



The Baseline

The Newsletter of the Alberta Geomatics Historical Society

Collecting, Preserving and Sharing the History of Land Surveying in Alberta

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Message from the President

While here in Edmonton, we had to put up with a lot of rain at the beginning of the summer. So much so that we set a record for rainfall in June and July. Although this precipitation was much needed and appreciated, all that moisture caused serious flooding problems throughout the area. This moisture has also resulted in an explosion of mosquitoes, with numbers higher than they have been since the 1980s.

All surveyors who have spent time in the field over the years have many stories about these little stinging critters. They, along with the other biting and stinging flies, can make a day, let's say, memorable. We are fortunate, however, to live in a time when we actually have options to fight back against them.

I would like to refer to the words of Lieutenant Charles Wilson, Secretary of the British Boundary Commission, who recorded his experiences in his diary while on the survey of the 49th parallel between 1858 and 1862. Although these entries were written while Wilson was in British Columbia, I think we can all relate to his words.

July 2, 1859: "the mosquitoes have now regularly set in; it is perfect agony performing even the regular actions of life. Washing is perfect torture.... none of us have had any sleep for the past two nights & we can scarcely eat, exposing the face is such a painful operation."

July 11: "the mosquitoes so bad today all work had to be stopped."

July 27: "My hands... have been so swollen & stiff that I can hardly bend my joints...."

Source: Charles Wilson, *Mapping the Frontier: Charles Wilson's Diary of the Survey of the 49th Parallel, 1858–1862*, edited and with an introduction by George F. G. Stanley (Toronto: Macmillan of Canada, 1970).

And how about this for a remedy from Charles Æneas Shaw, an Ontario Land Surveyor, who wrote in his memoir:

"At first our only protection against these pests was to carry a square of pork rind which we rubbed over our faces and necks at frequent intervals.... [We] got a five-gallon keg of fly dope — three parts Stockholm tar to two of olive oil. By smearing the dope on our faces and hands at frequent intervals... we managed to get some relief by fall we were a fine mahogany colour."

Source: Charles Æneas Shaw, *Tales of a Pioneer Surveyor*, edited by Raymond Hull, introduction by Norman Æneas Shaw (Toronto: Longman Canada Limited, 1970).

So, if you're someone who thinks maybe the old ways were better than modern solutions, put away that new can of bug spray and wrap a piece of pork rind around your neck the next time you venture out to the garden!

Enjoy the rest of your summer.

Les Frederick, AGHS President

Surveying History on Display at the University of Calgary Geomatics Department

I am pleased to report that the first historical artifact display case showcasing some of our survey artifacts has been completed at the University of Calgary Geomatics Department. This has been a long time coming, with our first correspondence with the department beginning in April of last year. These displays will be on long-term loan until the fall of 2029.

There will be a total of four display cases: two large and two smaller ones. The first large case we have completed tells the history of the Dominion Land Survey from 1861 to 1920. Some of the artifacts displayed include a Gunter's chain, steel tapes and their accessories, a T. Cooke & Sons transit circa 1900, and several examples of survey monuments.

Over the next few months, we will be designing and preparing the two smaller cabinets, which will contain artifacts representing advances in survey calculations, both in the office and in the field. Artifacts that may be included are several of our field and office calculators, as well as Leroy drafting sets, French curves, and mylar plans.

The final large cabinet is planned to continue the history of surveying in Alberta from 1920 to the present day. Artifacts may include later styles of transits, early EDMs and total stations, and early examples of GPS technology.

We feel it is important that these artifacts be exposed to the next generation of surveyors so they can see the instruments and publications previous land surveyors were using so they may appreciate the history of the land survey profession in Alberta.



The first large display case, featuring survey instruments, equipment, and publications used in the Dominion Land Survey from 1861 to 1920

Preserving Alberta's Surveying History at SAIT

On August 28, the first two of four display cases at SAIT were filled with artifacts showcasing surveying instruments used in Alberta from 1900 to 2000.

The first display case is entitled "Chains to the Speed of Light". The artifacts displayed include a Gunter's chain, various survey tapes and accessories, and a Tellurometer MRA2 setup.

The case also includes a coloured official township plan of Twp 42 - Rge. 2 - W5M confirmed in 1901.

This display will remain on long-term loan until September 2029.



ALSA 2026.02.01
Gunter's Chain

In 1620, Edmund Gunter (1581-1626), an English mathematician, introduced the four pole chain, which became commonly known as the Gunter's chain. He standardized the length of a pole which was a basic unit of measurement in medieval England at 16.5 feet. The Gunter's chain was four poles long and consisted of 100 links.



80 chains square equals 640 acres equals one square mile equals one section of the township system.

In the Alberta Land Survey System, a road allowance is one chain wide.

The 1871 Manual for the Dominion Land Survey specified:
"6. All measurements will be made with the ordinary four pole chain, and iron or steel tally pins. The chain is to be tested and corrected at least every other day during use by a standard measure which shall have been previously compared and approved by the Surveyor General."

CHAINS TO THE SPEED OF LIGHT

For 300 years the Gunter's Chain was used for land surveying. Around the turn of the 19 century, it was gradually replaced by the more accurate steel band chain. The introduction of Electronic Distance Measuring (EDMs) in the 1960's made measuring faster and more accurate. Today, Global Positioning has revolutionized surveying by integrating land surveys with global spatial reference systems.



ALSA 2007.21.04
500 link chain



ALSA 2007.21.02
200 foot Surveyor's tape

Chaining using the Gunter's chain was a rudimentary process. A major concern was the length of the chain increasing through wear, therefore the need to have it compared to a standard measure. Care was also taken to ensure the chain was held horizontal. With the advent of the steel band chain, greater accuracy could be achieved with additional corrections applied for sag, slope and temperature.



4. Wuhr, Box 14, (4)
Chaining a long distance on the prairies in the 1960's.



3. Weir, #4, 9, SS01



29. Midwest Surveys
The Total Station integrated distance and angular measurement.



ALSA 2006.24.01
Geodimeter Model 6 introduced in 1964

The Geodimeter applied the speed of light to measure distances. By measuring the time required for a beam of light to travel to a reflective prism and back, it could accurately determine the distance between the two points.

The Alberta surveying community was one of the first to realize the advantages of GPS. It did not require line-of-sight visibility between survey stations and it could operate anywhere there was a good view of the sky.



30. Focus Surveys

Learn more about Alberta land survey history and land survey artifacts.
albertalandsurveyhistory.ca/



The explanatory panel behind the historical artifacts in Display Case 1

The second display case is entitled "Surveys Were to be Astronomical." It features a 1905 Bausch & Lomb Geodetic theodolite, various transits, a Geodimeter 420 total station, and a Leica System 300 GPS Series.





ADHS 1900-04
Taking a Star Shot to determine azimuth

SURVEYS WERE TO BE ASTRONOMICAL

When the Dominion Land Survey started in 1871 the first Manual of Instructions specified:

"The land survey of Manitoba and the North-West Territory are to be astronomical - that is to say, performed independently of the magnetic needle."

The use of a transit, theodolite, or solar compass was required so that celestial objects could be observed. At that time, a transit was a type of theodolite whose telescope could make a full rotation (transit) about the horizontal axis. This feature made it possible to reverse the telescope, thus eliminating collimation errors, making line productions and angular measurements more accurate. By the late nineteenth century, nearly all theodolites had this capability, and the term "transit" became commonplace. The solar compass was an instrument that used the sun's position to determine true north and was therefore independent of the magnetic needle.



ADHS 20. Fels Surveys
Measuring using a Total Station



Library and Archives Canada PA-018893
Accurate time was critical for astronomical observations. Knox McCusker in 1927 in the Peace River area of Alberta obtaining a time signal from CFRN short wave radio.



ALSA 2016.01.01
Donated by The Surveyor General Branch, Natural Resources Canada

This Wild T4 made by Wild Heerbrugg, Switzerland was produced in 1965. It is one of the largest and most precise micrometer theodolites ever built. It was used for first order geodetic triangulation and astronomical observations. It has 65x magnification. The horizontal circle reads directly to 0.1" and the vertical circle to 0.2". Only 439 T4s were produced.

In the 1970s manufacturers began designing EDMs to mount directly on theodolites. Soon after they integrated EDMs with theodolites creating what became known as the Total Station.

Measuring was revolutionized in the 1990s with the introduction of Global Positioning.

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albertalandsurveyhistory.ca



The explanatory panel behind the historical artifacts in Display Case 2



Lance Hummel, CST, Instructor, Geomatics Engineering Technology, and Les Frederick, ALS (Ret.)

Recent Acquisitions to the AGHS Artifact Collection

Eugene Dietzgen Engineer's Transit, AGHS 2026.04.01

Donated by Brett Egar, St. Albert

Eugene Dietzgen engineer's transit, s/n 1459, does not have a vertical circle, so it could not be used for reading vertical angles or taking astronomical observations.

On the face of the compass on the transit beside the cardinal direction marking E, S, W and a North symbol is marked "Eugene Dietzgen Co. Chicago & New York 1459." The number 1459 is presumably the serial number.

According to the serial number, the date of production is 1906. It appears identical to a transit shown on page 378 of the 1907 Eugene Dietzgen catalog.



T.H.S. CO. Transit, AGHS 2026.05.01 and tripod, AGHS 2026.05.02

Donated by Anita Zarn, Calgary

This transit was used by Robert Zarn, a seismic surveyor who worked in the 1970s in northern Alberta.

There is very little information about the T.H.S. CO. The company was a mid to late 20th century manufacturer of precision optical surveying equipment in Japan.

Based on the serial number of 30987, it likely was manufactured between the late 1950s and mid-1960s.



HP 3800B EDM, AGHS 2026.06.01

HP 3801B Power Unit, AGHS 2026.06.02

Donated by Bruce Gudim, ALS (Hon. Life), Calgary

The HP 3800B was introduced in 1970 and had a range of 3 km using a triple prism reflector with a direct readout in metres. Due to its ease of use, it is estimated that by September, 1971, there were over 2000 units in use in the United States and Canada.



The HP 3801B power unit provided rechargeable battery power and allowed operation from an external 12-volt DC source.

The AGHS has two HP 3800A units in its collection. The 3800A model displays in feet while the 3800B displays in metres.



AHEFLS Closes its Doors

The Alberta Historical and Educational Foundation for Land Surveying has applied to the Canada Revenue Agency to dissolve its charitable status effective as of June 30, 2026.

In light of the fact that the AHEFLS, also known as the Surveyors Historical Foundation, (SHF), has lost two of its members, Monroe Kinloch and Dave Williams, and the remaining four members are advancing in age, the organization has resolved that it can no longer carry out its objectives in the future. Fundraising and recruitment of new members have proven to be more of a challenge in recent years, with limited resources available.

The Foundation was originally chartered in 2006 by the Alberta Land Surveyors' Association, with Ken Allred as President, Dave McWilliam as Vice President, and Jim Halliday as Secretary-Treasurer. Gordon Olsson, Monroe Kinloch, and Dave Williams joined the Foundation in 2010, and Al Jamieson in 2019.

Over the years, the Foundation has focused its efforts in two directions; firstly, in providing an avenue for the collection of survey artifacts by donation from individuals and the estates of deceased land surveyors. As a charitable foundation, the SHF was authorized to provide tax receipts for both financial donations and donations of artifacts, subject, of course, to an appraisal of those items.

Secondly, the AHEFLS focused on preserving the history of surveying by way of establishing monuments and displays commemorating various survey activities, such as the A.O. Wheeler display boards in Banff. The AHEFLS was initiated by a generous donation from Ross Tate, ALS, as a means to preserve and publicize the history of surveying in Alberta. The AHEFLS initially set out to recruit senior members of the survey profession by means of a luncheon directed at retired or retiring land surveyors.

One of the first projects the AHEFLS took on was to support the David Thompson Canoe Brigade in 2008 when it completed its canoe trip from Rocky Mountain House to old Fort William on Lake Superior, where the fur brigades transferred their cargo for the final leg to Montreal.

In 2009, the AHEFLS donated \$5,000 to the ALSA to purchase a Spenser Browning & Co. London sextant, with a Faith & Co. Washington, D.C. artificial horizon and drafting set dating back to the mid-19th century. The items were purchased from Denny DeMeyer, PLS, from Washington State, who was an active participant in the David Thompson Canoe Brigade in 2008.

The AHEFLS worked closely with the Historical and Biographical (H & B) Committee of the Alberta Land Surveyors' Association to obtain survey artifacts and to enhance the preservation of the history of surveying in Alberta. One of the initial projects of the H & B Committee was the erection and dedication of a set of township monument pits and mounds at Ukrainian Village Park, east of Elk Island National Park.

In 2016, the AHEFLS purchased a park bench on Nose Hill Park in Calgary and dedicated it to Ken Pawson, ALS. Pawson was City Surveyor for the City of Calgary and a pioneer of integrated control surveys in the province of Alberta. With the expiration of the AHEFLS's 10-year sponsorship, this bench has now become a permanent fixture of the Calgary Parks Foundation.





With the demolition of the old Claremount/Wheeler House on the north slope of Sulphur Mountain in Banff in 2011, a commitment was received from Parks Canada to recognize the accomplishments of A.O. Wheeler, ALS, BCLS, DLS, and to erect three interpretive panels near the Upper Hot Springs in Banff. Despite bureaucratic delays and the COVID-19 pandemic, the AHEFLS continued to press Parks Canada to complete and erect the panels. Finally, in June 2022, a dedication ceremony was organized, and the panels were officially unveiled. Various dignitaries, including the Mayor of the Town of Banff, the Superintendent of Banff, representatives of the Alpine Club of Canada, and Jennifer Compton, great-granddaughter of A.O. Wheeler, were present.

Wheeler was a resident of Banff and was well known as the founding President of the Alpine Club of Canada. From a survey perspective, he was the British Columbia Commissioner on the Alberta-British Columbia Boundary Survey and was instrumental in the survey of the Continental Divide, implementing phototopographical survey methods to delineate and monument the boundary from peak to peak, from the International Boundary (49° latitude) to the intersection of the Continental Divide with 120° of longitude. R.W. Cautley, ALS, DLS, was the Alberta Boundary Commissioner, and J.N. Wallace, ALS, DLS, was the Commissioner representing the Dominion of Canada.



In 2022, the Foundation was involved with the H & B Committee in setting up a permanent survey display in the A.E. Cox Land Agents building at the Kootenai Brown Pioneer Village (KBPV) in Pincher Creek. The survey display occupies the entire building and is the first building encountered when touring the 30 buildings at KBPV. The display features interpretive panels prepared by Gord Olsson, as well as survey artifacts from the AHEFLS collection.

The SHF has also been involved in lobbying the Government of Alberta to restore the C.H. Snell monument at the courthouse in Red Deer. This monument, erected by Alberta Public Works in 1987, has been vandalized. We continue to work with various government departments to restore this historic monument.



The final project of the Surveyors Historical Foundation was the publication of a 100-page booklet, *The Art of Surveying*. This booklet is being distributed to schools, libraries, art galleries, and museums throughout the province. Copies have also been provided to surveyors across Canada and the United States, as well as in Australia, and to the International Federation of Surveyors (FIG).

Ken Allred, ALS (Hon. Life), CLS (Retired)

Names from the Past: Before the Surveyors Came: Peter Pond and the Mapping of the Northwest

When I was surveying around the Fort McMurray area in the 1980s and 1990s, I often stayed at the Peter Pond Hotel, which was located near the Peter Pond Mall in Fort McMurray. From what I remember, many a cool beverage was consumed there while watching the Oilers on another playoff run. The hotel and mall were familiar landmarks to anyone working in Fort McMurray at the time.

So who was Peter Pond? What connection did he have to Fort McMurray or to the region?

Peter Pond was a fur trader, explorer, and mapmaker who spent the latter part of the 18th century travelling through the interior of what is now Canada. Although he was not a trained surveyor, his travels and maps helped increase European knowledge of western and northern Canada.

Pond was born in Milford, Connecticut, in 1740. As a young man, he served in the British army during the French and Indian War (1754–1763). His military service taught him discipline, survival skills, and how to travel through the wilderness. These experiences would later prove useful. Around 1765, Pond entered the fur trade. He joined independent traders in Montreal and gradually moved westward. By the 1770s, he was travelling far beyond the established European settlements, following the rivers and lakes that served as the natural highways of the interior.

His connection to Fort McMurray is primarily related to the route he travelled. In 1778, Pond crossed the Methye Portage in northern present-day Saskatchewan, travelled down the Clearwater River, and reached the Athabasca River in the area that would one day become Fort McMurray. He did not establish Fort McMurray, and his main trading post was not located there. He did, however, continue north toward Lake Athabasca and later established a trading post on the Athabasca River.

The exact location of this fort has never been identified. One historical account describes it as being: “About forty miles from where the Athabasca [River] empties into Lake Athabasca... Pond selected a site for a post now generally known as Athabasca Fort.” (*Barry Gough, The Elusive Mr. Pond, page 100*) Pond was among the first Montreal-based fur traders to travel this route into the Athabasca country. He used the fort as the centre of his Athabasca trade for much of the next decade, although he travelled widely throughout the region and was not there all the time.

As we are a surveying historical society, let me reiterate that Peter Pond was not a surveyor. There is no evidence that he received any formal training in surveying, astronomy or mapmaking. He did, however, produce several maps of western and northern Canada that would become important sources of information to future surveyors, traders, and explorers.

Perhaps Pond’s greatest contribution was the maps he created from his travels and from information he obtained from Indigenous peoples. Pond’s travels through this territory depended heavily on the knowledge and assistance of Indigenous peoples, who provided him with local knowledge of rivers, lakes, and travel routes through the region. Along with his personal observations, Pond incorporated their knowledge of the land into his maps.

So how was he able to turn this knowledge into maps covering such a large area?

David Thompson, the famous fur trader, surveyor, and explorer, later described Pond’s methods. Thompson wrote:

"At Lake Superior he (Pond) procured a Compass, took the courses by the compass through the whole route to his wintering place; and for the distances adopted those of the canadian canoe men in Leagues, and parts of the same, and sketching off the Lake shores the best he could. In the winters, taking the Depot of Lake Superior as his point of departure, the Latitude and Longitude was known... He constructed a Map of the route followed by the Canoes. It's features were tolerably correct; but by taking the League of the Canoe Men for three geographical miles (I found they averaged only two miles) he increased his Longitude so much as to place the Athabasca Lake, at it's west end near the Pacific Ocean."

(David Thompson, The writings of David Thompson, Volume 1, page 172)

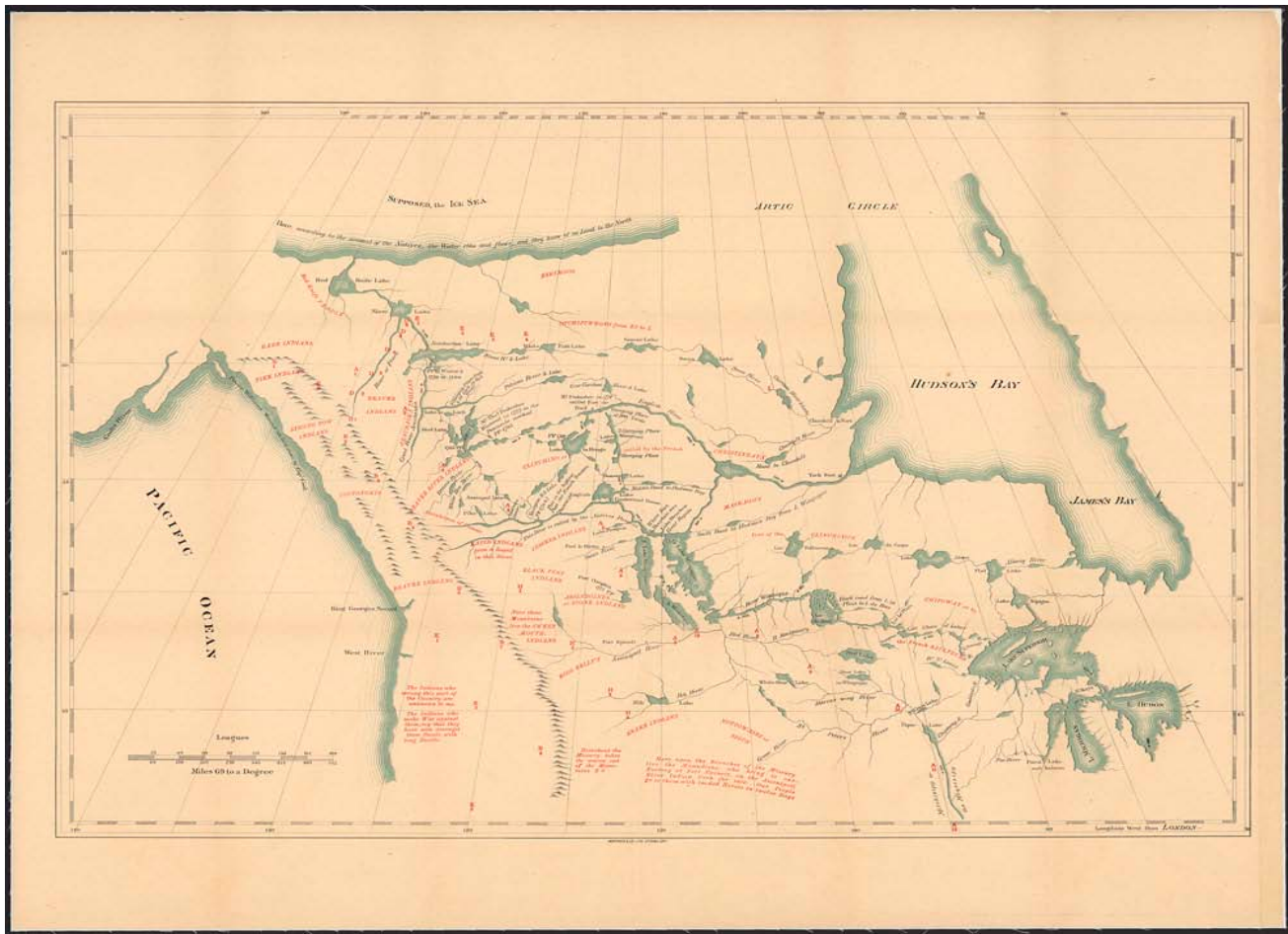
Thompson's description gives us a valuable insight into how Pond created his maps. He used a compass to determine the courses of his travels, estimated distances using the leagues employed by Canadian canoe men, sketched the shores of lakes as best he could, and used a known position at Lake Superior as a starting point. His maps were therefore based largely on compass bearings, estimated distances, personal observation, sketches, and information obtained from Indigenous peoples and other travellers.

The limitations of these methods are apparent in Pond's maps. Some of his distances and locations were in error by several hundred miles. This can be partially explained by Thompson's observation that Pond treated a canoe men's league as three miles when it was actually closer to two. Over his long journeys, this would result in enormous errors.

The maps did, however, show major river systems, lakes, trading routes, and mountain ranges much more accurately than earlier European maps. They would provide a tantalizing image of a vast area that was still very much unknown to Europeans. His maps helped draw attention to the enormous potential of the area and contributed to a growing European awareness of a vast region that would require further exploration, surveying, and mapping.

One of Pond's most important geographical contributions was recognizing the existence of a great northern drainage system connecting the Athabasca country with the country around Great Slave Lake and, ultimately, the Arctic Ocean. Although his understanding of the system was not entirely correct, his maps provided important geographical information that would help guide later exploration.

For a surveying historical society, Pond is an interesting figure precisely because he was not a surveyor. His maps illustrate what could be accomplished before trained surveyors such as Philip Turnor and David Thompson reached the region. By the use of compass bearings, estimated distances, sketches, accumulated travel experience, and knowledge obtained from Indigenous peoples, Pond produced maps that would encourage future exploration. His explorations and maps provided an early representation of an unknown area of our country that would lead to future explorations, surveys, and more precise maps.



Copy of Peter Pond's 1785 map of Western and North-Western Canada, showing Indigenous nations, rivers, lakes, fur-trade routes and posts. Printed reproduction, 1891
 Source: Library and Archives Canada, H2/700/1785, Item ID 4125138.

Content of article information courtesy of "The Elusive Mr. Pond, The Soldier, Fur Trader and Explorer Who Opened the Northwest" by Barry Gough, Douglas & McIntyre (2013) ISBN 978-1-77162-039-0

Les Frederick

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

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