North America.

The “Sterling” name was used by Warren-Knight on a series of mid-range surveying instruments intended for practical field use. Many examples featured brass construction with black lacquered components, spirit levels, precision adjustment screws, and finely engraved graduated circles. The serial number (5580) suggests this instrument was likely manufactured during the early decades of the twentieth century, when transits such as this represented the standard equipment of professional surveyors and engineers.

## Recent Acquisitions to the AGHS Artifact Collection

Engineer's Chain, AGHS 2025.05.01



Marker at 10 feet

20 feet

30 feet

40 feet

50 feet

The engineer's chain was an important measuring instrument used in surveying and civil engineering during the nineteenth and early twentieth centuries. Unlike the Gunter's chain, which was designed primarily for land subdivision and acreage calculations, the engineer's chain was intended for engineering and construction projects where straightforward decimal measurements were preferred. The chain measures 100 feet in length and is divided into 100 individual links, with each link representing exactly one foot. This simple decimal arrangement made calculations easier and reduced the possibility of errors in the field.

Engineer's chains were commonly used in railway, highway, canal, pipeline, and construction surveys. As large transportation and infrastructure projects were being constructed during the late nineteenth century, surveyors and engineers required a measuring system that was efficient for linear measurements. The engineer's chain became especially useful for railway location surveys, where long distances, grades, and alignments needed to be calculated quickly and accurately. Its use reflected the growing influence of civil engineering and industrial development during this period.

The chain itself is constructed of steel links connected by rings, with brass tally tags attached at intervals to assist with counting distances in the field. Handles at each end allowed two chainmen to stretch the chain across the ground while measurements were recorded by the surveyor. Although rugged and reliable, the chain required careful handling and regular maintenance, as dirt, moisture, and rust could affect both its movement and accuracy. For both the engineer's chain and the Gunter's chain, (next article), due to wear on the links, the chain required regular calibration against a standard measure with a subsequent correction made to any field measurement.

By the mid-twentieth century, engineer's chains were gradually replaced by steel tapes and, later, by electronic distance measuring equipment. Despite becoming obsolete as a practical surveying tool, the engineer's chain remains an important artifact representing the era of early engineering and infrastructure development. This chain is one example of the equipment used by surveyors and engineers who helped shape transportation networks and settlement across western Canada.

The Society has one other engineer's chain in its collection.

## Recent Acquisitions to the AGHS Artifact Collection

### Gunter's Chain, AGHS 2026.02.01



Marker at 10 links

20 links

30 links

40 links

50 links

The Gunter's chain, also known as the surveyor's chain, was one of the most important measuring instruments used in land surveying from the seventeenth century through the early twentieth century. Invented in 1620 by the English mathematician and clergyman Edmund Gunter, the chain was designed specifically for measuring land and simplifying calculations related to acreage and distance. Its introduction standardized land measurement practices throughout Britain and later across North America, including Canada.

The chain measures 66 feet in total length and is divided into 100 individual links connected by small rings, allowing the chain to flex easily over uneven ground. Each link measures 7.92 inches in length. The 66-foot length was chosen because it worked conveniently with both miles and acres. Eighty chains equaled one mile, while an area of ten square chains equaled one acre. This relationship made the Gunter's chain especially useful for laying out farms, townships, roads, and property boundaries during the settlement of western Canada and the implementation of the Dominion Land Survey.

An important feature of the Gunter's chain is the use of distinctive brass tally markers attached at every ten links. These markers helped the chainmen quickly count distances in the field without needing to count every individual link. The markers often varied in shape so they could be identified by touch as well as sight. On this chain, the tags at 10 and 90, 20 and 80, 30 and 70, 40 and 60 links are similar with the number of notches, so the chain could be used from either direction. The centre marker at 50 links, representing half a chain or 33 feet, is differently shaped so it could be recognized immediately. These tally markers allowed survey crews to work more efficiently and reduced mistakes during long days of chaining across rough terrain.

A typical survey crew using the Gunter's chain consisted of two chainmen and a surveyor. One chainman carried the forward end of the chain while the other remained at the rear point. Metal chaining pins were used to mark each full chain length as measurements progressed. The surveyor recorded the distances and directions needed to establish property boundaries, road allowances, and township lines. Despite its simplicity, the chain was remarkably effective and remained a standard surveying instrument for centuries.

The Gunter's chain remains one of the defining symbols of early land surveying. Surviving examples provide a direct connection to the surveyors who mapped and measured the Canadian landscape during the era of exploration, settlement, and township surveys.

The AGHS has four Gunter's chains in its collection.

## Recent Acquisitions to the AGHS Artifact Collection

### Topley Transit, AGHS 2025.06.01



Transit No. 12138 is an early twentieth-century surveying instrument retailed by The Topley Company of Ottawa, Canada, and inspected by the Department of the Interior Surveys Laboratory on July 15, 1912. Instruments such as this were essential tools during the great era of Dominion Land Surveying, when surveyors established township boundaries, railway routes, mining claims, and settlement lands across Western Canada.

This precision vernier transit features heavy brass construction, open-frame standards, and finely graduated circles designed for accurate angular measurement. The Surveys Laboratory stamp indicates the instrument was officially tested, calibrated, or accepted by the federal government in Ottawa before being used in the field.

Transits of this quality were commonly carried by Dominion Land Surveyors working under demanding frontier conditions. This instrument remains an excellent example of the craftsmanship and technical precision that supported Canada's early mapping, settlement, and resource development.

### W. S. Darley & Co. Miners compass, AGHS 2025.05.02

This miner's compass, manufactured by W. S. Darley & Co. of Chicago, U.S.A., is an example of an early twentieth-century surveying instrument used in mining and exploration work. Unlike modern compasses marked with a full 360-degree circle, this instrument uses a quadrant bearing system, reading from north or south toward 90 degrees east or west. This allowed surveyors and miners to record bearings in the traditional form of "N 45° E" or "S 30° W," a common method used in compass traverses and underground surveying.



Constructed with a brass housing and magnetic needle, the compass was designed to be rugged, portable, and practical for field use. Instruments such as this were commonly used to establish directions for mine workings, exploration lines, and preliminary surveys before the widespread use of transits and electronic surveying equipment.

## Searching for Original Survey Monuments in the Foothills and Front Ranges

Land surveyors frequently think of the first surveyors who produced lines through the wilderness. Their gritty determination resulted in monuments being placed in rough remote terrain, and with amazing accuracy. For many years I have hiked in the foothills of western Alberta. The views are spectacular and unparalleled; often the trails have yet to be created. Bushwhacking is a constant diet of scrapes, moving over hills and dales that have no respect for footing or sore muscles.

When I retired, I realized that I was not really tired of surveying, but perhaps had grown weary of bureaucracy, policies that did not make sense, and invoices that were forever being challenged. Perhaps I could still enjoy something that came earlier in my career; the survey evidence. A new hobby was created: I would search for original monuments placed by the original surveyors during the survey of the Alberta township system. A second criterion would be that these monuments had never been shown on a plan of survey. It seemed probable that several of these monuments had not been intentionally visited since they were originally placed.

There is one very important rule that I follow. As I no longer hold a commission as an A.L.S., the monuments cannot be restored or disturbed. Starting with the ATS co-ordinates provided through the Alberta government, copies of the original field notes and a topographic map, my "survey equipment" includes a handheld GPS unit, a compass, a clinometer, a 15 metre tape and (of course) a notebook. I normally do not carry a magnetic pin finder.

One of my favourite search areas is the township surrounding Elbow Falls, southwest of Calgary. Since C.M. Walker laid down the lines in 1911, an excellent highway has been built diagonally across the township, providing easy access such as he could only have dreamed about. Trails for horses, hiking and mountain bikes as well as logged areas, now permit access to much of the area.

I almost never travel alone during my searches. Several of my hiking friends have become interested in this odd hobby also, and having given them a rudimentary understanding of the various types of monuments that have historically been used (including iron posts, earth mounds, stone mounds and pits), they have become as skilled searchers as any experienced survey assistant I worked with!

To date, I have been able to search about 30 Walker monuments. It is rare that I have not found his monument within 5 metres of the published co-ordinates. In rare instances there are still traces of his cut tree stumps, and the stone mounds have survived well unless the terrain is sloping more than 20° from the horizontal or if it is on an open scree (gravel) slope. Bearing trees were not commonly made (or have not been found), perhaps because the area had been burned over by fire in 1910. Wood monuments generally have not survived, but pits are often the first sign that we are getting close to the position.

Sometimes I clear away deadfall, brush and small trees before I add a bit of flagging. Many times during my active career, I found old flagging that has helped in the first stages of locating a monument; I think of my added flagging as a "pay it forward" kind of contribution, just as I have been previously helped.

Once a monument is located, I create a set of field notes for it – what else would a seasoned surveyor do! Although bending the guidelines slightly, I often enter a report in the Corner Recordation Index. This index is kept by the Alberta Land Surveyors' Association as a repository for survey plans or records of monuments that are not registered at the Land Titles Office. Although nothing was disturbed or re-established, I call these records a 'field inspection' and include an annotated set of photos of the monument.

Two other areas where I have done searches are close to Exshaw and Canmore. This is mountainous, rough country with ridges, deep intervening valleys that are heavily treed. The success rate of locating these original monuments is much lower in such areas. Measuring distances by hand chaining was brutal work and mistakes

were frequent. A couple of rules of thumb have helped when the co-ordinate location does not result in a successful search. After checking that the co-ordinates in the ATS were entered in my handheld GPS correctly, I check along the original surveyed line. If the field crew has made a chaining error, then this method can sometimes be helpful. In such terrain, the distances are less reliable than the orientation of the surveyed line. When the slopes become quite steep, a small horizontal distance translates to a much larger slope distance.

Another factor which seems to have a large role in locating the original monuments is how close it is to human activity. Those monuments close to roads, housing or railroads have a higher probability to have been lost, missing, or destroyed. A key to surviving is to be out of sight or hard to access.

The biggest puzzle remains why these rugged townships were surveyed, partially or completely. They are usually unsuitable for cattle, nearly impossible to cut/extract timber and a logistical nightmare for a commercial mineral operation. It required a great deal of time, energy and money to survey these areas.

During these searches, I have often been astounded and amazed at the hardship those crews endured. They spent weeks cutting down trees, wading through swamps, climbing over and around rock outcrops, pushing into the rough terrain. Just as we cannot predict how our work will be seen or evaluated by others, they had little inkling of who might follow to find their monuments. It has been an energetic chore just to follow their example more than a century later.

A fully surveyed township has about 90 locations that would normally be monumented. Some of these locations were never monumented as they fall in a river, muskeg, body of water, truly mountainous terrain or other inaccessible or hazardous position. Many of the original monuments have already been used and visited since they were placed, and those appear on registered survey plans.

But there is still a large number of monuments that are just waiting to be found, admired and valued. They represent a tremendous testament to the original hardy surveyors who laid down the lines.

#### **Allan Main, ALS (Retired), Calgary**



Wit NE26-24-9-W5M



N 1/4 36-20-8-W5M stone mound



NE 9-24-9-W5M

## **Robert (Bob) F. Baker, ALS (1935–2026)**

*Surveyor, Mentor, Storyteller, and Bagpiper*



The surveying profession lost one of its most respected members with the passing of Bob Baker on May 20, 2026. During a career that spanned more than four decades, Bob served as an Alberta Land Surveyor, Director of Surveys, mentor, historian, and dedicated volunteer within the Alberta Land Surveyors' Association (ALSA).

I first met Bob in the fall of 1998. I was a member of the newly resurrected ALSA Historical & Biographical Committee under the chairmanship of Doug Barnett. Doug had to resign due to health reasons and Bob Baker took over as Committee Chairman. This was a position Bob held until 2005. Under Bob's leadership, the committee completed several initiatives, most notably, many oral interviews of land surveyors and the publication of "*Laying Down the Lines, A History of Land Surveying in Alberta*", by Judy Larmour, a book published to commemorate the 100<sup>th</sup> anniversary of the ALSA.

The following is a summary of an interview I conducted with Bob in January, 2001:

Bob was born in Brandon, Manitoba, in 1935, and he spent much of his childhood on his grandfather's farm. In 1949, his family moved to Fernie, British Columbia, where a high school mining and surveying course introduced him to the survey profession. Learning to use compasses, chains, and sextants while completing traverses around the school grounds sparked an interest that would shape the rest of his life.

While still in high school, Bob worked for the federal government on a survey crew working in southeastern British Columbia. After graduation, he continued surveying in the Yukon, where he met surveyors such as Ernie Tessari and Tom Swanby, who encouraged him to continue his education and attend the Provincial Institute of Technology and Art (PITA) in Calgary (now the Southern Alberta Institute of Technology (SAIT)).

Following graduation from SAIT in 1955, Bob joined the Surveys Branch, Department of Highways and articulated under Ted Rippon and later Albert Tonsoo, whom he credited as one of his most influential mentors. On June 2, 1961, he received his Alberta Land Surveyor commission.

Bob's career with the Alberta government included a wide variety of projects. One of his earliest assignments as a commissioned surveyor was the surveying of St. Albert Trail from Edmonton to St. Albert. He also completed mineral claim surveys near Nordegg and spent considerable time in Fort McMurray during the early years of northern development, including work related to the Athabasca River bridge and highway construction.

In 1964, Bob joined the Director of Surveys Office, where his practical field experience and knowledge of survey legislation made him a trusted resource throughout the province. His expertise eventually led to his appointment as Alberta's Director of Surveys in 1988. He retired from government service in 1990 after thirty-five years.

Bob's service to the ALSA was equally impressive. Over the years he served as Secretary-Treasurer, Registrar, Vice-President, President of the ALSA, and was a member of many ALSA Committees. He was committed to mentoring the next generation of surveyors, articling seven students who went on to successful careers.

Retirement did not end Bob's involvement in surveying. He continued working with private firms in Whitecourt, Edmonton, and Lethbridge, sharing his knowledge and experience with colleagues and clients alike.

Bob was a gifted storyteller whose recollections preserved an important chapter of Alberta surveying history. His speeches at ALSA annual meetings were informative, relevant, and entertaining. Many surveyors will remember the sight and sound of Bob piping newly elected ALSA Presidents into office.

His contributions to Alberta surveying, and the many people he mentored and inspired, cannot be overstated and Bob will long be remembered.

*Les Frederick, ALS (Retired)*

### ***History of Land Surveying in Alberta* Presentation to Glenora Park Retirement Living residents.**

On April 30, 2026, Gord Olsson and I were pleased to give a presentation to several seniors at Glenora Park Retirement Living in Edmonton on the history of the land survey system in Alberta. The residents, who included a retired doctor, astronomer, draftsman, and nurse, were quite interested in how Alberta came to be surveyed as it was. We discussed the Third System of Survey, how it was surveyed, how it originated, and the monuments used. We also discussed the transportation, accommodation, and the survey instruments used in those early surveys. Finally, we talked about the Alberta Geomatics Historical Society, our mission, and showed pictures of many of our artifacts. We also took a Gunter's chain, a T. Cooke & Sons transit, and other publications for the residents to see. At the conclusion of our presentation, we donated a copy of the book, "*Laying Down The Lines*", by Judy Larmour, and a copy of "*The Art of Surveying - The history of the surveying profession as told through art*", by Ken Allred, ALS (Hon Life), CLS (Retired) for use in their resident library. We were also appreciative of their \$100 donation towards our Society.

These presentations are important, as they contribute to our mandate of educating the public on the history of surveying in Alberta.

*Les Frederick, ALS (Retired)*

**Editorial Note:** AI-assisted tools were used in portions of the preparation and editing of this newsletter. Contributors reviewed all content for accuracy prior to publication.

#### **Alberta Geomatics Historical Society Executive Board 2025-2026:**

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