The Baseline

The Newsletter of the Alberta Geomatics Historical Society

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

Vol. 2 No. 1 **September, 2025**

Message from the President

Well, hasn't this been a summer to remember? In Edmonton, we've managed to escape a lot of the wildfire smoke, but that hasn't been the case for a lot of Canadians. Reports say this is the second-worst wildfire season ever recorded in Canada, and experts warn it could become the new normal. Already in Canada, fires have burned an area more than 100 times the size of Edmonton—and the season isn't over yet.

This quarterly newsletter's *Names from the Past* article introduces Peter Fidler, one of Canada's most accomplished surveyors, though few people know his name. In his journals from his travels through southern Alberta in 1792, Fidler often described wildfires: *"grass having been lately burnt," "grass nearly all burnt," "grass yet burning."* For days, fire dominated his entries, with no end in sight.

The Indigenous peoples in the area used fire as part of their culture. They used it to improve wildlife habitat, clear horse pasture, herd elk, drive game, signal neighbours, and encourage the growth of food and plants. Fire provided warmth in the winter and enabled them to cook their food. They understood the importance of burning a forest area before undergrowth became too dense, and they had been caring for the land this way for thousands of years.

When Europeans arrived, they saw fire as dangerous and destructive and worked hard to stop it. They banned the practice, often punishing Indigenous peoples who continued it. That clash of beliefs has left lasting consequences.

Today, after decades of fire suppression, Canada faces mega-fires fueled in part by thick, dry undergrowth. Attitudes are shifting, however, and there is growing recognition that traditional fire stewardship holds valuable lessons. The challenge now is finding solutions that include all voices—especially Indigenous voices—so that this knowledge can be passed on to future generations.

Looking Back and Moving Forward

It's true what they say—the older you get, the faster time flies. It's already been a year since the Alberta Geomatics Historical Society (AGHS) launched its website, and it's been a great success. In fact, it's now the top result in AI searches for land survey history in Alberta and western Canada. Thank you to all our members who write articles and help maintain the site. The website is our main link to the public, so it's always being updated. If you have ideas or feedback, I'd be glad to hear them.

Just as time moves quickly, so does technology in surveying. What's cutting-edge one year can be a museum piece the next. Recently, Spatial Technologies donated a Leica P20 laser scanner to the society—many thanks to Jeff Johnston for making this possible.

The first portable laser scanner for surveyors was the Cyrax, made by Cyra Technologies in 1998. It could capture a 40° × 40° view at 1,200 points per second and weighed about 40 kg. In comparison, the Leica P20, released in 2009, can scan a full 360° at one million points per second, with 5 mm accuracy over 50 metres, weighs just 12 kg, and completes a scan in six minutes.

In our artifact collection, we have a Galileo photo-theodolite generously donated by Ed Hodge. This instrument integrates the functions of a theodolite and a camera, allowing photographs to be tied to measured angles. It was primarily used for mapping, but could also be used for volume calculations of earthworks. The concept behind it could be interpreted as similar to a scanner, however instead of digital points, a photograph is utilized. Ed used this instrument in the 1970s at Syncrude for tar sand monitoring.

Leica P20 scanner
donated by Spatial Technologies

Galileo Photo-theodolite
ALSA 2022-04-01
donated by Ed Hodge

The AGHS artifact collection holds survey instruments spanning centuries—from an 18th-century Spencer Browning & Co. sextant, through various EDMs and total stations, to modern RTK equipment. While many still work, fewer people know how to use them. Displaying these tools with short descriptions is helpful, but seeing them in action would be even better—especially for today's Alberta Land Surveyors and students. Perhaps one day, we will bring some of the artifacts out, charge them up and give demonstrations as to their use. How interesting it would be to compare the procedures required to obtain a distance between a Gunter's chain, a 1960's Tellurometer, a 1970's Hewlett Packard, and a modern total station. How many surveyors would like to learn how to use a sextant, a Curta calculator or a tachymeter? I think it would be an interesting topic to discuss sometime in the future.

Tellurometer MRA-1
ALSA 2006-05-05
donated by the Director of Surveys

Curta calculator
ALSA 2008-16-02
donated by Murray Ingalls

Sanguets Tachymeter
ALSA 2007-06-01
donated by Siegfried Osterwoldt

Just as Indigenous fire knowledge is worth preserving and passing on, so too is the practical know-how of operating these historic surveying instruments. Both are part of our shared heritage, and both deserve to be kept alive for the future generations.

Les Frederick, President

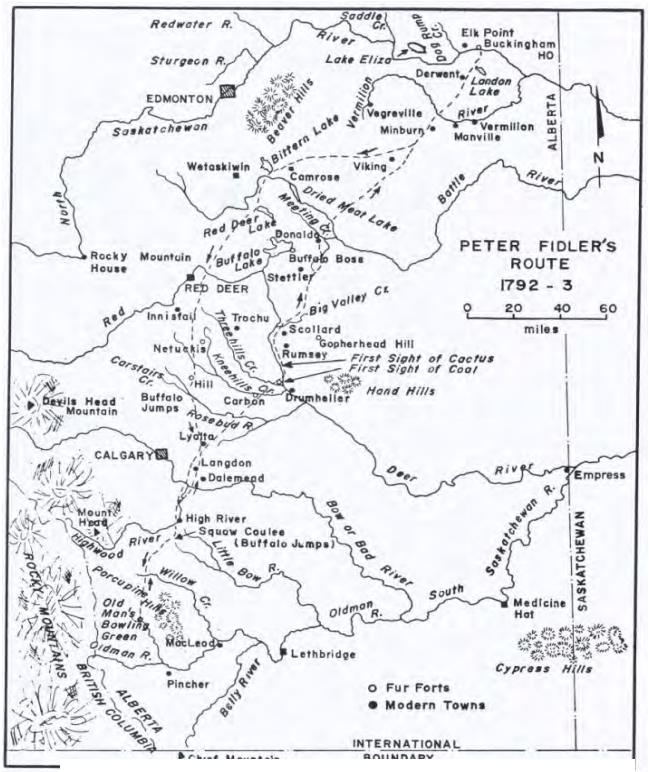
Names from the Past: Peter Fidler, Canada's Unknown Surveyor

Peter Fidler was born in 1769 in Bolsover, England. When he was nineteen, he joined the Hudson's Bay Company (HBC) as a labourer and travelled to York Factory, an HBC trading post on the shore of Hudson Bay. His early education must have shown, as he was soon promoted to post journal writer. In the spring of 1790, he was sent to Cumberland House where he would be trained by Philip Turnor, the HBC's chief surveyor in surveying and astronomy.

It was a twist of fate that brought Fidler and Turnor together. Turnor had sent for Fidler because his student, David Thompson, was still recovering from a broken leg sustained in December, 1788, and was unable to accompany him on the journey. Turnor had spent the winter training Thompson in practical astronomy, record keeping, and mapmaking. Now, with Thompson unable to travel, Turnor began training Fidler in the use of instruments such as a sextant, compass, quadrant, and chronometer. These instruments were essential in accurately determining location, measuring off distance, and mapping the natural features of the country.

Turnor had arrived at Cumberland House in October, 1789 and was preparing for a northward expedition to map the rivers, lakes and terrain of the Lake Athabasca area. The HBC was particularly interested in finding a navigable water route from the Hudson Bay area to Lake Athabasca and Great Slave Lake due to the large amount of high quality furs available there. They were also to determine the extent to which the rival North West Company (NWC)had infiltrated the area and established trading posts. Peter Fidler's journal states, "our sole motive for going to the Athapescow is for Mr. Turnor to survey those parts in order to settle some dubious points of geography, as both Messrs Hearn (Samuel) and Pond (Peter) fixes those places in their respective maps far more to the westward than there is good reason to think them".

The exploration of the Athabasca region took almost two years, and in that time, Fidler proved his skills not only in surveying and mapmaking but also in building relationships with the Indigenous peoples of the area. He was eager to learn from the Indigenous communities. He spent from January to April 1791 living with Chipewyans north of Île-à-la-Crosse and the winter of 1791-1792 living with them around Great Slave Lake, learning their language and traditional methods of shelter, hunting and travel and recording it all in his journal. This knowledge would serve him well throughout his life.



map courtesy of www.peterfidler.com

In November, 1792, Fidler embarked on a journey which took him deep into present-day Alberta. He travelled with a band of Peigans from Buckingham House, near present day Elk Point, following the Battle, Red Deer and Bow Rivers to the foothills of the Rocky Mountains. This journey was one of the earliest recorded European crossings of the southern Alberta prairies.

Along the route, he recorded observations in his field journals with meticulous attention to detail. He noted the locations of rivers, recorded weather patterns like the Chinook winds and described the landscapes. He described the Peigans' use of a buffalo jump. He spent six weeks in the High River area before continuing south to present day Livingstone Gap, where he became the first European to trade with and document the customs of the Kootanays.

In February, 1793, Fidler and his party started back to Buckingham House retracing their route. His journal mentions the first written record of coal in Alberta,

near Kneeshills Creek near present day Drumheller, and the first mention of cactus. Another note in his journal mentioned the incredible abundance of buffalo in the area northeast of the Red Deer River Valley. “The Buffalo are very numerous on the NE side the Red Deers river & near it… from the N to S the ground is entirely covered by them & appears quite black. I never saw such amazing numbers together before. I am sure there was some millions in sight as no ground could be seen for them in that compleat semicircle & extending at least 10 miles….”

On March 20, Fidler arrived back at Buckingham House only to be dispatched almost immediately to survey the mouth of the Sturgeon River near present-day Fort Saskatchewan. There, he concluded the site unsuitable for a fort due to lack of timber, but his latitude measurement proved astonishingly precise—within 500 metres of its true position.

What types of surveying instruments did Peter Fidler use on his travels and how did he attain his remarkable accuracy at the time? Fidler mentions in his “Journal of a Journey with the Chepawyans or Northern Indians, to the Slave Lake, & to the East & West of the Slave River, in 1791 2” that “the observations in this journey are made with the small Sextant … of 5 inches radius with an artificial horizon of quicksilver but no parallel glasses! Being obliged when I took an observation to seek a calm place that the Wind might not have any power to shake the Mercury which answered nearly as well as having Parallel Glasses… sometimes I would have had an observation more frequent but either the Wind blowed too hard or else being in the midst of thick woods I had no watch with me consequently could make no Observations for the longitude with the necessary degree of accuracy… The Nautical Almanack & requisite Tables composed the whole of my Library”.

An artificial horizon is a little basin which you can fill with mercury which was carried in a small container. The surface of the mercury is used as a mirror to reflect the images of the sun and stars in taking astronomical observations. The parallel glasses are sheets of glass used to cover the mercury to prevent the wind from disturbing the surface of mercury. The artificial horizon was used when the real horizon was not visible.

Fidler also utilized a small brass compass for directions to stay on course and record the directions of rivers and trails, a watch to enable him to calculate longitude, and a thermometer. Remarkably, Fidler recorded the temperature three times a day for over 22 years!

Spencer Browning Sextant
ALSA 2010-10-01
purchased by ALSA H & B Comm.

surveyors field compass

Artificial Horizon & mercury bottle
ALSA 2010-10-02
purchased by ALSA H & B Comm.

The next several years were spent working at York Factory and taking part in building several HBC trading posts in northern Saskatchewan. Fidler's next travels to what would become present-day Alberta would not be until August, 1799, when he, his Cree wife and two young sons and others undertook a voyage from Cumberland House to Lac La Biche via the Beaver River. The rival North West Company had constructed a trading post at Lac La Biche in the fall of 1798 and the HBC was determined to establish a chain of trading posts that would support their push into the Athabasca area.

Fidler travelled west from Cumberland House navigating through dense forests, muskeg and various waterways. He followed the Beaver River where at Meadow Lake, he constructed Bolsover House, named after his birthplace. From Bolsover House, he continued west and after two months of frustrating and time consuming travels due to the characteristics of the Beaver River and swampy portages, he finally reached Lac La Biche on September 26.

At Lac La Biche, Fidler established Greenwich House, another trading post designed to challenge the NWC's dominance. The location was ideal. It was located at the crossroads of several major waterways, and served as a gateway to the Athabasca and Mackenzie River systems. Control over Lac La Biche meant access to rich fur resources and gaining influence over Indigenous trade networks. By establishing Greenwich House, Fidler aimed to secure HBC dominance in the region. The post served as a base for trading, surveying, and further exploration.

Fidler's time at Greenwich House was marked by intense rivalry with the NWC. Nevertheless, Fidler managed to maintain relatively peaceful relations with local Indigenous groups, thanks in part to his respectful approach and his family's integration into Cree society. He performed detailed surveys of the lake and region. One of Fidler's most notable contributions during this period was his collaboration with Indigenous peoples. He collected birchbark maps and oral descriptions from local guides, which he then transcribed onto paper. This information, combined with his own personal surveys resulted in Fidler being able to produce highly accurate maps. Fidler's openness to Indigenous knowledge set him apart from many of his contemporaries and contributed to the success of his surveys.

Peter Fidler departed Lac La Biche in the summer of 1800, after spending the winter of 1799–1800 at Greenwich House. His next destination was the junction of the Red Deer and South Saskatchewan Rivers, where he established Chesterfield House, near modern-day Empress. Fidler continued surveying until 1802, when conflict between the HBC and the North West Company shifted the focus onto maintaining existing trading houses, rather than establishing new ones. Fidler continued as a surveyor and later as a chief trader, but his days as an explorer were over. He died in 1822 at Dauphin House in Manitoba, at the age of 54.

Over more than 30 years of exploration and surveying for the HBC, Fidler travelled approximately 48,000 miles, produced 373 sketch maps, and surveyed over 7,300 miles of western Canada. He was more than just a surveyor or explorer- he was a bridge between European and Indigenous knowledge. His interest in Indigenous peoples and his willingness to learn from them made him one of Canada's most effective early surveyors and mapmakers. His integration of Indigenous knowledge with his surveying training enabled him to create maps that served as foundations for future exploration and development across western Canada.

All article information courtesy of "Peter Fidler, Canada's Forgotten Explorer 1769-1822" by J. G. MacGregor, Calgary: Fifth House Ltd. (1998). ISBN 1-894004-19-1

Peter FIDLER (on the left) and Philip TURNOR (centre)
Oil Sketch by Lorne Bouchard
www.peterfidler.com

Les Frederick

“Ducks must be plentiful”: Surveying dry lakebeds in Alberta, 1912-1920

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Alberta was surveyed into townships (nominally 6 miles by 6 miles) by Dominion Lands Surveyors (“DLS”) starting in 1881; the surveys continued with great gusto for three decades. Before 1912, the Topographical Surveys Branch (“Branch”) of the federal Department of the Interior surveyed lakes during the township surveys by traversing their banks and noting their characteristics. For example, C. Rinfret, DLS surveyed Township 56, Range 1, West of the 5th Meridan in Lac Ste. Anne County in 1905 (Figure1). He noted that:

- “There are a few muskegs, but the lakes are numerous.”
- “Water in Sandy Lake is good, but water is bad in other lakes,”
- “Ducks must be plentiful as in the adjacent townships.”

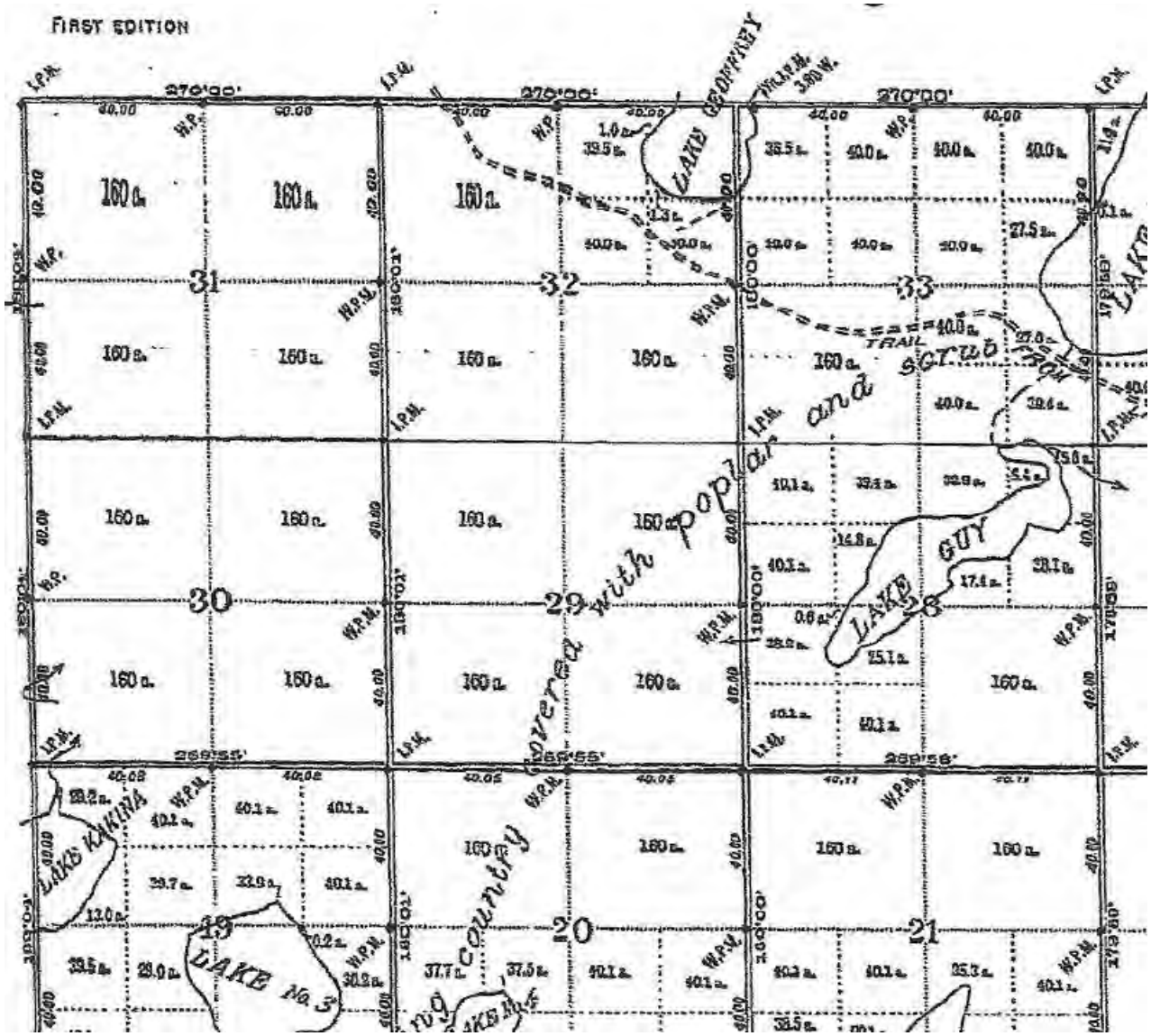

Figure 1: North-west part of Plan of Township 56, R1, W5M, as surveyed by C. Rinfret, DLS (1905).

Recall that Alberta started off life in 1882 as the District of Alberta within the North-west Territories and became a province of Canada in 1905. However, the federal government continued to administer natural resources after 1905 in Alberta (and elsewhere). This meant that the federal government continued to survey, resurvey and grant Crown land in Alberta, until the *Natural Resources Transfer Agreement* shifted the administration and control of resources from Ottawa (Canada Crown) to Edmonton (Alberta Crown) on October 1, 1930. As an aside, the *Alberta Act 1905* set out that – because Alberta did not have jurisdiction over its public land as a source of revenue – Canada would pay Alberta $375K to $1.125M annually, depending on provincial population, and would pay $93,750 annually for erecting public buildings.

By the 1910s, the Branch realized that the many shallow lakes in Alberta – indeed, across the three Prairie provinces – were shrinking because of drought. There were devastating drought events over western Canada during the 1890s, and throughout the 1910s (in 1910-11, 1914-15, and 1917-20). Such droughts continue to bedevil Alberta, which is located in the lee of the Rocky Mountains and distant from a large moisture source (e.g. Pacific Ocean); droughts are affected by the El Nino/Southern Oscillation. The result of such recurring droughts (which a have a duration of 8-32 months) is that water levels of most closed-basin lakes in Alberta have declined since 1900.

In 1912, the Branch also knew that Prairie lakes varied significantly in area owing to farming – the clearing of land and draining of waterbodies. Knowledge of the effects of these two forces (drought and farming) led to a change in how the Branch resurveyed lakes. Between 1912 and 1920, the Branch employed DLSs to investigate and re-survey lakes and former lakebeds using two criteria:

- Permanent lakes greater than 5 acres in area were traversed using stadia.
- Lakes which had dried up or were likely to dry up were investigated.

Of course, if the water in a lake had receded, then it meant that there was exposed lakebed. The Department referred to such exposed/dry land as additional land area, as accrued lake area now available to be purchased, as additional area due to the recession of the waters of the lake and to a different method of survey, and as a formerly submerged portion.

The *Annual Reports* of the Branch reveal that there was much re-surveying of lakes and much re-compiling of Township plans in the 1912-1920 period across the Prairies. In 1913-1914 alone, eight surveyors resurveyed lakes in 458 townships. They traversed 3,359 miles, recorded measurements – distances and directions – in 113 fieldbooks, and drew 789 plots/sketches. Three of the surveyors resurveyed lakes in Alberta:

G. W. Coltham, DLS surveyed east of Edmonton. He noted that, at Sickman Lake, “the old shore is visible in many places more than a chain [20 m] from the water’s edge” and that “a small lake in the SW-quarter of Section 7 has entirely dried up.”
G. C. Cowper, DLS surveyed near Medicine Hat. He noted that, in one area, “only one lake was found to contain water, all the other lakes having dried up, these now form valuable hay meadows.”
A. Saint Cyr, DLS traversed hundreds of lakes across 54 townships near Red Deer.

The 1917-18 *Annual Report* noted that “when townships were originally subdivided many bodies of water existed which have now wholly or partially dried up.” The Branch employed 11 surveyors to traverse lakes in Alberta and Saskatchewan; they traversed 8,229 miles of shoreline, sketched 1,159 lake plots, and recorded observations in 204 fieldbooks. This included traverses by H. M. R. Soars, DLS of lakes in Township 56 within Lac Ste. Anne County, which had first been surveyed in 1905 (Figure 2).

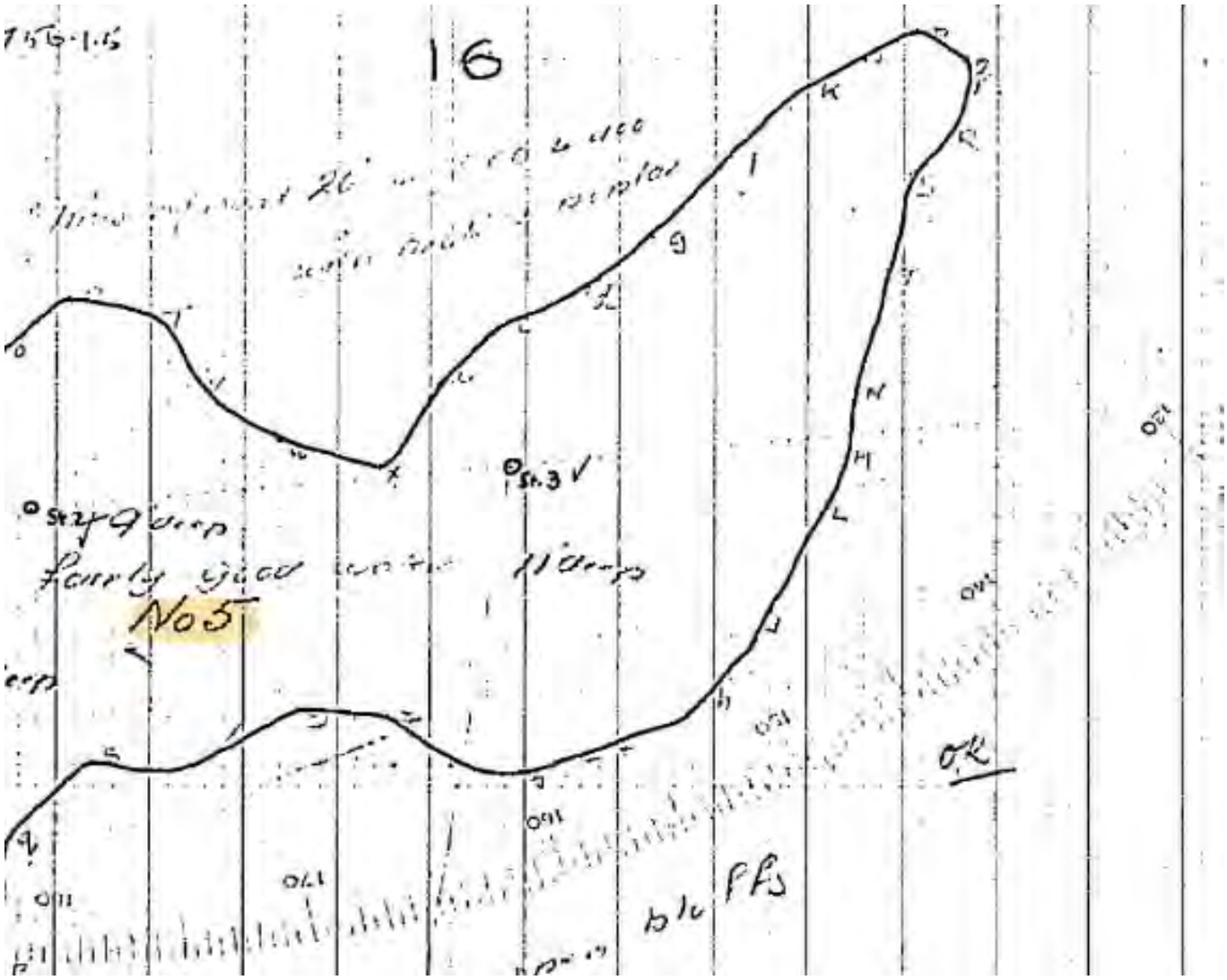

Figure 2: Stadia traverse of Lake No. 5 within Township 56, R1, W5M, as re-surveyed by H. M. R. Soars, DLS (1918).

The 1919-20 *Annual Report* noted that stadia surveys were an accurate and inexpensive method of "determining the boundaries and extent of water areas … to ascertain the area of land available for cultivation on account of the drying up of lakes since the last survey." The Branch employed 10 surveyors to traverse lakes in the prairies; they traversed 5,689 miles of shoreline and sketched 710 plots of lakes, across 504 townships.

The 1920-21 *Annual Report* described "the work of determining the present area and permanency of all the bodies of water in the townships which were surveyed years ago and the plans of which are being revised as the work progresses." The Branch employed 10 surveyors to traverse lakes in Alberta, Saskatchewan and Manitoba; they traversed 4,010 miles of shoreline, sketched 517 plots, and recorded observations in 114 fieldbooks.

After re-survey, Township plans were re-compiled to show any dry lakebed as fractional parts of a legal subdivision (a legal subdivision is a parcel of 40 acres, being ¼ of a ¼ Section). The fractional part was usually 10 acres, being ¼ of a legal subdivision. These straight-line boundaries divided "land available for disposal and that rendered useless by water." For example, the plan of Township 56 in Lac Ste Anne County was redrawn in 1919, based on the 1918 resurvey of the lakes within the township, and the dry lakebed was included in the 10-acre fractional parts of each ¼ Section (Figure 3).

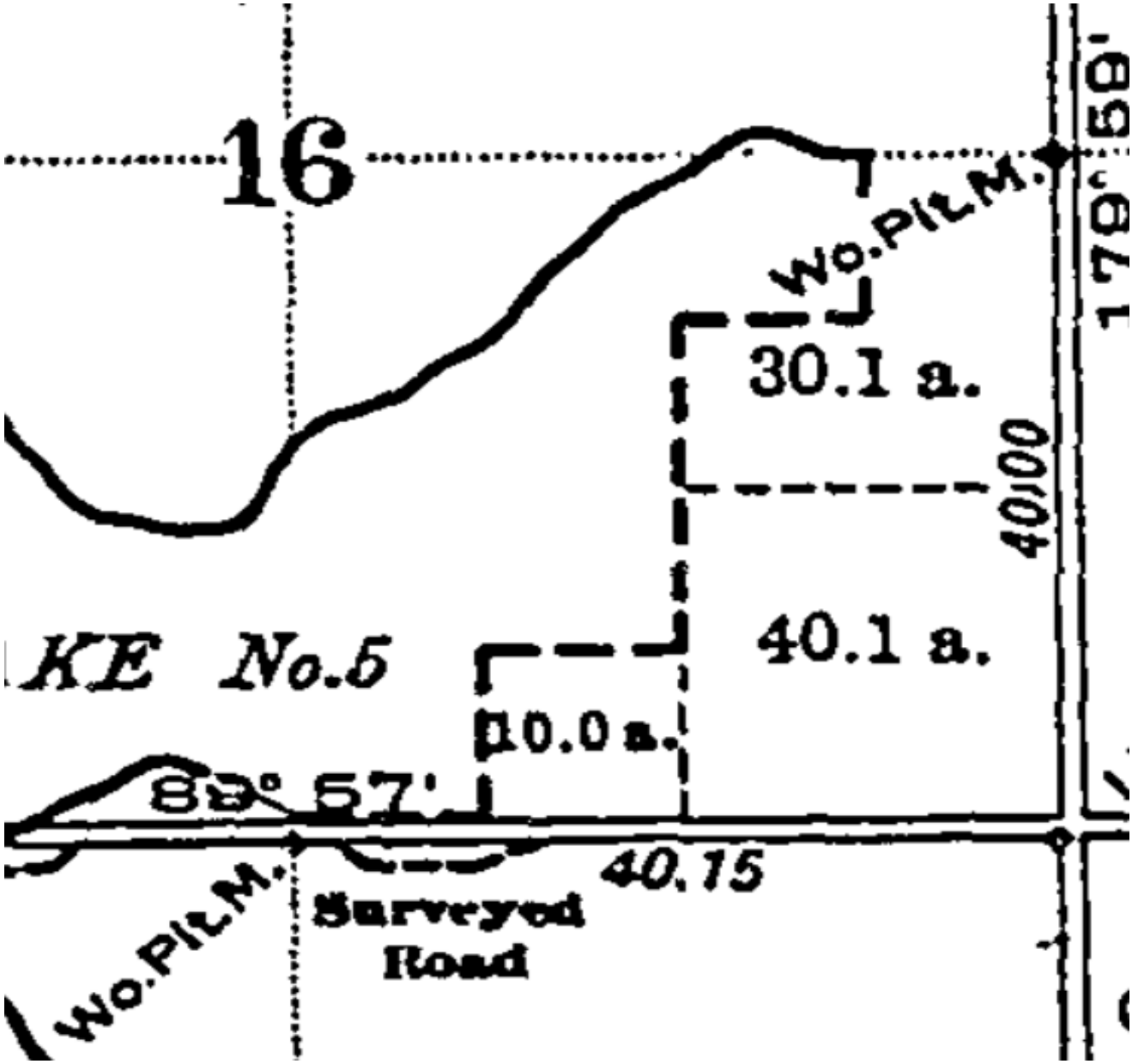

Figure 3: Recompiled Plan of Township 56, R1, W5M, showing new boundary around lake No. 5 (1919).

This review of 39 DLSs across four years, three provinces and 21,287 miles of traverses reveals the scale of the Canada Crown's effort in surveying and mapping dry lakebed. The surveys were condoned by the province, accepted by the adjoining landowners, and acknowledged by the courts. A 1923 court decision observed that "by this practice, the Crown makes a survey of all land which from time to time emerges from lakes, and deals with it as owner" (*Lang v Greaves*, 1923 - MBKB). In 1938, the Surveyor General (Canada) described the surveying process to the Director of Surveys (Alberta) as "not perfect but on the whole has worked out very satisfactorily over a period of years."

What did the Crown do with the dry lakebed parcels? One might infer that, if the lake had dried up gradually, then the exposed lakebed would naturally attach to the waterfront parcel as accretion. However, such was not Crown policy. Rather, the Crown (federal before 1930 and provincial until 1966) insisted that dry lakebed were separate parcels to be granted or sold to the adjoining waterfront parcel (Figure 4). But that is a story for another issue of *The Baseline*.

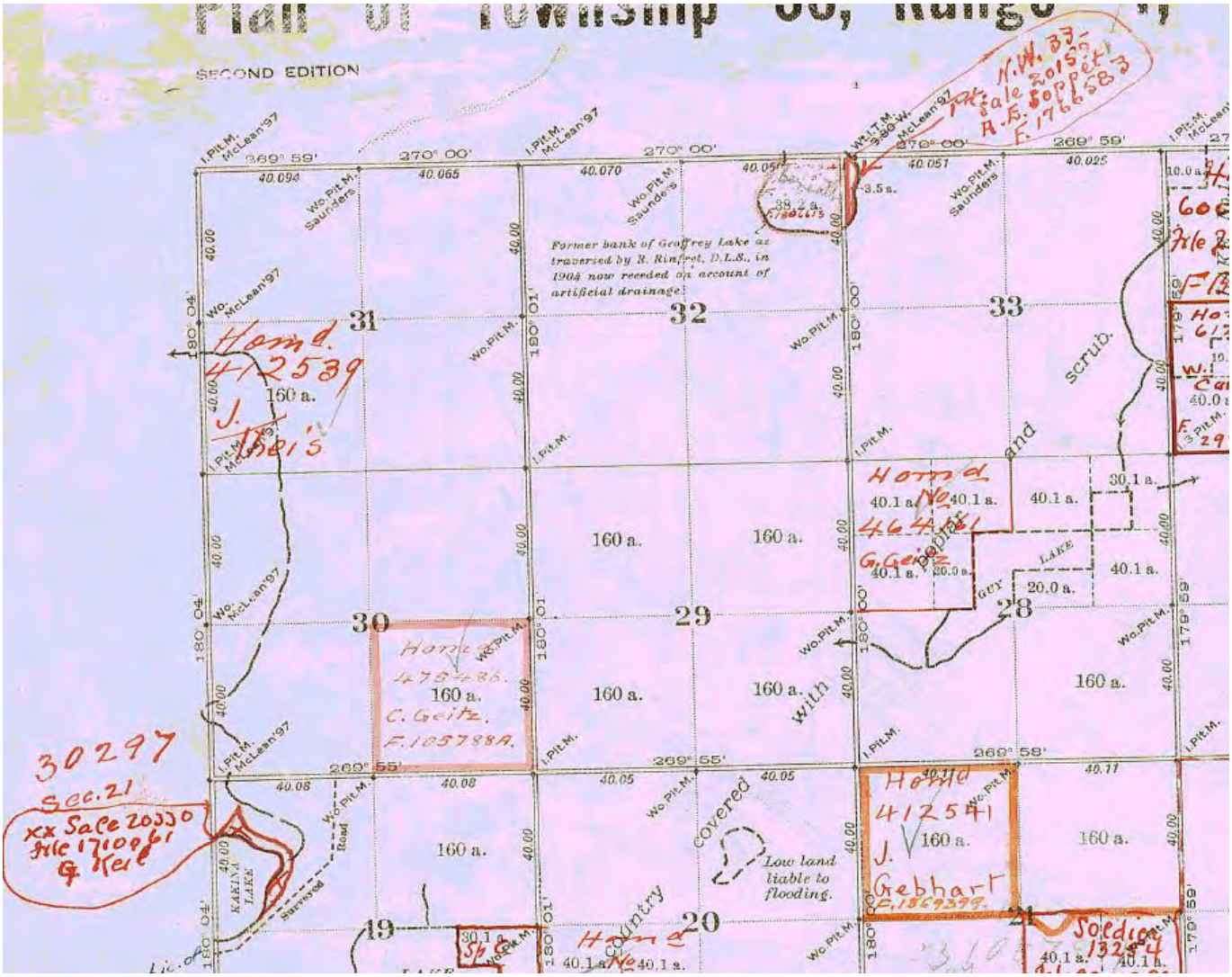

Figure 4: North-west part of Plan of Township 56- R1- W5M, showing changes from 1905 Plan (1919).

Brian Ballantyne

Update on NAIT pausing Surveying and Geospatial Engineering Technology Program

It has been reported by the ALSA that NAIT management has removed the Surveying and Geospatial Engineering Technology Program from the pause list. This is welcome news for our profession. Nevertheless, it is important that we continue to demonstrate our support for the program by communicating to NAIT's decision-makers the vital role it plays in sustaining and advancing our industry, and to support the students.

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