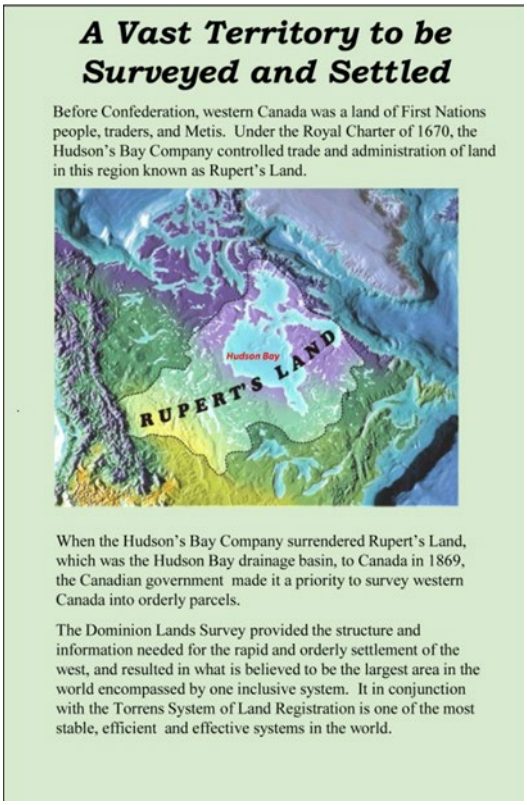
The Baseline

The Newsletter of the Alberta Geomatics Historical Society
Collecting, Preserving and Sharing the History of Land Surveying in Alberta
Vol. 1 No. 2 **December 2024**



The first of the 15 descriptive panels on the "Making Their Mark" museum exhibit.

The "Making Their Mark" museum exhibit as set up at the Alberta Legislature.

Message from the President

It has been a busy and exciting fall for all of us on the AGHS Board. Since the launch of our Society website in September, we have had almost 2000 page views generated through Google and 16 new members joining from across Alberta. We thank all of you who have joined our society and look forward to working together to preserve and promote the history of surveying in Alberta.

Please remember that membership is open to anyone with an interest in the history of surveying, not just professional surveyors.

We have several initiatives in the planning stage. One of the most important is the revitalization of the historical museum exhibit that was made by the Alberta Land Surveyors' Association to commemorate the Associations 100 anniversary and that has been shown in several museums across the province since 2009. This exhibit will showcase several of our over 700 artifacts. One of the goals of this exhibit is to educate the public about the role that surveying in Alberta has played in shaping our province. There is a lot of work to be done to update and refresh the exhibit so that the artifacts will be showcased in ways that will inspire people to learn about our profession.

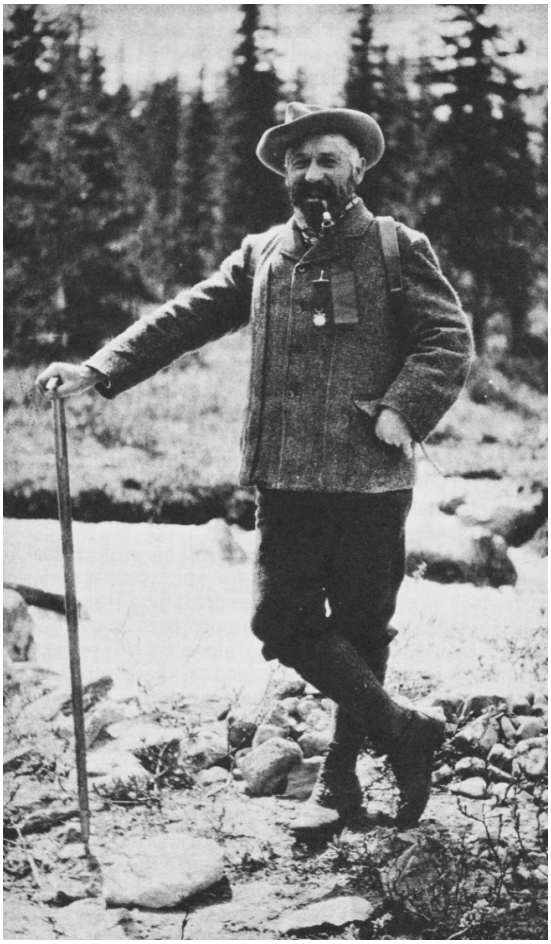
If you're not familiar with the museum exhibit, it consisted of an authentic surveyors' tent complete with a cot, wardrobe and instruments, 3 display cabinets showing a progression of survey artifacts, a display of several different types of boundary monuments used throughout history, and 15 display panels describing the history of land surveying in Alberta.

There is, however, much to be done to update the exhibit. Several panels require revising and display cabinets need to be built to name but a few. This requires time, manpower and money. We will require applying for grants and donations, sending correspondence to museums promoting our exhibit, and organizing artifacts.

Please join us and contribute to help us share the history of land surveying in Alberta!

Les Frederick, President

Names from the Past: Arthur O. Wheeler, DLS, BCLS, ALS, MLS, OLS



A. O. Wheeler, photo credit Dr. John O. Wheeler, retrieved from Wheeler, by E. Fraser, Summerthought Ltd, 1978, p. 97.

Arthur Oliver Wheeler, (A. O. Wheeler), was a pioneering Canadian surveyor and mountaineer whose work contributed significantly to the surveying and mapping of Western Canada, including the promotion of mountaineering, tourism and conservation in the Canadian Rocky Mountains.

Arthur Oliver Wheeler was born in Kilkenny, Ireland, on May 1, 1860. His family immigrated to Canada in 1876, eventually settling in Collingwood, Ontario. An interest in the outdoors and adventure was heightened by his reading of "Ocean to Ocean", a record of the epic journey of Sanford Fleming from the Atlantic to the Pacific in 1872. With the settlement of the North West imminent and the proposed construction of a coast to coast railway, Wheeler was told by a family friend that surveyors would be in high demand. Wheeler then started as a surveyors apprentice with Ryley and Hamilton, and with Elihu Stewart in Collingwood in 1877. After gaining practical experience on several surveys including timber permit surveys in Manitoba for railroad timber, Wheeler qualified as an Ontario Land Surveyor in 1881 and as a Manitoba and Dominion Land Surveyor in 1882. At this time, the Canadian government was actively mapping the vast, uncharted territories of western Canada and Dominion land surveyors were required for this task. Surveying was essential for the orderly settlement of the West.

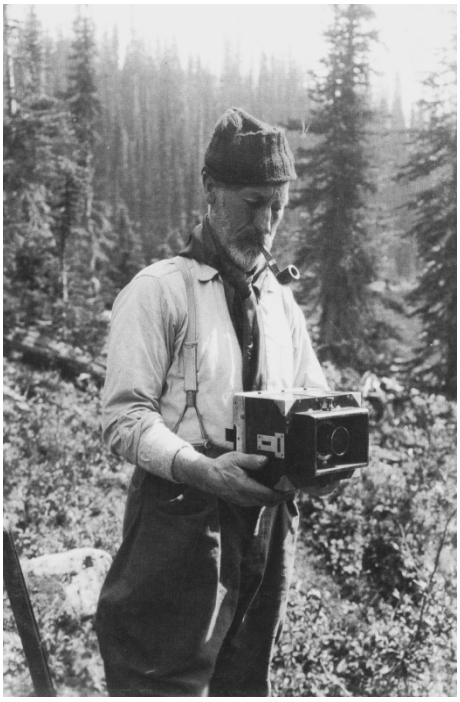
The Dominion Land Survey, established in 1871, was tasked with surveying the lands of Western Canada according to the grid system based on the meridian. Surveyors were sent into the field to mark out townships, sections, and ranges. Wheeler was one of many surveyors involved in surveying townships in 1883 when a record 27 million acres were surveyed for settlement; however, his career would take him further west – into the rugged and challenging terrain of the Rocky Mountains.

For six years from 1894, Wheeler was involved in irrigation surveys in southern Alberta along several rivers such as the Elbow, Highwood, Oldman and Milk Rivers. During his topographic surveys, he would use the photo-topographic camera developed by Edouard Deville to take photographs. This technique would incorporate the traditional triangulation survey using theodolites with a photographic camera to take a series of photos at each survey station. When the field work was finished, he would develop and enlarge the photos and incorporate the data obtained from theodolite observations to create topographic maps of the areas.

In 1901, Wheeler received instructions from Surveyor General Deville to perform a photo-topographic survey in the railway belt of the Rockies. "It was, therefore, with a thrill of satisfaction I realized, on reading my instructions, that the work lay among the biggest of the big fellows, and that I was to go into the heart of the Selkirks." The letter read: "to make a topographical survey of the Selkirk mountains adjacent to the line of the Canadian Pacific Railway, paying most attention to that portion, in the vicinity of the summit, visited by tourists and mountain climbers during the summer months."

Wheeler realized that in order to perform his surveys, he would require professional climbing instruction and this he received from Swiss guides that were employed by the C. P. R. Within a few months, he became an accomplished climber. From June to October of 1901, Wheeler and his crew occupied 35 camera stations on mountains, the highest being Mount Sir Donald at 10,808 ft. The next season, higher peaks were mastered, three being over 11,000 ft. During the second year, Morrison Bridgland (who was discussed in the September 2024 AGHS newsletter) was part of the survey crew.

Two seasons were spent completing the survey, covering an area from Beavermouth (43 km west of Golden) to Revelstoke and for several miles on either side of the railway. Not only did Wheeler produce accurate topographic maps, but he also published a report of his survey called *The Selkirk Range* in 1905, which described in detail his survey in addition to sections on travel and exploration, previous surveys, and mountaineering in the Selkirks.



A. O. Wheeler with a photo-topographic camera. V465-pd3-374, Whyte Museum of the Canadian Rockies.

Wheeler's passion for mountaineering extended beyond his survey work. In 1906, he helped establish the Alpine Club of Canada (ACC), with the goal of promoting the scientific exploration and appreciation of Canada's alpine regions. The ACC became an important institution in Canadian outdoor and mountaineering culture, offering a space for adventurers and scholars alike to connect with the country's rugged landscapes.

From 1903 to 1912, Wheeler continued his photo-topographical surveys throughout the Rockies, from Bow Lake and Lake Louise to Maligne Lake and Jasper.

A. S. Thomson photograph of A. O. Wheeler using the photo-topographic camera. A10726, Provincial Archives of Alberta.

In October 1912, he was appointed the British Columbia Commissioner of the three-member Interprovincial Boundary Commission which included J. N. Wallace representing the Dominion of Canada and R. W. Cautley representing the government of Alberta. Their instructions were to survey and map the Alberta-British Columbia border. They received their instructions from G. Deville, Surveyor General of Canada in February 1913.

The interpretation of the boundary was approved on February 18, 1913 and is read as follows: "Between the International Boundary and the 120th degree of longitude, the Interprovincial Boundary is the line dividing the waters flowing into the Pacific Ocean from those flowing elsewhere. This line may cross several times the meridian of 120th longitude. Should this be the case, it is proposed that the Interprovincial Boundary follow the watershed line from the International Boundary to the most northerly crossing of meridian and thence follow the meridian to the 60th degree of latitude. The watershed line being a natural feature is preferable to the meridian as a boundary and there are as many chances that the proposal, if agreed, to, shall be in favour of one Province as of the other."

It is well beyond the scope of this short article to describe the survey of this boundary. Suffice to say, the survey began in 1913 and Wheeler's participation ended when the watershed portion was completed in 1924. It was a

monumental task for all involved. It focused on 13 of the most significant passes which were close to populated areas, mining and timber claims, and highways or railways. Some of these included the Kicking Horse, the Crowsnest, the Palliser and the Yellowhead passes. For more information on this survey, please refer to the feature article, "*The Survey of the Alberta-British Columbia Boundary 1913-1924*" on the AGHS website.

It makes interesting reading in the books I will mention at the end of this article as to the methods of survey, the construction and numbering of the monuments, and the sheer determination of the men working under all sorts of weather conditions in all sorts of terrain from mountain tops to swamps. Wheeler surveyed and mapped the topography along the peaks of the Great Divide using his photo-topographic camera. It is a testament to the quality of their work that upon inspection in recent years, many of the original monuments are still in good condition.

Wheeler's survey crew taking photographs in the Chaba Valley. Notice the bag under the tripod which was filled with snow to weigh the setup down to prevent vibration from wind. 89.03.206, Jasper Yellowhead Museum and Archives.

The Alberta-BC boundary survey was the final project in A. O. Wheeler's illustrious surveying career, but he remained active in the Alpine Club of Canada for several more years. His work was widely recognized, and he received numerous awards and honors for his contributions to surveying, mountaineering and geography.

A. O. Wheeler passed away on March 20, 1945 in Banff and was buried in the Banff Town Cemetery.

His famous quote "Never give in, never, never, never – in nothing, great or small, large or petty – never give in except to convictions of honour and good sense" sums up the perseverance and dedication that defined his life and work.

For more information on the life of A. O. Wheeler and his survey and mountaineer career, please refer to:

- Fraser, Esther. Wheeler. Summerthought Ltd, Banff, Alberta: 1978
- Sherwood, Jay, Surveying the Great Divide: The Alberta/BC Boundary Survey, 1913-1917. Caitlin Press, Halfmoon Bay, BC: 2017
- Sherwood, Jay, Surveying the 120th Meridian and the Great Divide: The Alberta/BC Boundary Survey, 1918-1924. Caitlin Press, Halfmoon Bay, BC: 2019
- Sanford, R. W., The Canadian Alps: The History of Mountaineering in Canada, Volume 1. Altitude Publishing, Banff, Alberta: 1990
- Wheeler, A. O., The Selkirk Range. Government Printing Bureau, Ottawa, 1905
- Report of the Commission Appointed to Delimit the Boundary between the Provinces of Alberta and British Columbia: Part 1: From 1913 to 1916. Office of the Surveyor General, Ottawa, 1917
- Report of the Commission Appointed to Delimit the Boundary between the Provinces of Alberta and British Columbia: Part II: 1917 to 1921: From Kicking Horse Pass to Yellowhead Pass. Office of the Surveyor General, Ottawa, 1924

What is it?

By Les Frederick

I was given this instrument by my uncle when he learned I was studying surveying at the University of Toronto. The instrument originally belonged to my grandfather, who farmed near Powassan, Ontario. His father had emigrated from Prussia to Renfrew, Ontario in 1859. This particular instrument was unfamiliar to me, and I had no idea why my grandfather would have possessed such an object or where he might have acquired it.

From my research, I discovered that the instrument is a Pilot Balloon Theodolite, a specialized theodolite used for meteorological purposes rather than for land surveying. It looks very similar to a model made by Cary (London) in the 1930's, although there is no manufacturer's name on my instrument, only a serial number.

The instrument features a central plate bubble for levelling. The line of sight is reflected by 90 degrees, allowing the operators eye position to remain unchanged even as the elevation changes. The horizontal and vertical verniers are external and measured in degrees.

I came across a detailed description of a Pilot Balloon Theodolite on the website of Martin Brenner, Director of Technology at California State University. His description helped clarify the function and operation of this instrument:

Basic Definition:

A pilot balloon theodolite operates much like a surveyor's transit. It consists of a telescope mounted on two movable axes. The vertical axis controls elevation, while the horizontal axis controls azimuth. The telescope is mounted on a "bent axis" system, meaning that the optical path is bent 90 degrees. This design ensures that the operator's eye position stays constant even as the elevation is adjusted.

Basic Operation:

The theodolite is set up on level ground and oriented to true north, with both the vertical and horizontal scales set to 0 degrees. A weather balloon is then released in front of the instrument. At regular timed intervals, typically every minute, the position of the balloon is tracked by sighting it through the telescope. The azimuth and elevation angles are recorded to monitor the balloon's movement.

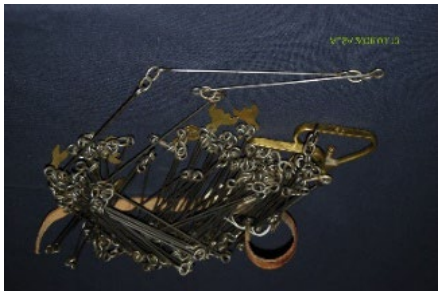
Purpose:

The primary use of this instrument is to track the direction and velocity of winds at various altitudes by observing the movement of a balloon. By measuring the azimuth (horizontal direction) and elevation (vertical angle) of the balloon at different points in its ascent, meteorologists can determine wind direction and speed at different heights.

Design and Origin:

According to Martin Brenner, the instrument is likely of German origin, based on its design, particularly the inclusion of a *finder scope*. Such scopes became popular in the 1930s, and German manufacturers were known for adding a complete second scope assembly, including a second eyepiece, to their theodolites. Brenner speculates that this instrument may have been produced by a smaller German workshop that is now defunct, making its exact origins difficult to trace.

Pilot Balloon Theodolite information courtesy of Martin Brenner, https://home.csulb.edu/~mbrenner/balloon.htm



Does your company want to showcase your surveying history?

We have several artifacts available from our collection for lease.

Leasing artifacts is a great way to showcase your company's survey history and is a creative and impactful way to tell your story. Not only does it allow you to honor the past and reflect on your company's milestones, but it also engages your employees and clients by connecting them with the legacy of your business. Whether you are a new company looking to build a sense of identity or an established firm wanting to celebrate its heritage, leasing historical artifacts could be the perfect way to tell your story while making a lasting impression on everyone who interacts with your company.

If you are interested in this endeavor, please contact us at: info@albertalandsurveyhistory.ca

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Website: www.albertalandsurveyhistory.ca

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For more information about how you can support the Alberta Geomatics Historical Society, please visit our website at www.albertalandsurveyhistory.ca or email us at info@albertalandsurveyhistory.ca