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on the cover ...

Sheraton on the Falls
Site of the 122nd AOLS AGM
Niagara Falls, Ontario

also in this issue ...

GIS 101 for Surveyors
Partners for a Season
Townships Named for Surveyors
Focusing on STEM in the 21st Century

plus our regular features:

Educational Foundation
News from 1043
Advertiser's News
Book Reviews

Canadian Publications Mail Product
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ONTARIO PROFESSIONAL SURVEYOR

VOLUME 57, No. 1 Winter 2014

CONTENTS

REGULAR FEATURES

ADVERTISERS

ON THE COVER ...

The 122nd AOLS Annual General Meeting will be held at the Sheraton on the Falls Hotel in Niagara Falls from February 26 to February 28. This year's theme is *Tomorrow is Now.* More information about the meeting can be found on the AOLS website (www.aols.org).

Professional Surveying in Ontario

encompasses the Disciplines of

Cadastral, Geodetic, Hydrographic, Photogrammetric Surveying & Geographic Information Management

President's Page

By Eric L. Ansell, O.L.S., O.L.I.P.

It is the first day of December as I write this, my final President's Page. It is hard to believe that my term is quickly coming to a close and that our 122nd Annual General Meeting is only, what seems to be, a few short weeks away. I committed to do a number of things and address a number of issues while President. Some of those tasks have been accomplished but like all great expectations some have not.

One of the main components of my platform was to instill and garner the ethics-based profession concept. Over the course of the past year I have seen many cases where our members have proven to be very ethical and only a very rare occasion where business or client needs have overshadowed our ethics. But of course ethics is not simply how we deal with our clients or undertake our surveys but also how we treat and interact with our employees and our fellow members. It is also how we act and conduct ourselves in our private and family lives as well.

Professional development is also something that we all have to embrace and support. I know the majority of us understand the importance of continued professional development and take the necessary steps to keep informed. However we tend to ignore or procrastinate regarding the need to record or tabulate our professional activities. As many of you read this, you have probably already struggled with completing the necessary forms to be submitted along with our annual dues. The recording of these activities is a necessary evil and hopefully many of you have now realized that tracking your activities on a regular basis is the appropriate course of action.

I was very hopeful that during my tenure we would see ODCC become a strong, self-sufficient corporation that was in such a good financial position that we would see returns on our investment. There are some exciting changes that will occur during the next couple of months leading up to our AGM and I am confident that there will be important announcements regarding ODCC and the Co-Operative. We continue to attract new clients and the corporation continues to grow. As an Association of Surveyors and Geomatics Professionals, through the ODCC we will ultimately have the ability to harness the potential benefits that come from an integrated digital survey fabric that is kept up to date and can be used by all land professionals to help them inform and safeguard the interests of the public. ODCC will have a positive impact on how our members work together for years to come.

There is a tremendous amount of work that goes on behind the scenes that many of you may not be aware of. One extremely important example of this is that this year the Academic and Experience Requirements Committee (AERC) has made some very important improvements to the articling process. These improvements are not necessarily changes to make it easier or less stringent for students to make their way through the articling process but changes that have taken away some of the administrative barriers allowing students to work through the process in a much more efficient manner. The AERC has relied on many surveyors to assist them with preparing the requirements and setting questions for the Essential Areas of Knowledge.

This fall we had the Professional Surveyors of Canada (PSC) By-Law which failed to pass and thus the AOLS will not be included in the PSC "all in funding model". Individual AOLS members will still be able to join PSC but will have to make a separate application to PSC and pay dues directly to PSC. I still encourage all members to support a national voice for the surveying community.

Of course I can't let this edition go by without mentioning the website. We struggled for a number of years to migrate from the old website to the new but this fall we saw the launch of the new and improved website. I am sure that everyone will agree that the new site offers much more to both our members and the public, and maybe as important, it is many times more attractive or appealing thus it is driving the public and potential students to the site on a regular basis. I am very pleased to see the new site up and running and running very well indeed. This of course does not mean that there are not improvements or better functionality that can be made but the new site does give us the ability to make those necessary enhancements internally and quickly.

In each of my previous President's Pages I have canvassed for volunteers and people willing to run for Council. It was very disappointing to see the notice go out on November 20th with only one candidate stepping forward for Council. At the time of writing this page I understand that others have already put their name forward resulting in a more fulsome slate of candidates. I thank and congratulate all members who have volunteered to be part of our many committees or have made the valuable commitment to run for Council and be a leader in directing our association over the coming years.

I made the analogy in my last President's Page that being on Council is like taking a roller coaster ride. Well I have crested the final rise and the car is slowing down towards the exit. It has been my great pleasure to serve as your President this year. I am very proud and humble at the same time to have been given this great opportunity. The roller coaster ride ends at the 122nd Annual General Meeting in Niagara Falls in February 2014. I hope to see all of you there and I look forward to many successful years for our association.

Townships Named For Surveyors (Part 1)

By Allan Day

On January 5, 1965 H(arry) A Sexton[1] reported that there are 2,558 townships[2] in Ontario. I thought that it might be interesting to see how many of the townships were named for surveyors. Much more can be said about several of these surveyors but due to space limitations I tried to focus on some of the highlights of their careers.

HELP WANTED If I'm missing any townships I would appreciate an e-mail telling me about the township. Thank you.

Abrey Township[3] named for ***George Spencer Abrey***. He received his secondary education at Upper Canada College. After leaving high school he entered an engineering course at the School of Practical Science in Toronto. He started his surveying career by being articled to his father George Brockett Abrey. On April 6, 1906 he received his commission to be an Ontario Land Surveyor.

Bazett Township[4] named for ***Edward Bazett***. He was educated at St Paul's College, Stoney Stratford, England. He and his family moved to Canada when he was 18 years old and lived in Orillia. Bazett studied to be a Provincial Land Surveyor and was articled to Frank Armstrong and became an OLS July 8, 1881. He spent two seasons in the west and later returned and started a practice in Midland. He was known for his work in Parry Sound and Nipissing Districts and the Cobalt area during the mining development. He was also a Dominion Land Surveyor.

Bolger Township[5] named for ***Thomas Oliver Bolger***. After coming to Canada in 1858 Bolger worked as an engineer under Mr Tate[6] on the construction of the Grand Truck Railway. He studied surveying under George Dean, PLS and was commissioned as a Provincial Land Surveyor on October 10, 1863 and practiced in Elora. He held the position of assistant engineer with the Intercolonial Railway under Mr Peterson who was the chief engineer of the Canadian Pacific Railway. Bolger practiced surveying in Toronto, St Catharines and for 14 years in Penetanguishene. He was employed at the Ontario and Dominion Governments at various times during his career. In April 1895 he was appointed engineer for the Township of Ops.

Bridgland Township named for ***James William Bridgland***. He was apprenticed to John Stoughton Dennis and qualified as a provincial land surveyor on May 6, 1844. He became a member of the staff of the Crown Lands Office on January 22, 1856. He surveyed the townships of Mornington, Kincardine, Carden and along the Muskoka River and the Indian River. After 1860 Bridgland's duties lay chiefly in the area of colonization roads. His duties led him also to the mining districts and Indian lands north of Lake Superior. In 1864, when the superintendent of colonization roads in Canada West, David Gibson died, that office was discontinued but the duties were transferred to Bridgland. After confederation Bridgland continued to perform the duties connected with the oversight of colonization roads in Ontario.

Cavana Township[7] named for ***Allan George Cavana, Sr***. He was the township of Mara engineer. In 1885 he advertised as a PLA and DLS – draftsman, insurance agent and money lender. He was a Fenian Raid veteran. Cavana was commissioned in July of 1887. He formed a partnership with John Watson in 1897 and between the two of them they surveyed a number mining claims in Northern Ontario as well as township outlines in Algoma District. On July 12, 1906 the *Orillia Times* described the achievements of the Cavana Watson firm, *"Cavana & Watson have surveyed more territory in new Ontario and the Northwest than perhaps any other firm now doing business and this in addition to a very extensive local patronage because these surveyors are widely known and their services are eagerly sought after"*.

Code Township named for ***Thomas George Code***[8]. He was articled to his brother Abraham Silas Code. Thomas Code was commissioned as a surveyor on April 17, 1907. He went overseas in 1914 with the 228th Battalion and then for the remainder of the war became an officer with the Royal Engineers in the Tunnelling Corps.

Devine Township named for ***Thomas Devine***. After immigrating to Canada, he was appointed as a Provincial Land Surveyor on June 11, 1846 and became a surveyor and draftsman in the Crown Lands Department, Upper Canada surveys branch, on July 7, 1846. However, he made only one field survey of the York Branch of the Madawaska River through the townships of Dungannon, Monteagle, Carlow, Raglan and Radcliffe in 1847[9]. By 1857 he had succeeded Andrew Russell in charge of the branch although his position as head of surveys, Upper Canada, was not confirmed until July 22, 1859. In 1857 he submitted a new form of field notebook for surveyors employing the "split-line method".[10] In 1872 he became Deputy Surveyor General of Ontario. In 1877 he produced his last major map, covering North America and designed to show all historical boundaries that would have a bearing upon the impending decision on Ontario's northern and western boundaries. After 1858 he was a member of the Board of Examiners of Land Surveyors for the Province of Upper Canada and was

cont'd on page 6

chairman of the Ontario board at his retirement. In 1860 he was elected as a member of the Royal Geographical Society. As a topographer, Canada is indebted to him for many valuable maps.

Dickson Township[11] named for ***James Dickson***. On June 30, 1841 he immigrated to Canada booking passage to Quebec aboard a ship named "*Independent*". In 1861 he became articled to William J McDonald, PLS of Arnprior joining him in January 1862. In February 1863 he became an assistant to William Bell, PLS who was surveying "Free Grant Lands" on the Opeongo Road. This work took ten weeks to do. McDonald received instructions to survey the township of Wylie and Dickson assisted him. He became acquainted with Samuel T A Evans, PLS of Pembroke and became his assistant. The following June, Dickson was sent to the Board of Examiners with his certificates of service from McDonald, Bell and Evans. He was informed that another full year's apprenticeship would be needed before appearing for his final examination. He passed his final examination on April 6, 1867. In August of 1872 he surveyed timber limits on the north shores of Georgian Bay and on the Mississagi and Thessalon Rivers. Between 1878 and 1885 Dickson surveyed the townships of Peck, Hunter, Canisbay, McLaughlin, Bishop, Bower, Finlayson and Ballantyne for the Ontario Government.[12] In 1887 he was appointed Inspector of Surveys, a position he held for nine years. In 1889 Commissioner of Crown Lands, the Honourable Timothy Blair Pardee asked him to report on the feasibility of establishing Algonquin Park and later became one of the Park Commissioners. Also in that year he was commissioned by the Government to adjust a long standing dispute in the Township of Kennebec which he eventually settled satisfactorily. In 1905 he returned to his old job as Inspector of Surveys for the next two years.

Fitzgerald Township[13,14,15] named for ***James William Fitzgerald, Sr***. In 1849 he won a scholarship of 30 Pounds and a year's tuition in the School of Civil Engineering, Queen's College, Cork. In 1852 he served on the Ordnance Survey of Ireland under Sir Richard Griffith. He immigrated to Canada somewhere between 1853 and 1856[16] and was articled to Colonel John Stoughton Dennis[17] and was admitted as a PLS in 1857. In 1858 CCL Philip Vankoughnet asked him to survey the township outlines north of the counties of Peterborough and Victoria. In 1865 he did an exploration line between the Spanish River and Parry Sound to connect up to the "*Great Northern Road*" at the Spanish River. In 1861 he surveyed the "Burleigh Road*"* running through the townships of Burleigh, Anstruther, Chandos, Monmouth, Cardiff and Dudley. He surveyed the lots on the "Rosseau and Nipissing Road*"* in 1867.

Gilliland Township[18] named for ***Thomas Brown Gilliland***. His family came to Canada in 1836 and settled in the Township of Oxford in the County of Grenville. He was articled to H O Woods of Ottawa He passed his preliminary examination on October 7, 1863 and was appointed a Land Surveyor on July 11, 1868. His first surveying job was for the Toronto, Grey Bruce Railway which ran between Orangeville and Owen Sound. Gilliland surveyed Dominion Land in the North West between 1881 and 1882. He practiced around Collingwood, Stayner and Mulner until his death on December 15, 1899.

Hawkins Township named for ***William Hawkins***. He qualified as a DPS on October 31, 1832. Between 1834 and 1838 and 1856 and 1864 he performed government surveys. In 1852 Hawkins was appointed as a member of the Board of Examiners. He was appointed Chairman of the Board in 1864. Surveys he performed prior to 1841 – Big Island on the King's Mill Reserve on the Humber River, exploration East on Lake Huron, Town of Barrie, Town Plot of Essa, Town Plot of Sunnidale and Sunnidale Road. Between 1839 and 1855 he was employed in the Crown Lands Office. After 1856 he did surveys on Lots 10-11, Concession 3 in Whitby Township, the second Concession of Etobicoke Township, Lots 1-5, Concession 9 and 10 Clarke Township and part of the seventh Concession of Hope Township.

Hutcheon Township[19] named for ***James Hutcheon***. He was one of the first students to be enrolled in the School of Practical Science[20] under Professor John Galbraith. After graduating as an engineer he became an Ontario Land Surveyor on November 10, 1891. In 1893 he was appointed City Engineer for the City of Guelph[21]. He held this job until 1906 when he retired to do survey work for the Provincial Government in Northern Ontario. Between 1906 and 1912 he surveyed the following townships Lennox, Dargavel, Barker, Eilber, Sankey, Shackleton and Machin in the District of Cochrane. He also surveyed Township Outlines and Base and Meridian Lines in Sudbury, Nipissing and Algoma Districts. After spending a number of years in the North he came back to Toronto. In 1913 he took the position as Assistant Surveyor and Draughtsman with the Department of Lands and Forests. Later he was appointed Inspector of Surveys until his death. Hutcheon was widely known throughout Canada in his surveying and engineering profession.

Kirkpatrick Township named for ***George Brownly Kirkpatrick***. He completed his education at Trinity College in Dublin, Ireland and then became a Midshipman for 2 years with the Merchant Service. Kirkpatrick immigrated to Canada in 1857 and settled in the Kingston area. He worked on the construction of the Grand Trunk Railway which ran from St Mary's to Sarnia. He then took up surveying with Aylsworth Bowen Perry, PLS for three years and became a licensed surveyor on April 13, 1863. In 1864 he surveyed the north boundaries of Garden River Indian Reserve and the Batchawaning Reserve as well as the Townships of Fisher and Palmer for the Government. Kirkpatrick obtained his Dominion Land Surveyor's licence in 1872 and never did any surveys. In 1866 he worked in the Department of Crown Lands in Ottawa. In 1878 he was appointed Director of Surveys for the Province of Ontario. He was the

cont'd on page 8

Secretary of the Board of Examiners of Land Surveyors from 1869 to 1892. He introduced the Government to a new system of exploration of Northern Ontario in 1900 which resulted in opening up settlement and mining operations. Some 16,000,000 acres of valuable agricultural land and minerals were found.

Kirkup Township named for ***Roy Stanley Kirkup***. Kirkup received his public and high school education in Fort William[22]. He served his apprenticeship under Edwin Ralph Bingham, OLS and was commissioned at the age of 22 on April 30, 1914[23]. He enlisted in World War I as a Private with the 28th Battalion of the Canadian Expeditionary Force and served there until 1918. He was wounded twice and left the Army with the rank of Captain. In 1919 he returned home and practised surveying with his former employer under the name of "Bingham and Kirkup – Engineers and Ontario Land Surveyors". Bingham practised in Fort William[22] while Kirkup worked in Port Arthur[24]. Five years later Kirkup moved back to Fort William[22] and practised under his own name until his son John Clifford became a surveyor on April 30, 1951[23] and they formed a partnership until Roy's death in 1955. Kirkup surveyed numerous mining claim surveys in the Red Lake area and he also surveyed townships and township resurveys.

Kitto Township named for ***Franklin Hugo Kitto***. He graduated from Teacher's College and taught in Huntsville and Kleinburg until 1904 when he went to Edmonton and became managing editor of Francis "Frank" Oliver's[25] *"Edmonton Bulletin"*. His health was failing and he was advised to get outdoors for a few years. He was articled with Driscoll and Saunders, Dominion Land Surveyors in Edmonton. Kitto wrote his DLS examination and obtained his licence in 1908 and went into Federal Civil Service at the Department of the Interior. In 1911 he became the Director of Surveys for the Yukon District. He returned to Brampton and in 1934 obtained his Ontario Land Surveyor's certificate. He worked in a private practice until 1941 when he went to work for the Lands Branch of the Department of Lands and Forests in Toronto and worked there until he retired in 1950. Kitto then returned to Brampton and went into private practice with Ian Jackson, OLS until 1954.

Lendrum Township[26] named for ***Robert Watt Lendrum***. The Lendrums emigrated from Ireland in 1849 and settled in Bytown[27]. Robert worked with his father on the Brockville and Prescott Railway and on the Rideau Canal. He had to go to Vankleek Hill[28] in order to teach school in Ontario. Later he was articled to Robert Hamilton and became a Land Surveyor on January 8, 1874. In 1880 he received his certificate to be a Dominion Land Surveyor and went to Fort Garry[29] where he did considerable survey work for the Dominion Government. Between the years of 1882 and 1893 he practiced surveying in Ontario.

Lett Township[30] named for ***Charles Arthur Lett***. The Lett family emigrated from Ireland and settled in Collingwood where Charles went to private school and was educated by tutors. He studied surveying with William Murdock, PLS[31] for two and a half years and for six months with Clifford Thompson, PLS and was appointed as a Land Surveyor on July 6, 1877. He surveyed around Collingwood and surveyed mining claims in North-western Ontario.

Lillie Township[32] named for ***Henry Lillie***. He became articled to John Booth, DPS and passed his final examination as a PLS on January 8, 1853. Lillie was a most conscientious and painstaking surveyor whose services were in constant demand. His notes were clear and concise and his plans were very accurately drawn. A greater part of his survey work was devoted to running of township lot lines and making subdivisions in towns and villages. He surveyed the townships of Chapman, Laurier, Nipissing[33], Lewis, Proctor and Shedden for the Provincial Government.

MacQuarrie Township named for ***Edison Malcolm MacQuarrie***. Edison was born in Sault Ste Marie on December 7, 1894. He received his primary and secondary schooling in Sault Ste Marie and graduated from the University of Toronto with a Bachelor of Applied Science[34] in 1924. In 1919 he was discharged from the armed forces where he had served with the 3rd Canadian Engineers. His ambition was to become a surveyor and an engineer. He worked for the surveying and engineering firm of Lang and Ross and articled with the firm. In July 7, 1925 he received his commission as an Ontario Land Surveyor. While working for Lang and Ross he gained experience in all types of surveying and engineering such as township and base line surveys, mining and town surveys and transmission lines and highways. After John Lang and Kenneth Ross retired, MacQuarrie acquired their survey notes and records which date back to the 19th century. His work carried him across the whole of the District of Algoma.

McAree Township named for ***John McAree***. McAree was born on November 16, 1840 shortly after his parents arrived in Canada. The family settled in Eramosa Township[35]. He was sent to the Rockwood Academy[36] after being schooled in a log-house. McAree learned his surveying profession from Hugh Wilson and passed his final examination on April 6, 1867. In 1896 he moved from Toronto to Rat Portage and for a time did mining prospecting and assaying. He reported the nickel mineral wealth of the property known as the Creighton Mine[37]. McAree subdivided the following townships for the Provincial Government: Sinclair, Lyon, Neelon, Creighton[38] and Sharpe. He also surveyed township outlines in Algoma in 1892. Also he was in charge of Exploration Party #10[39] in 1900 in Northern Ontario. On May 15, 1884 he received his commission as a DTS and did many surveys for the Dominion Government.

McAuslan Township named for ***Herbert James McAuslan***. Herbert graduated from Meaford High School in 1900, from the School of Practical Science in 1903 and in 1905 received his degree of BASc[34]. The following year he

received his commissions as an OLS and a DLS. Most of his life from 1905 onward was spent in the north and around his hometown of North Bay. Between the years of 1906 and 1910 he was on the engineering staff of the T & N O Railway[40]. In 1911 he formed a partnership with Herbert M Anderson and the company was known as "McAuslan & Anderson, Engineers, Surveyors and Contractors". During the partnership McAuslan acted as engineer for North Bay from 1915 to 1919. In 1921 the company merged with Angus and Taylor Limited[41] which was a construction company that did railway, highway & airport construction. McAuslan was the President of this expanded company from 1928 to 1945.

McCubbin Township named for ***George Albert McCubbin***. He was born in the Township of Burford and at an early age moved with his parents to Leamington. McCubbin spent 6 years teaching school at South Essex, Perth and St Thomas. He spent his leisure time studying the fundaments of surveying. He decided to take up surveying and was articled to Archibald W Campbell of St Thomas and was commissioned as an Ontario Land Surveyor on November 9, 1895. He entered into a partnership with James A Bell in St Thomas. He did three township surveys for the Provincial Government (Sanford, Firstbrook and Michaud). In 1910 he turned to drainage work in which he had considerable knowledge, becoming an authority on the subject. He established his own practice in Chatham and did a large number of projects involving drainage for the Counties of Essex and Kent.

McGeorge Township named for ***William Graham McGeorge, Sr***. After his early education had been obtained, he taught school for a number of years and studied surveying at the same time. He was articled to Sherman Malcolm, PLS and he was commissioned to practice as a Provincial Land Surveyor on June 8, 1866. For most of his career, he practiced surveying in the Chatham area retracing and running lines in Kent and the adjoining counties. Between the years of 1872 and 1885 he did a number of surveys for the Provincial Government. These surveys included the 9th Concession of Aldborough Township, five concession lines in Raleigh Township and one concession in Oxford Township, re-surveys of certain lines in the townships of East Dover and Oxford, two concessions in Romney Township and lots in Howard Township and the Middle Road in the township of Oxford.

McMeekin Township[42] named for ***Albert McMeekin***. He received his pre-university education at Bright Public School and Woodstock High School and Ottawa Normal School. After that he went to McGill University and took a course in mining engineering and graduated in 1906 with a B Sc[34]. In December of 1906 he went to Kenora and became manager of the Golden Horn Mine[43]. On February 22, 1911 he became an Ontario Land Surveyor. For the rest of his career he practised surveying in the Kenora District which became known for a tourist resort area. He did many surveys of summer cottage locations for both Americans and Canadians.

Niven Township[44,45] named for ***Alexander Niven***. He was educated at Niagara Grammar School and studied surveying under Frederick F Passmore. In 1859 he passed his examinations and became a Provincial Land Surveyor and set up practice in St Mary's. He was approached by the Honourable Thomas Chandler Haliburton, Chairman of the Canada Land and Emigration Company to act as an agent for the company and his job was to survey lots, prepare purchase agreements and assess timber to be harvested. He was offered $1,000.00 per annum plus 5% on all sales and accepted $1,200.00. He was employed by the Ontario Government to survey townships and base and meridian lines. He ran an exploration line to James Bay by extending it northward and it then became the boundary between Nipissing and Algoma. In 1896 he surveyed the line to milepost 120 and two years later extended it to a point just north of the Moose River. He was a member of the Council and of the Board of Examiners after the incorporation of the Association in 1892.

The information in this article was obtained from books which I have in my library. A 3 volume set of books entitled "Places In Ontario" published by Mikki Publishing Company, Belleville, ON.; Herbert F Gardiner's "Nothing But Names" Hamilton 1899; "Renewing Nature's Wealth", Centennial History of the Public Management of Lands, Forests & Wildlife in Ontario 1763 – 1967 by Richard S Lambert, MA and Paul Pross, MA; Wikipedia; Canadian Dictionary of Biography; "Mapping Upper Canada 1780 – 1867" by Joan Winearls; "Men and Meridians, Part 1" by Don W Thomson; Ministry of Natural Resources Land Index System database; AOLS Annual Reports, and biographies found on the AOLS web site.

I would like to say thank you to the following people who helped me put this article together. Cindy Kliaman, OLS, CLS, Toronto, Ont; Eric Ansell, OLS, Peterborough, Ont; Chester Stanton, OLS, Orillia, Ont; Wharton "Rusty" Russell, QC, LLB, BA Orillia, Ont, Margaret Walton (Allan George Cavana's great-granddaughter) Bracebridge, Ont and Jeff Ball, Geographic Names Specialist, with the Ministry of Natural Resources, Geographic Names office in Peterborough, Ont.

Allan Day worked in the Office of the Surveyor General, Ministry of Natural Resources for 28 years as a Survey Records Information Officer. He now owns a survey and research business in Peterborough. E-Mail **surveyresearch@cogeco.ca**

[1] Harry A Sexton was the Head of the Lands and Forests Drafting Unit at Queen's Park, Toronto.

[2] 1,386 townships not originally subdivided (outlines only), 1,172 townships originally subdivided (wholly or partially).Of the 1,172 subdivided townships 204 have been annulled wholly or in part (104 wholly and 100 partially). Townships presently subdivided 968; of these 791 were surveyed between the years 1783 and 1902 and 177 were surveyed after 1902.

[3] Originally the name was applied to a township in Kenora District. In 1940 it was changed to one in Thunder Bay District. Present day township is unknown.

[4] Formerly known as Township 8.The name was changed 1974.

[5] Formerly known as Township 155.The name was changed 1974.

[6] Unknown person.

[7] Formerly known as Township 7.The name was changed in 1974.

[8] See *"Surveying – A Family Affair – Part 3"* by William C Yates, OLS in the biographical section of the AOLS web site.

[9] This plan was dated Montreal June 5, 1847, Instructions were issued January 19, 1847, MNR Instruction Book Volume 5 Pages 58 - 60, FNB 1847 and the plan has been transferred to Archives Ontario and is filed under MNR Survey Records microfilm #7090 MNR Archive # O18-5.

cont'd on page 10

[10] This form of field note taking was given formal approval by the Government April 2nd, 1859 and over one hundred and fifty years later this system is still being used today to record field notes.

[11] Dickson Township was one of eighteen townships that became the "original" Algonquin Park.

[12] In 1893 the townships of Peck, Hunter, Canisbay, McLaughlin, Bishop and Bower along with 12 other townships became the "original" Algonquin Park. A year later the East 1/2 of Finlayson, Ballantyne, McCraney, Butt and Paxton Townships were added.

[13] Fitzgerald surveyed the township he was named for.

[14] The West 1/2 of the township was added to Algonquin Park in 1904 and the East 1/2 was added in1914.

[15] The township was named by the Honourable Timothy Blair Pardee, Commissioner of Crown Lands.

[16] There appears to be a conflict when Fitzgerald came to Canada. In 1918 AOLS annual report shows the year of 1853 and Gardiner's book shows 1856. I never able to find any documentation showing which year was correct.

[17] Dennis later became the first Surveyor General of the Dominion on March 7th, 1871.

[18] Formerly known as Township 35.The name was changed 1974.

[19] Formerly known as Township 10E.The name was changed 1974.

[20] The school was affiliated with the University of Toronto.

[21] During his appointment as City Engineer the city's sewerage system was constructed and permanent pavement and walks were made on many streets in the City.

[22] Fort William later became the city of Thunder Bay.

[23] Father and son were commissioned as surveyors on the same month and day 37 years apart.

[24] Port Arthur later became the city of Thunder Bay.

[25] Francis "Frank" Oliver was a politician and journalist from the Northwest Territories and later Alberta. The first issue of the *"Edmonton Bulletin"* was published on December 6, 1880.

[26] Formerly known as Township 30 Range 23.The name was changed 1974.

[27] The former name of Ottawa. It was founded on September 26, 1826 and named for Lieutenant Colonel John By. Bytown came about as a result of the construction of the Rideau Canal.

[28] Vankleek Hill is a community in Champlain Township in eastern Ontario situated south of Hawkesbury on Highway 34. This agricultural based community became a thriving community in the 1890s and still retains many of the buildings and structures which were present then. It was named after Simeon Vankleek, a United Empire Loyalist, who settled here near the end of the 18th century. The town has one set of traffic lights.

[29] Present day Winnipeg.

[30] Formerly known as Township 90.The name was changed 1974

[31] Murdock passed his final examination as a PLS on January 10th, 1860. He made a valuable collection of photographs between 1870 and 1885. One photo that was taken was when the last spike was driven in at Craigellachie, British Columbia at 9:30 November 7th, 1885 by Lord Strathcona. Lord Strathcona was Donald Alexander Smith, 1st Baron Strathcona and Mount Royal. He and his first cousin, Lord Mount Stephen co-founded the Canadian Pacific Railway.

[32] Formerly known as Township 9.The name was changed 1974.

[33] South Part of the township Concession 1 – 12.

[34] The Bachelor of Applied Science is an undergraduate degree awarded for a course of study that generally lasts three to four years in the United Kingdom and Australia, and four to six years in Canada, the Netherlands and the United States.

[35] Bought a farm on Lot 19, Concession 4.

[36] Rockwood Academy was a private school. It was founded in 1850 by William Wetherald, a Quaker. Former students of the school include: James J. Hill, member of the Canadian Pacific Railway Syndicate and builder of the Great Northern Railway, who ascribed his success in large part due to his education at Rockwood, Arthur Sturgis Hardy, former Premier of Ontario and Sir Adam Beck, hydroelectric pioneer.

[37] Creighton Mine is an underground nickel mine owned and operated by Vale formerly known as INCO, one of the richest nickel properties in the world.

[38] The township's name of Creighton was changed to Creighton-Davies by a private members Bill #167 to honour David Creighton MPP for Grey North, 1879 and Thomas M Davies former chair of the Regional Municipality of Sudbury.

[39] Party # 10 was to survey from the Canadian Pacific Railway between Wabigoon and the western boundary of the Province north to Lac Seul and English River.

[40] The railway was incorporated as the Temiskaming and Northern Ontario Railway on March 17, 1902.

[41] I was unable to find any documentation about the company.

[42] The name McMeekin was originally applied to a township in Thunder Bay District but after applied to the township in Kenora in November 1940.

[43] This mine was situated in Glass Township.

[44] The West 1/2 of the township was added to Algonquin Park in 1904 and the East 1/2 was added 1914.

[45] The township was named by Commissioner of Crown Lands Honourable Timothy Blair Pardee.

GIS 101 for Surveyors

By David M. Horwood, O.L.S.

I have delivered a GIS 101 for Surveyors seminar now to five regional groups covering the basics of GIS in the context of surveying. It covers the fundamentals of GIS, compares GIS with Computer Aided Design (CAD) and looks at how GIS impacts and can benefit surveying now and in the future. It is impossible to fit all of GIS into a two hour seminar, so this seminar is necessarily a shallow dive into the concepts and concentrates on the areas of GIS that relate to surveying. This article covers some of the highlights.

We tend to forget that computers are not what they were 25 years ago. I remember (and I realize I'm dating myself) working on the first IBM PC/AT in the mid 1980's and running a PC version of Esri's ARC/INFO on a COMPAQ 386. Both of these computers would be blown away by your mobile smart phone. It is now possible to assemble and maintain jurisdiction-wide parcel maps and use techniques like least squares to adjust and readjust them holistically, something not possible on a PC with 640K of memory.

Geographic(al) Information Systems or GIS evolved from work in the 50's and 60's. The idea of portraying data on maps in layers and relating things graphically has been around much longer than that, well before computers. The popular terms for this science or discipline have changed over the years and now include Geospatial Information Science (mostly in the U.S.), Spatial Information Science (in Australia) and Geomatics, although this usually refers to more disciplines than just GIS. From Wikipedia, a GIS is a "system designed to capture, store, manipulate, analyze, manage and present all types of geographical data." Basically it boils down to maps connected with data.

Geography is the science of mapping the earth and GIS is a system used to manage and exploit this information. There are three fundamental representations in GIS;

- Features – objects on or near the earth's surface (point, lines, polygons or combination)
- Attributes – descriptive information of features (e.g., identifier, owners)
- Imagery – a picture or grid (e.g., orthophotography, satellite, LiDAR, scanned map)

GIS representations are normally organized by theme or layer and are usually presented as a map. In fact GIS is very closely related to Mapping.

Another important concept in GIS is topology. Topology refers to the spatial relationship between features, identifying connectivity and adjacency. For example, topology ensures that parcel edges are coincident with parcel boundaries and the ends of parcel boundaries are coincident with parcel corners. So when a corner is moved, the boundary lines are automatically moved and the parcel area adjusted. Topology is normally implemented as a series of rules, .e.g., parcels cannot overlap or have gaps, boundaries cannot intersect except at end points. Topology can also be used to navigate connectivity, e.g., finding the boundaries intersecting a corner or tracing a public works network upstream from a break.

Analysis is a key capability of GIS, in fact this is primarily why a GIS is created. Analysis normally involves combining existing themes or layers into a new layer using overlays or performing computations based on the GIS attributes (or both). Analysis is developed using scripts or models so that the same analysis can be run again and again with changing conditions. The possibilities for analysis in a GIS are endless and extend across many sectors. This is why a GIS is normally multipurpose and may be captured and maintained by agencies other then the primary users.

A GIS also needs to have a data model. There are standard data models available for different sectors or the data model can be constructed from scratch. Then the GIS needs to be loaded with data to be useful. There are tools in GIS software as well as specialty suites like Safe Software's FME. Finally, once loaded it is extremely important that the GIS be kept up to date, normally by some sort of transaction (e.g., a new survey plan in a parcel map). In fact you should think about updating before you finish your loading. Metadata (information about the data) needs to also be maintained to record the source, accuracy, projection, representation and other characteristics of the data so that it can be discovered and used by others.

Map projections are also extremely important. GIS must be portrayed on the earth and the earth is not flat but round (actually ellipsoidal). In order to flatten the earth for display and analysis, a map projection must be used. All map projections have some distortion and the distortion is normally characterized by what is preserved; conformal (shape), equal area (area), equidistant (distance). Web maps use a projection called Web Mercator which is quite different than UTM and MTM. And don't get me talking about datums and epochs.

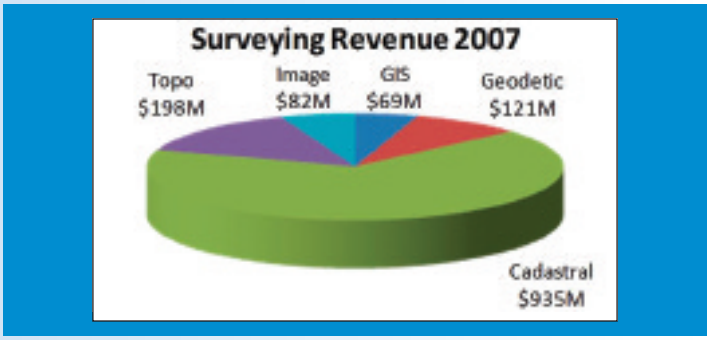
GIS is very different from CAD. There is some overlap, most CAD software has some GIS capability and most GIS software has some CAD capability, but they are entirely different approaches. CAD is predominantly a design tool whereas GIS is an information management tool. A CAD drawing is normally produced for a single purpose with fixed symbology and annotation, whereas a GIS is multipurpose with attribute driven symbology. CAD is normally project-based in individual drawing files whereas GIS is

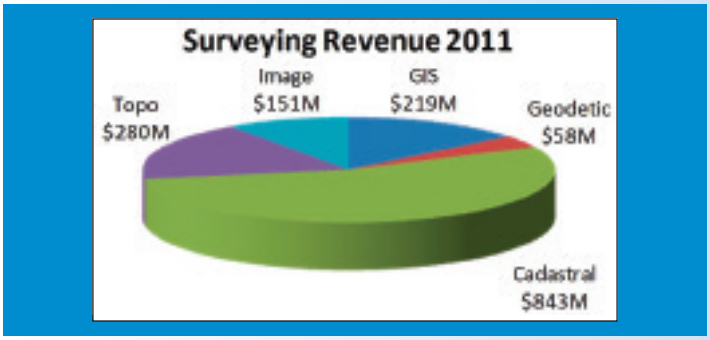
enterprise-wide with a continuous centralized database.

This is why it is hard to get CAD information into a GIS. If we look at a survey plan prepared by CAD, the end product is a printed plan. However if we are to use this information in a GIS (e.g, a parcel map), the information contained on the plan needs to be extracted and captured. Since this was not the plan's original purpose, most plans present a number of issues. These issues include non-standardized layers, lines not split at parcel corners or worse lines clipped at bar symbols (affecting topology), dimensions not connected to lines (just text adjacent to the line), narrow parcels widened for visibility, separate detail areas not drawn to scale, curve parameters in a separate table. As a result, many times these plans are recalculated from scratch, since capturing the information from CAD would take longer.

Some jurisdictions have submission standards that address some but not all of these. It is important that the standard be a cooperative effort between the agency requiring the submission and the suppliers (in this case surveyors) to ensure that specifications do not impose undue effort on the suppliers and provide the necessary information to the agency in a streamlined format. In order to address these issues I've developed a stand-alone Plan Validator application which will both independently validate the plan and capture the essential plan information from CAD or scanned plans (www.planvalidator.com).

GIS has not been embraced by the surveying community in the past. This is in part because GIS relies on background context data for analysis, and this data was not readily available. Also, the computers at the time were not powerful enough to exploit the power of GIS. However this has changed. There are a number of trends in GIS that are making it easier for the smaller company to play with the big boys. The Cloud and web maps bring GIS technology to the desktop, allowing a small company to have a worldwide presence on the web. The move towards Open Data and standard data models is providing base data for GIS, so that a GIS with data can be deployed. There is also a move towards digital submission, where the GIS database gets updated directly from the source information. This is in fact a GIS best practice, to collect data closest to the source.





GIS can also be used in a survey office. Surveyors can georeference their jobs and create their own in-house SRI, something I did for my father's company 15 years ago. From their projects they can develop an in-house cadastre or parcel map, this is in fact how some large cadastres got started. Surveyors can also add value to open or other data and provide these as products extending their product offering beyond cadastral. Finally they could capture (and possibly maintain) data for municipal and / or provincial GIS.

Some surveying firms are already doing this. Statistics Canada keeps a statistics on the surveying industry as part of professional services. Between 2007 and 2011, cadastral surveying revenue in Canada declined by about $100 million. However GIS revenue in surveying increased by $150 million, which accounts for the total increase in surveying revenue over the same period. GIS revenue in surveying increased continually between 2007 and 2011 even through the recession. The results for 2012 will be published in early 2014, it will be interesting to see if this trend is continuing.

GIS is a vibrant and growing industry that has been steadily expanding over the past 25 years. Both GIS and surveying capture the world as it is and there is a part of GIS that is related to surveying. Surveyors definitely could position and capture GIS information, but only if this is captured in a way that it can be efficiently used in GIS. Surveyors could also possibly maintain a GIS for other agencies or could present and distribute GIS information. They could also possibly perform GIS analysis or software development, but this is more industry specific. Finally surveying can expand the surveyor's current product offering, providing additional products and services. Some surveying companies are obviously already doing this, are you?

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Single-Frequency Precise Point Positioning Using USTEC Ionospheric Model

By Mahmoud Abd El-Rahman and Ahmed El-Rabbany, Ryerson University

Introduction

Precise Point Positioning (PPP) technique can achieve positioning accuracy at the centimeter level for static applications and at the decimeter level for kinematic applications, when dual frequency receivers are used. This, however, is not the case with low-cost single-frequency GPS receivers, which are limited by the effect of ionospheric delay. A number of mitigation techniques have been proposed by the scientific community to account for the effect of ionospheric delay for single-frequency users. Unfortunately, however, most of those mitigation techniques are not suitable for precise point positioning (PPP). More recently, the US Total Electron Content (USTEC) product has been developed by NOAA, which describes the ionospheric total electron content with high resolution over most of North America. This article investigates the performance of USTEC and studies its effect on single-frequency PPP solution. A performance comparison with two widely used ionospheric mitigation techniques, namely the International GNSS Service (IGS) final global ionospheric maps (GIM) and the CODE-generated Klobuchar-style models, is also presented.

A well known empirical method to account for the effect of ionospheric delay is the Klobuchar model, whose coefficients are transmitted as part of the navigation message (Klobuchar, 1991). Although this model can be implemented in real time, it can only correct for 50%-60% of the total ionospheric effect. The Centre for Orbit Determination in Europe (CODE) has been producing Klobuchar-style ionospheric coefficients since 2000 (CODE, 2012). The coefficients are estimated through best fitting of CODE-produced IONosphere map EXchange (IONEX) data. CODE performed a validation study, which showed that Klobuchar-style ionospheric coefficients outperform those of the standard Klobuchar model (CODE, 2012).

The GIM product provided by the IGS offers an alternative way to mitigate the ionospheric delay. The two-dimensional GIM file contains the vertical total electron content (TEC) grid values and the differential code biases (DCBs) of the satellites and stations in the IONEX format (Schaer et al., 1998). IGS provides two different ionospheric TEC grid products, namely the final and the rapid. The final product is accurate to 2 to 8 TEC units (i.e., $2*10^{16}$ to $8*10^{16}$ electrons/m^2) with a latency of 11 days, while the rapid product is accurate to 2 to 9 TEC units with a latency of less than 24 hours (IGS, 2012). Both final and rapid GIM have a temporal resolution of 2 hours and a spatial resolution of 5° in longitude and 2.5° in latitude.

More recently, the US National Oceanic and Atmospheric Administration (NOAA) used a regional network to provide maps of the TEC values over the Continental US. The product, which is known as the US Total Electron Content, or USTEC, provides vertical TEC and slant path values of the line-of-sight electron content to the GPS satellites in view (Araujo-Pradere et al., 2007).

NOAA Ionospheric Mitigation Model - USTEC

The US National Oceanic and Atmospheric Administration, through collaboration of different offices, used a regional network of CORS, GPS/Met and IGS reference stations to produce maps of TEC values over the Continental US (Araujo-Pradere et al., 2007). The product, which is known as the US Total Electron Content, or USTEC, provides vertical TEC as well as line-of-sight TEC values to the GPS satellites in view of the reference stations at the time. The USTEC product is based on a data assimilation model, which uses Kalman filtering for parameter estimation (Spencer et al., 2004).

The files are produced every 15 minutes and cover all the satellites in view of the network. The USTEC maps have a spatial resolution of 1° by 1° and cover regions across the US, which extend from latitude 10° to 60° North, and from longitude 50° to 150° West. The expected accuracy of the USTEC maps is in the range of 1 to 3 TEC units. To estimate the ionospheric correction using the USTEC (and also the GIM), it is necessary that a two-dimensional spatial interpolation function be applied to match the station location. In addition, a temporal interpolation function is needed to obtain the ionospheric correction at a particular time. In this research, we used the Lagrange interpolation method (Spiegel, 1999).

Results and Analysis

In order to evaluate the USTEC, Natural Resources Canada (NRCan) GPSPace PPP software was modified to facilitate single frequency GPS data processing with USTEC ionospheric modelling. Data from four North American IGS reference stations representing different latitudes (Figure 1) were downloaded and used in our analysis. The data sets were selected to represent three different seasons (January, July, and October), each for three days of the year 2011, which reflect the seasonal variations of the ionospheric delay. The values of slant ionospheric delays

were estimated using NOAA USTEC, Klobuchar-style, and GIM models.

The PPP solution convergence and the root-mean-square

Figure 1: IGS stations used in data analysis

error (RMSE) of the positioning residuals were calculated for each station and compared with those of dual frequency results. Figures 2 to 4 show the positioning solution (latitude, longitude and height) for the NOAA, Klobuchar-style and the GIM models for station MOD1 on October 30, 2011, as an example.

Figures 5 and figure 6 show summary results of the RMSE of the positioning residuals for stations CRO1 and QUIN respectively in various seasons.

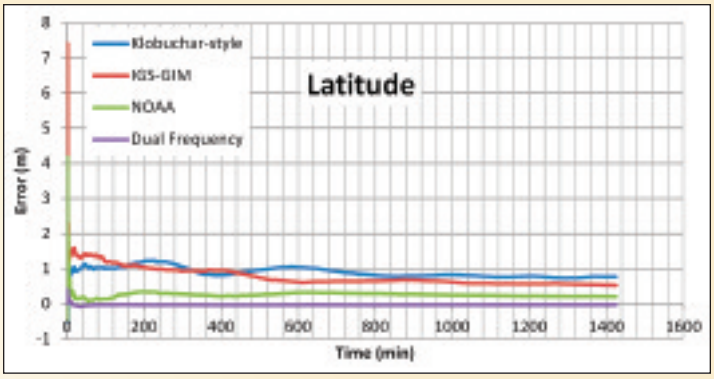

Figure 2: Latitude accuracy and convergence for station MOD1 on October 30, 2011

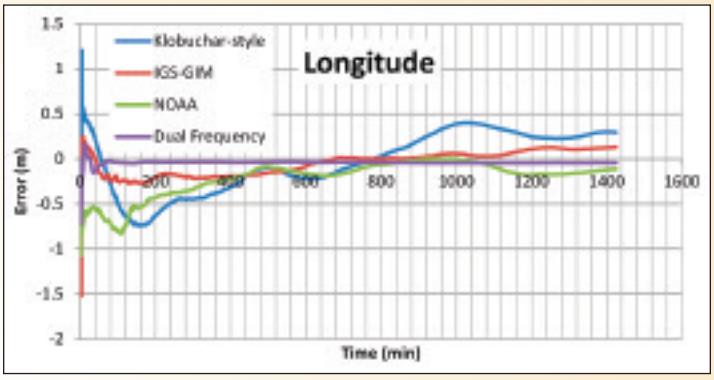

Figure 3: Longitude accuracy and convergence for station MOD1 on October 30, 2011

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It can be clearly seen from these figures that the use of the NOAA model improved the positioning accuracy to decimeter-level and speeded up the convergence time in comparison with the GIM and Klobuchar-style models. The GIM model is capable of attaining sub-metre level accuracy. The Klobuchar-style model performed poorly in comparison with other models and was capable of only achieving metre-level accuracy. This is particularly clear in the height component. In general, the values of the RMSE are smallest in the January results and largest in the October results, which suggest that the performance of the models are seasonal-dependent.

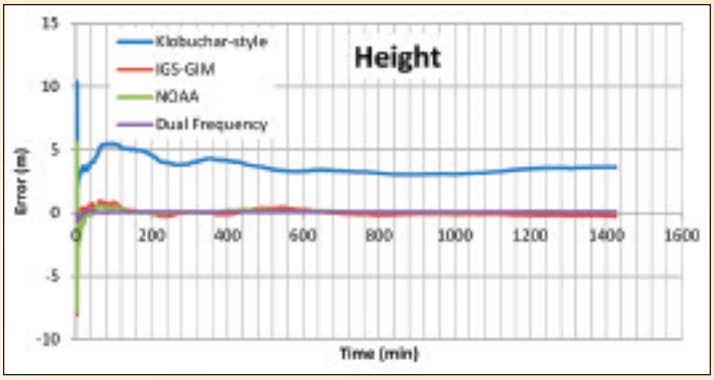

Figure 4: Height accuracy and convergence for station MOD1 on October 30, 2011

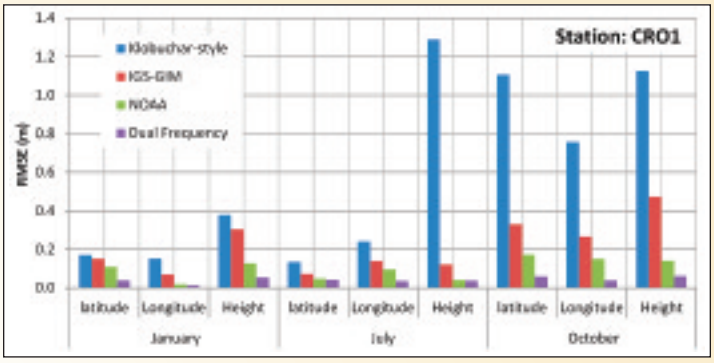

Figure 5: RMSE of positioning residuals for station CRO1

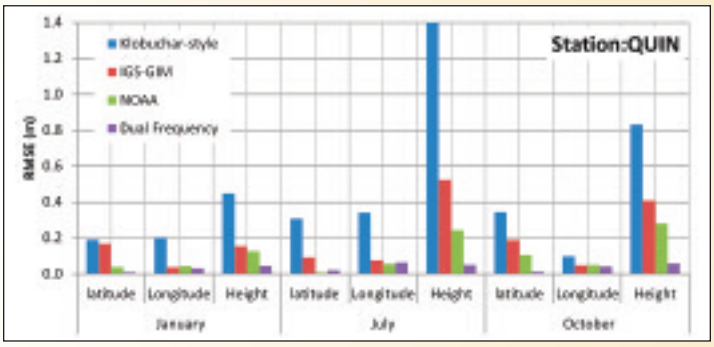

Figure 6: RMSE of positioning residuals for station QUIN

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Calendar of Events

February 4 to 6, 2014
11th Annual ORCGA Damage Prevention Symposium
Collingwood, Ontario
www.orcga.com

February 17 to 19, 2014
International LiDAR Mapping Forum
Denver, Colorado
http://www.lidarmap.org/international

February 26 to 28, 2014
122nd AOLS Annual General Meeting
Tomorrow is Now
Niagara Falls, Ontario
www.aols.org

March 23 to 27, 2014
ASPRS 2014 Annual Conference
Geospatial Power in Our Pockets
Louisville, Kentucky
www.asprs.org

May 28 to 29, 2014
GEO Business 2014
London, England
www.geobusinessshow.com

June 16 to 21, 2014
XXV FIG International Congress
Engaging the Challenges, Enhancing the Relevance
Kuala Lumpur, Malaysia
www.fig.net/fig2014

Partners for a Season

By Glen Robert Belbeck

This article was first submitted to Alberta's Heritage Park Historical Society in August 2013. It summarizes what the author knows about two early Dominion Land Surveyors who were in business together in the Calgary, NWT area in the summer of 1883. Their names were Charles Everard Wolff and Archibald Westmacott McVittie, both Provincial Land Surveyors from Ontario.

During the latter part of the 19th century many changes happened to the land and the people of Rupert's Land and the North West Territories, which the Dominion government of Canada bought from the Hudson's Bay Company in May of 1869. Part of the settlement price with the Hudson's Bay Company, and some year's later with the syndicate known as the Canadian Pacific Railway (CPR), involved claims to some of the lands in Manitoba and the North West Territories. Those claims could not be settled until the land was divided into parcels, an activity owned by the Department of the Interior. This federal government arm decided the methods by which the plains would be surveyed, chose whom to use to venture west to do the work of subdivision, and was instrumental in adjudicating disagreements with those already on the lands with prior claims of ownership. Dominion Land Surveyors (DLSs) were among those who first went west to divide the great ocean of grass into parcels of land designed to support the homesteading efforts of the great waves of settlers who were anticipated to arrive in the North West Territories following the completion of the CPR. At Heritage Park in Calgary, Alberta there is an early log cabin, rough but strongly built on the west bank of the Elbow River, and occupied by a DLS in the late fall of 1882. In a photo taken by the early CPR photographer John Cornelius Soule in August 1883, there is a cabin that looks much like the Heritage Park cabin. On the building next door is a sign "Wolff & McVittie". This is their story, as we know it in the summer of 2013, exactly 130 years later.

Charles E. Wolff was the grandson of the well-respected and locally-famous Lieutenant Colonel Alexander Joseph Wolff, an Austrian-born orphan who had been adopted by a British Army officer. Alexander entered the British Army in 1801 at the age of 13, fought with the British Army under the Duke of Wellington between 1804 and 1815 against Napoleon and the French, and somewhat ironically was given a land grant in Val Cartier, Quebec for his retirement. He later became the commander of the 11th Battalion of the Quebec Militia[ii]. Charles' father was Dr. James John Fitzgerald Wolff, one of eight children of Lieutenant Colonel Wolff. Charles E. was born on June 29, 1846 in Quebec City, the third of five children and second son[iii] of Dr. James and Mrs. Elizabeth Dodds Taylor Wolff. The names of the other children who have been found in various Canada census records are brother James Fitzgerald (b. 1841), sister Julia (b. 1844), brother H. H. (b. 1856), and brother S. M. (b. 1858)[iv]. At an early age Charles was indentured to an East Indian sea merchant, and as a result earned his Captain's certificate[v]. In 1872, he started the study of Land Surveying under a Provincial Land Surveyor (PLS) named Robert Sparks of Ottawa, Ontario, and in the spring of the next year qualified as a PLS for Ontario. By the end of 1875, Wolff also was qualified as a Quebec Land Surveyor[vi]. Over the next few years, Charles was involved in a number of boundary surveys in Ontario, and likely during this period was a member of the firm "Sparks, Wolff and Patrick", presumably located in Ottawa. On April 18, 1879, Charles Wolff received DLS commission number 0035 in Ottawa, Ontario.

Figure 1 – August 1883 photo – McVittie on extreme right[i]

Archibald W. McVittie was born on May 05, 1858 to Thomas M. (born in Ireland) and Bessie (born in Scotland) McVittie of Toronto, Ontario. He was the second son and fourth of eight children[vii] born to the McVitties, offspring of half-pay military British Army officers of the Napoleonic Wars[viii], who had come to Canada about 1830 to take up land grants near Lake Simcoe. In the census records found for 1861, there is an older brother Chris (b. 1850), sister Kate (b. 1853), brother Thomas (b. 1854), and younger sister Mary (b. 1860)[ix]. By the census of 1871, there is also a brother Henry (b. 1864) and brother Walter (b. 1866)[x]. In 1872, Archibald's family moved to Barrie, Ontario where his father owned a hardware store, and he was soon articling with Maurice Gaviller, PLS. Apparently he attended Upper Canada College to study architecture, sometime after starting with Gaviller. Due to his young age when he had completed his article period, Archibald was not sworn in as a PLS until July 1879, just after he turned 21 years of age.

Early the next year Archie opened his own office in Barrie[xi]. In December 1880, Archibald W. became the first partner with a firm headed by Thomas Kennedy, an architect in Barrie, and he remained a partner there until August 1881. In the census of 1881, a sister Bessie (b. 1863) is living in the Barrie, Simcoe North, Ontario household of Thomas and Bessie McVittie – seven of the eight children are still at home[xii]! In early 1882, McVittie entered into a partnership with Kennedy and Holland, with offices at 88 York Street, Toronto as well as in Barrie, Ontario. But this partnership would last only until about December 1883[xiii]. Archibald Westmacott McVittie received DLS commission number 0103 in Barrie, Ontario on March 30, 1882.

By the end of the year 1880, the Dominion of Canada had already been subdividing the North West for over 10 years. Lieutenant-Colonel John Stoughten Dennis had been sent to the Red River colony in August 1869 by the Minister of Public Works to begin surveying land holdings for future settlers. Although Dennis was instructed not to disturb the holdings already established by the Metis settlers, previously surveyed as early as April 1813 by Peter Fidler the chief surveyor of the HBC, those 1869 activities helped to trigger the first Metis rebellion that year. From about 1871 to 1880 the DLSs involved had subdivided a total of 16,256,000 acres or 101,600 farms of 160 acres each[xiv]. Most of the subdivision work had been in Manitoba and the District of Assiniboia, although the 5th Initial Meridian (IM) had been produced from the Fort Edmonton area south to the International Boundary by July 30, 1880. Charles Wolff started his work in the west the next spring. We have no evidence that he knew Archibald McVittie before then, but there was an opportunity for this to have happened, as they were both PLSs in Ontario and recent DLSs. Perhaps they were destined to have a chance meeting for the first time on the prairies which led to their partnership by August 1883. Without the existence of personal diaries, all we can do is identify those places and circumstances that perhaps facilitated their meeting.

The DLS was required to follow the *"Manual Shewing the System of Survey of the Dominion Lands"*, published from time to time by the Minister of the Interior for Canada. When the candidate had written and passed the DLS examinations that ensured he was suitable for this new type of land subdivision, he was expected to know and follow all instructions therein. Township orientation was related to True North using Polaris, distances were to be measured multiple times using calibrated chains, and special methods were used to denote the corners of townships, sections, quarter-sections and town sites. Most DLSs were from Ontario and Quebec and were previously licensed as PLSs in their home province. They would have had, as a result of the PLS designation, experience in managing crews in remote areas. But nothing they experienced in the eastern bush would have matched the conditions they were to face in the North West Territories.

Here is what likely faced Charles Wolff that first spring he went west – 1881. Our first record of him and his crew of seven is on Saturday, June 25, 1881 when he is busy surveying the northeast boundary of Township 08, Range 01 west of the Second IM, in the southeast part of the current province of Saskatchewan[xv]. This is in the vicinity of Manor, Saskatchewan, southeast of Moose Mountain Provincial Park. In his crew was his Assistant, a man named John P. A. Sproule who had been living in Wolff's house earlier that spring in Ottawa[xvi], and Charles' brother H. H. Wolff – Picketman. In addition to these two positions there was a Starke - Cook, Lacombre - Choreman, Taylor - Freightman, Sherick - Moundman, and Swalwell - Chainman[xvii]. The best guess is that these other five men were hired in the west, but that is not yet proven. The end of the CPR rails was Portage la Prairie that spring and the CPR syndicate had just set up an office in Winnipeg. Charles Wolff and his Ottawa, Ontario crew likely travelled to Winnipeg by rail, by way of Kingston, Toronto, Sarnia, Chicago, St. Paul, and then the Pembina Railway north down the Red River valley. Perhaps they took the train to Portage la Prairie as well, although since the CPR was gearing up to construct a rail line just west of Portage la Prairie, there may not have been passenger service in May. The crew would have traveled about 10 days west from Portage, Manitoba to the Manor, Saskatchewan area, then known as the District of Assiniboia (*Figure 2*). Normal movement was by horse and Red River Cart, with all their provisions, equipment, tools and weapons aboard. A good guess would be that the trip from Ottawa to Manor took Charles and crew about 25 days in total, meaning that the 35 year old Wolff left his wife and young family at home in Ottawa just before June 1st. During that summer he covered an area 19 townships wide (114 miles) by 4 townships high (24 miles), doing scattered Township outline surveys. The last entry in his official field book for that season was made on Wednesday, October 12th, when his crew finished work in the northeast corner of Township 05, Range 19 west of the Second IM. This is west of Colgate, Saskatchewan and southwest of Weyburn, Saskatchewan. By that time of year, it can get quite cold on the Prairies, so he and his crew likely headed for Brandon, Manitoba, where the first official CPR passenger train had arrived the day before – October 11, 1881. That trip would have been approximately 350 kilometres, initially along the cart trail to Wood Mountain that the crew noted on their survey notes in Township 8, Range 18, about 15 miles northeast of where they ended the season's work. The trip back to civilization at Brandon would have taken about two weeks. A plethora of cart trails criss-crossed the prairies in the era (North West Territories Trails[xviii]). Charles Wolff and H. H. Wolff would have been back in Ottawa by Thanksgiving, which in those years was celebrated on a Thursday in November.

During the early years of the 1880s, the Indian tribes started to move to their roughly-mapped out reserves. The

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severe decline in the bison population that happened about 1879, forced them to begin to rely on the Federal Government for food. Cattle ranches were on the increase as well, bringing in herds from the US, in some cases to feed the Indians on the reserves. Some Township outline surveys were occurring west of Fort Calgary. The CPR decided to choose a southerly route through the mountains to Kamloops, BC, using the Kicking Horse pass. In spite of the CPR's severe financial difficulties, they managed to lay out 161 miles of new rail line in 1881, and the end of the line was at Oak Lake, MB[xix]. In the season of 1881, there were a total of 73 DLS survey crews, up from 55 DLSs the year before, working in the North West Territories, producing 23,300 miles of surveyed lines[xx]. Many of them returned to their homes in Ontario or Quebec during the late October and early November timeframe, as the weather became worse and the number of daylight hours available for land survey work shrank. The word would spread to their PLS colleagues, about the Dominion Land Surveys going on in the North West Territories.

The next spring a newly-certified DLS named Archibald McVittie joined the ranks of the surveyors heading west, whose number in 1882 totaled 92 surveyors and their crews[xxi]. While the beginning of the survey season was significantly delayed due to flooding in Manitoba and washouts on American and the CPR railroads, McVittie is already recording his field notes on Sunday, June 18, 1882, and had apparently started work on Friday, June 02, 1882[xxii]. In his crew of nine, Archibald had hired his older brother T.T. McVittie as his assistant, Hayes – Chain, Campbell – Chain, Moloney – Axeman, Stephen – Axeman, Ridsdale – Axeman, Wilkinson – Axeman, Cook – Campman and Staley – Cook. McVittie must have been expecting a lot of trees in the areas he was assigned! The McVittie crew was in that first work area, between modern day Touchwood and Raymore, Saskatchewan, until the middle of July. One month later he and his crew had started work just inside the current border between Saskatchewan and Alberta, straight east of Calgary, doing the outline surveys for Township 23 and 24 west of the Fourth IM. We can guess at the manner they travelled and the route they took to get to their job sites – it would have been similar to the way Charles Wolff came the spring before, except that they may have found that the CPR rails went somewhat west of Brandon to the Oak Lake, Manitoba area. Archibald may have been waiting in Winnipeg for better weather conditions to travel west, and attended the initial meeting of the Association of Dominion Land Surveyors on Monday, April 24th, but he does not appear in the photograph containing C. E. Wolfe that was taken during that period. It would be a reasonable guess that the two single McVittie brothers left Ottawa in early May of 1882.

Charles Wolff was in Winnipeg already by that late April 1882 period, as he appears in the back row on the right side of the photograph taken to mark the occasion of the formation of the DLS association. With one year of North West experience under his belt, he had most likely decided to get an early start. For DLSs getting paid by the mile surveyed, the weather and logistical risks were all theirs. But the weather didn't cooperate that spring – almost 100 inches of snow had fallen in the Winnipeg area that winter of 1881/2, causing severe flooding when it melted in April. Perhaps because he was upset with the late start, Charles Wolff didn't put a date on any page of his field book for work in Saskatchewan that year, nor for that matter on most of the field books for his crew's work in Alberta. Without a copy of his detailed field report, which may still exist in the Department of the Interior files, we do not really know when he started his 1882 season's work. We assume that his first set of work was directly beside the area he finished the previous October – Township 07 to 12, Ranges 18 and 19 west of the Second IM. And we believe that he then ended up the summer working in Townships 13 to 16, northwest of Medicine Hat, Alberta later that summer. We know all those field books are examined in Ottawa by December of 1882. The last block of Townships for which the Wolff crew did outline surveys was Ranges 22 to 24 west of the Fourth IM, almost halfway between modern-day Lethbridge

Group of Dominion Land Surveyors – Winnipeg, Manitoba. C.E. Wolfe is in back row on right end[xxiii]
Glenbow Archives NA-878-7

and Calgary. We can make an educated guess that Charles Wolff and his crew made a re-provisioning trip to Calgary before starting to work west of Fort Macleod.

This guess is supported by what is recorded on a plan of survey dated February 24, 1883. That plan shows just to the north of a cabin labelled "A.W. McVittie" and marked by the pink star, one that is labelled "J. Sproule" – the assistant of Charles Wolff, marked by the orange star. We know there is a connection by early 1883!

McVittie's movements in the summer of 1882 are easier to follow, as he was diligent to note the date on almost each page of his field books. He and his crew did three sets of Township outlines, each one closer to Calgary than the previous one. On October 19, 1882, the McVittie crew made their last measurement along the northeast corner of Township 22, Range 17 west of the Fourth IM. This was about 13 miles northeast of Bassano, Alberta. His crew of nine was still intact, and at that point in the year it would have been an easy decision to head for the settlement at the confluence of the Bow and Elbow Rivers, even though none of them had likely visited it before. The trip of 130 kilometres would have taken 5 days, so by October 25th the crew would have arrived in the Fort Calgary area. It was possible they met up with Charles Wolff and his crew getting ready to head south to the Porcupine Hills about a week later. Some of the McVittie crew may have decided to head to the end of the CPR line at what is today Maple Creek, Saskatchewan, a trip that would have taken them about eight days. From there they would have made their way back to Winnipeg and then Ottawa, where they may have been home again by the 1882 Thanksgiving time.

McVittie Plan of Survey for SW14-24-01W5[xxiv]
Library Archives Canada

The first date on any of Wolff's field note books done during the 1882 season is November 08, 1882, when he and his crew are working in Township 07 to 12, Ranges 29 and 30 West of the Fourth IM and Range 01 West of the Fifth IM. This seems unusually late in the season, but Wolff may have proceeded hoping for a chinook effect that is sometimes felt in that part of Alberta. The Wolff crew took a break between November 17th and 28th, a Christmas break between December 21, 1882 and January 01, 1883, and finally a 3 week break in February 1883. This 1882/1883 field book is also the first one to record the names of his 1882/83 crew members: Sproule – Assistant; Nols – Chainman; Sherrick – Picketman; Barriseaut – Moundman; Alor – Cook; McCraig – Moundman; Drothe – Chainman; Joseph – Rodman; and Cox - Moundman[xxv]. Sproule and Sherrick are the only ones still with Charles Wolff from the 1881 season. It must have been a miserable time for these gentlemen, living in tents all winter in the windiest part of the prairies where wind turbines now turn the wind's energy into electricity. The breaks in the work that we see in the field books were likely spent in Fort MacLeod, some distance to the east. For instance, the Wolff crew was only about 22 miles west of Fort Macleod when they took a Christmas break on December 20, 1882.

While Charles Wolff was spending his winter days shivering on the prairies or sheltering in the Porcupine Hills of southwest Alberta, Archibald McVittie warmed his hands and feet in the cozy log cabin on the west side of the Elbow River, in the small settlement that was springing up around Fort Calgary. He was likely making some good connections at the local hotels east of the Elbow River and at the NWMP barracks as well. It is not known if his brother Thomas T. McVittie remained in Calgary for the winter, as some reports say he went to British Columbia as early as 1879[xxvi]. Based on the April 1881 census returns and the McVittie crew list in the District of Assiniboia in June 1882, that earlier 1879 move of the older McVittie brother to the Kootenay mountains seems baseless. It is most likely that Thomas stayed in Calgary for awhile, and was likely the brother who is a business partner with Archibald McVittie in about 1885 in Calgary.

The CPR rails had reached Maple Creek, Saskatchewan at the end of the 1882 construction season, and anticipation was high that the trains would soon be running between

cont'd on page 22

Calgary and Winnipeg. Archibald McVittie's presence near Fort Calgary proved fruitful, as he was soon linked with Wesley Orr, a land speculator. In February of 1883 Archibald was working on a topographical survey of the claim of a Metis squatter named Louis Rousselle. Louis, an HBC employee since 1847, had settled down on the east side of the Elbow River in 1880 on a rise of land north of Scotsman's Hill in what is modern-day Inglewood. His farm can be seen just to the south of the Hudson's Bay store that was built soon after the I.G. Baker Company built the NWMP barracks at the confluence of the Elbow and the Bow Rivers in the fall of 1875. Rousselle had made an earlier petition for recognition of his rights as a squatter, but to no avail. The McVittie survey plan signed on February 24, 1883 shows where the boundaries of SW Section 14, Township 24, Range 01 west of the Fifth IM would be located when the township was eventually subdivided. The buildings that were believed to be in place before 1877 were noted in red, and the locations and names of businesses were also noted on the plan. Ten days before signing the plan of survey, Archibald McVittie apparently offered Louise Rousselle $10,000 for his claimed land[xxvii]. It is believed that McVittie, working with Wesley Orr, did indeed purchase the Rousselle claim during the middle part of 1883[xxviii]. The DLS named Charles LaRue started the subdivision of Township 24 on July 20, 1883 and the plan was approved, confirmed and signed on March 08, 1884, more than one year after McVittie's offer to purchase Rousselle's claim and the signing date on the plan[xxix].

The CPR photographer's picture (*Figure 1*) showing the "Wolff & McVittie" sign has a Glenbow Archives' assigned date of August 1883. An advertisement appearing in the September 14, 1883 "Number 3 Edition" of the weekly Calgary Herald mentions C.E. Wolff and A. W. McVittie as "Dominion Land Surveyors, Architects, and Real Estate Agents". So we can confidently conclude that they were in business together by the summer of 1883. The Calgary Herald also stated in that mid-September advertisement that they had offices in "Macleod and Calgary, NWT". This timing fits well with Charles Wolff's crew's activities in 1883, as they surveyed outlines in several areas of the District of Alberta to the southeast of Calgary between Township 05 and 20, all the way from the modern-day Saskatchewan/Alberta border to the Fifth IM south of Calgary. Charles' brother H. H. Wolff had rejoined his crew by this time as well, after a one-summer hiatus. We know that Archibald was in Fort Macleod in mid-April of 1883, as he signed affidavits concerning his field books done during 1882. He was engaged as a Town Surveyor by the Department of the Interior to survey the new town site for Fort Macleod on the south bank of the Oldman River. The survey of that Town Plot ran from August to November 1883[xxx]. It is likely that McVittie set up a temporary office in Fort Macleod as an operations centre, which may have evolved into a more permanent office to take advantage of the growing opportunities in the southern part of the District of Alberta.

What seems unclear is whether or not Charles Wolff ever lived in the Calgary area. He and his crew ended the 1883 season surveying the NE corner of Township 06, Range 03 West of the Fourth IM[xxxi]. This is 40 miles SE of Medicine Hat, which that year was the headquarters for the DLS efforts in the North West Territories. It is likely that Wolff travelled back to Medicine Hat to report to the manager of the surveys – William F. King, on the way back to Calgary or Fort Macleod. Wolff may have headed from Medicine Hat to Ottawa for Christmas with his family, as passenger rail service from Medicine Hat to Winnipeg was in place by June 11, 1883[xxxii]. Then Charles could have followed the normal railway route via the US to Ottawa. Charles must have cut his family visit short though, as we know that on January 19, 1884 Wolff was located back in Macleod, signing affidavits regarding the field books from 1883. So it is likely that he was running the Macleod office of "Wolff & McVittie" during the early part of 1884. McVittie was reportedly working hard on the survey of the Calgary town site for the CPR in Section 15 of Township 24 Range 01 West of the 5th IM. By April of 1884, Archibald was hard at work for the Department of the Interior on a "Town of Calgary" plan one section west of the CPR's survey, in Section 16. He signed the plan of that area, which today is on the south side of the Bow River, to the east of the 14th Street Bridge, on July 18, 1884[xxxiii]. It is possible that Charles Wolff and his crew helped out with the Calgary, NWT town site survey in 1884, but the names of the crews working on that survey are different than Wolff used in 1883.

The survey season of 1883 had been the most memorable accomplishment of the Dominion Land Survey group, as they set a record that has never been bested anywhere in the world. William King's team of 119 DLSs and with support staff of over 2,000 assistants, cooks, labourers and teamsters subdivided 27,234,000 acres, or 170,212 farms of 160 acres[xxxiv]. That is almost the same area as the whole of England. The close of 1883 saw the CPR rails constructed from 74 miles east of Medicine Hat to the summit of the Rockies west of Lake Louise, Alberta. The following couple of years were somewhat anticlimactic for the profession. In 1884, only 71 DLSs were employed, surveying an additional 40,218 farms of 160 acres[xxxv]. Tensions were rising between squatters and ranchers with several court cases heard in Fort Macleod. William Pearce, a civil engineer and land surveyor who had been appointed to the Dominion Land Board and appointed as Inspector of Land Agencies in 1882[xxxvi], was investigating Metis river lot claims along the South Saskatchewan River. In July of 1884, Louis Riel returned from exile in the US and was urging all dissatisfied people in the North West to unite to press their case on Ottawa[xxxvii]. On March 19, 1885, the Metis formed a provisional government and established an armed force at Batoche with Louis Riel president and Gabriel Dumont as military commander[xxxviii]. As part of the Government of Canada's response, the

Dominion Land Surveyors' Intelligence Corps, commanded by Captain J. S. Dennis, was formed in late March of 1885. By April 2nd they proceeded by Pullman coach from Ottawa to Winnipeg by way of Chicago and St. Paul, arriving on April 11, 1885. Charles Edward [sic] Wolff was listed as a member of that force, a lieutenant from Ottawa[xxxix]. Two days later martial law was declared in Calgary, partly due to the Metis situation and partly due to unrest among the railway workers there[xl]. Amongst all the turmoil, the CPR rail line between Montreal and Winnipeg was completed on May 6th, 1885, allowing direct transport through Canada instead of traveling via Chicago[xli]. The last shots were fired in the Riel Rebellion on June 03rd at Loon Lake, Saskatchewan between Sam Steele's troops and the Frog Lake Cree[xlii]. The subdivision of land was done by only 13 DLSs that summer, with an additional 2,448 farms made available by the end of 1885[xliii]. The biggest accomplishment in the west that year was the completion of the CPR railway, with the last spike driven home on November 07th at Craigellachie, British Columbia.

It seems, based on the research done to August 2013, the relationship between Wolff and McVittie is at an end sometime during 1884. Neither DLS does any Township Outline work that year or the next. Wolff goes off to war in the early spring of 1885, using his Captain's experience to drive a relief boat across Lake Winnipegosis during the Riel Rebellion. Wolff appears again in 1886, both as a contributor to a monument to a Perth, Ontario colleague – Lieutenant Kippen – who was a member of the "Surveyors Corp of Scouts"[xliv], and as a Township subdivider in the Porcupine Hills area of southwest Alberta. His eight man crew includes one J. Sproule – Assistant, and J. Sparks (likely a nephew) – Mound and Axeman, and work continues in the area during August and September. He apparently set up an office in Fort Macleod with an Ottawa DLS friend, A. F. Cotton, during 1887[xlv]. Wolff again did Township subdivision surveys in the summer of 1888, northeast of Calgary, again with the faithful J. Sproule as his assistant, completing the field work on September 19[xlvi]. That November 20th Charles Wolff is back home in Ottawa where he signs affidavits concerning his summer's work. Sadly, early the next year – February 03, 1889 – he dies from typhoid-pneumonia, at the young age of 42 years[xlvii]. He leaves behind his wife Esther Sparks Wolff, a daughter Alletha (b. 1875) and a son James C.S. (b. 1878).

The years following the short partnership between "Wolff and McVittie" go somewhat better for Archibald Westmacott McVittie. After his surveys for town sites for Calgary in Sections 15 and 16 for the CPR and for the Department of the Interior respectively, he continues with land development-related work and branches into other ventures in Calgary, NWT. He is involved with the bidding

cont'd on page 24

for the bridge construction over the Elbow River for the soon-to-be incorporated town of Calgary with Col. Macleod in early 1884, and is part of a company, likely with his brother Thomas, known as the "McVitty Bros", who are surveyors, real estate and mining agents[xlviii] in 1885. Archibald is also involved with a Thomas Cochrane, Dr. Andrew Henderson and others in a company called "Calgary Lumber Company" at Mitford[xlix], three miles west of present-day Cochrane. In March 1885, McVittie is the spokesman for the Bridge Committee for the Elbow River bridge in the Mission area. In 1887, he signed three plans – the completed town of Calgary site in Section 15 for the North West Land Company (a British-Canadian syndicate handling town site sales in 47 communities for the CPR), a subdivision plan called "218A" for James Barwis, owner of part of the southeast quarter section 22, Township 24, Range 01 west of the 5th IM across the Bow River from Calgary near the trail to Fort Edmonton, and most interestingly McVittie signed a plan called "A.2" of a survey done on the successful Rousselle claim east of the Elbow River, which is now owned by Wesley Orr. It appears that he then moved to join his brother Thomas McVittie, LS (Land Surveyor) in Fort Steele, BC by the end of 1887, where they shared an office with the Fort Steele Assay Office[l]. While he did return to Calgary in February 1888 to sign a plan at the Registry Office, he is listed as living in Fairmont, Kootenay District, BC the next month, in the proceedings of the fifth annual meeting of the Association of the Dominion Land Surveyors (ADLS). Sometime before the end of 1890, Archibald became an LS in British Columbia. This undated picture may have been from that time.

A fitting tribute for the early Calgary DLS was a kind gesture by a fellow DLS named Richard Jeremy Jephson, who in December 1896 registered a plan of survey called "A3-Calgary", for a part of western Inglewood. It contains a short three block street named after the departed McVittie – called "McVittie Avenue". It lies between the CPR tracks on its west end and the road allowance between Sections 11 and 14 on its east end and is now known as 11th Avenue. The Smithbilt Hat factory is on the western end of that street, and quite a number of residences are on the eastern part of the street.

A.W. McVittie was a restless soul, as he stayed in the Kootenay valley for less than ten years. In 1895, at the invitation of Thomas Kennedy his former partner in Barrie, he returns east and apparently practices in Ontario until about September 1897, when we find him back in Fort Steele at the inaugural meeting of the Board of Trade. He is soon engaged in a company that advertises in the April 1898 edition of the Fort Steele "Prospector" as "A.W. McVittie, T.T. McVittie, Charles Estemere and T.H. Taylor". Late the next fall he even marries a Prescott, Ontario girl named Emily Louise Lesley, in Fort Steele[lii]. They have a son Archibald, Jr. the next year – June 1900, followed by a daughter Margaret in May 1902. During this period he does one further Alberta subdivision survey for the Department of the Interior, in the Blairmore part of the Crowsnest Pass, where his older brother Thomas is listed as his Assistant.

Just after Alberta becomes a Province in 1905, we see the results of McVittie's renewed presence in Alberta, as he starts a series of surveys in the Lethbridge area, where almost all plans of survey are signed in Medicine Hat. This activity continues from April 1906 until about March 1910, when he signs the last affidavit for an Alberta plan of survey, from his new home – Victoria, BC[liii]. It appears that Archibald had an incurable urge for real estate speculation even from his early days in the Elbow River area when he partnered with Wesley Orr. In a reference to his Uncle Archy, Bruce Hutchison mentioned that "…the collapse of the land boom [in late 1914] ruined his Uncle Archy"[liv]. It may have been that the 21 plans of survey he registered in Alberta in the 1906-1910 period for subdivisions in Lethbridge was the basis of his paper-only fortune, and the Great War killed that along with many fellow Canadians.

McVittie spent his last years in the Oak Bay area of Vancouver Island, where he died on August 24, 1926. Of further note on his immediate family, Archibald McVittie, Jr. travelled to New York City where he prospered on Wall Street, married a local named Meg Bossi, and by 1942 was about to serve with General MacArthur's staff in the Pacific. Hopefully he had an office job there! His daughter Margaret Emily apparently married someone named Mr. Pressey, and was in Europe on vacation with her brother and cousin Bruce and Dot Hutchison in May 1937[lvi]. Archibald's wife Emily had a long life after his passing, and lived in Victoria, BC until her death in March 1966 at the age of 95, forty years after Archibald's death[lvii].

McVittie in mid-career[li]
Glenbow Archives NA-1046-7

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There is more to the story of "Wolff & McVittie" I'm sure, especially the McVittie part! We can only guess how they came to meet, but they seemed destined to get along. Both were second sons, had one grandparent at least who was a veteran of the Napoleonic Wars in Europe, both started articling under a PLS in Ontario the same year, and both surveyed in the District of Assiniboia during 1882. As we continue the attempt to document their careers, the obstacles they faced and overcame in helping our country during its infancy seem daunting. Their first markings of land boundaries in the ocean of grass live on as governing objects for our land parcel ownership and oil and gas rights management systems in Western Canada. As a result of the DLSs efforts, by the end of 1900 almost 82,000,000 acres had been subdivided, representing over 510,000 potential homesteads. The CPR and the Hudson's Bay Company were eventually able to claim the lands that were their due. Many immigrants were able to get a fresh start in a land that was freer, even if the weather was not as forgiving as the area they had just departed. Downtown Calgary still shows the influence of the streets and avenues first laid out by McVittie near the confluence of the Bow and the Elbow Rivers.

Archibald McVittie in about 1920[lv]
Glenbow Archives NA-3447-1

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i Glenbow Archives - NA-659-17
ii Wikipedia - Alexander Wolff (soldier)
iii 1851 Canada Census
iv 1861 Canada Census
v Association of Ontario Land Surveyors – Reports of Committees - Page 152 of unknown year – biography after death.
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vii B.C. Historical News - Fall 1993" - page 28
viii Web Family History article by Robert W. Allen, BCLS, CL @ http://www.mcvittie.co.uk/McVittie%20Brothers.htm
ix 1861 Canada Census
x 1871 Canada Census
xi B.C. Historical News - Fall 1993" - page 28
xii 1881 Canada Census
xiii Biographical Sketches of Architects of Barrie, Ontario", by Steve Otto - an unpublished manuscript, 1980, collection of the Glenbow Institute.
xiv Annual Report of the Department of the Interior for the year 1883 – Page xix
xv Field Notes of Township Outlines – Townships 7 & 8, Ranges 1, 2 & 3 West of 2nd Principal Meridian – Field Book #1275
xvi 1881 Canada Census
xvii Field Notes of Township Outlines – Townships 7 & 8, Ranges 1, 2 & 3 West of 2nd Principal Meridian – Field Book #1275
xviii Atlas of Alberta Railways
xix Eye on the Future, written by Henry C. Klassen – Page 68
xx General Report of Operations from 1869 to 1889, Topographical Surveys Branch, Department of the Interior – Page 22
xxi General Report of Operations from 1869 to 1889, Topographical Surveys Branch, Department of the Interior – Page 24
xxii Field Notes of Township Outlines – Townships 27 & 28, Ranges 17 & 18 West of 2nd Principal Meridian – Field Book #4197
xxiii Glenbow Photography Archive – NA-878-7
xxiv Library Archives Canada, Record Group 15 Volume 632 File 237386, via John Gilpin
xxv Field Notes – Townships 7, 8, 9, 10, 11, 12 Range 29, 30 & 1 West of 4th & 5th Meridian – Field Book #2291
xxvi B.C. Historical News - Fall 1993" - page 29
xxvii Louis Rousselle Collection at Glenbow Archives, via Iris Morgan at University of Calgary
xxviii The Elbow - A River in the Life of the City, by John Gilpin – Page 35
xxix The Elbow - A River in the Life of the City, by John Gilpin – Page 28
xxx Field Notes of Survey of Fort Macleod town site – Field Book #3004
xxxi Field Notes – Township Outline Surveys West of the 4th Meridian – Field Book #2529
xxxii THE CALGARY HERALD – MINING AND RANCHE ADVOCATE AND GENERAL ADVERTISER – Volume 1 Number 3 – September 14, 1883
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xxxiv Report to the Deputy Minister – Department of the Interior – 1898 – Page xvii
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xxxvi Frontier Calgary, edited by Anthony Rasporich and Henry Klassen – Page 198
xxxvii http://www.thecanadianencyclopedia.com/articles/northwest-rebellion
xxxviii http://www.thecanadianencyclopedia.com/articles/northwest-rebellion
xxxix Men and Meridians, Volume 2, by Don W. Thomson – Pages 45 and 49
xl Where the Elbow Meets the Bow, by William McLennan – Page 82
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xlii http://www.thecanadianencyclopedia.com/articles/northwest-rebellion
xliii Report to the Deputy Minister – Department of the Interior – 1898 – Page xvii
xliv www.rootsweb.ancestry.com – June 25, 1886 Perth, Ontario Courier article
xlv Laying Down the Lines, by Judy Larmour – Page 162
xlvi Field Notes – Subdivision Survey of Township 29, Range 27 West of 4th Initial Meridian – Field Book #4663
xlvii Association of Ontario Land Surveyors – Reports of Committees - Page 152 of unknown year – biography after death.
xlviii Burns and Elliott – 1885 – Page 61
xlix Eye on the Future, written by Henry C. Klassen – Page 312
l B.C. Historical News - Fall 1993" - page 29
li Glenbow Archives – NA-1046-7
lii British Columbia, Canada, Marriage Index, 1872-1935
liii SPIN2 Website – Government of Alberta – courtesy of Ed Titanich – Supervisor of Land Surveys Unit
liv The Far Side of the Street, by Bruce Hutchison – Page 44
lv Glenbow Archives – NA-3447-1
lvi The Far Side of the Street, by Bruce Hutchison – Page 116
lvii British Columbia Death Registrations, 1872-1986, index and images, FamilySearch

Sites to See

Guidelines for RTK/RTN GNSS Surveying in Canada

http://webapp.geod.nrcan.gc.ca/geod/publications/publications.php?locale=en

This set of *Guidelines for Real Time Kinematic (RTK)/Real Time Network (RTN) Global Navigation Satellite System (GNSS) Surveying in Canada* has been prepared by Natural Resources Canada, Surveyor General Branch to assist the surveying community in Canada through sharing what we view to be best practices. The guidelines have been prepared in response to needs expressed by the Federal, Provincial, and Territorial members of the Canadian Council on Geomatics (CCOG) and to provide Professional Surveyors with a set of concise and easy to follow best practice guidelines for achieving centimetre level RTK/RTN surveys.

Charting New Pathways for Fairness and Equity

By Bruce Millar and Maria Tretiakova

The End of the Beginning:

After 4 years and 9 months the Pathways Project has come to an end, at least as a Ministry of Citizenship and Immigration funded operation. Pathways was a very ambitious project attempting to completely change the way Internationally Educated Professionals (IEPs), who wanted to obtain licensure with the Association of Ontario Land Surveyors (AOLS) were assessed.

The existing system relied on the assessment of Candidates through a course-based system requiring Candidates to provide documentation of the courses and their content from their own countries. An attempt was then made by the AOLS assessor to determine if the course content was consistent with similar courses offered in Canada. This process was acknowledged to be impersonal and somewhat ineffective. Course-based comparisons are very problematic as even in Ontario, it is difficult to find congruity across university courses and programs. This is because the courses, even those with similar names, can and do differ substantially in content and emphasis. As a result, many (perhaps the majority) of Candidates were required to take a significant number of courses at either Ryerson University or York University to ensure that essential requirements were covered. Once Candidates received their assessment letter from the Academic and Experience Requirements Committee (AERC) they were left on their own to complete the requirements and contact between the Candidates and the AOLS was minimal.

New tools, processes and methodologies were created and applied to the licensure process in order to establish positive relationships between the AOLS and Candidates. These relationships allowed Candidates to feel supported as they navigated the challenging process of certification while adjusting and familiarizing themselves with the Canadian social and working environment. These relationships also allowed the AOLS to keep track of Candidates' progress which permitted intervention as required. Furthermore, the AOLS was able to forecast when Candidates would become eligible for Articling which would bring them a step closer to their swearing in ceremony.

The Project introduced the concept and practice of a "Competency Based Assessment" (CBA) which was implemented in a multi-step process. The first step was to identify all of the competencies required to successfully function as an OLS. The identified competencies were thoroughly reviewed and classified into three categories:

- Enduring knowledge or those competencies that an individual would absolutely have to have mastered in order to function as an OLS.
- Need to know or those competencies that an individual would need to know in order to function within their workplace. An example would be that an OLS working in the Timmins area would need to have a solid understanding of the Mining Act and the elements of working in the mining sector.
- Nice to know or those competencies that would benefit a person within their work, such as the use of new equipment and systems.

The second phase of this part of the project included listing all of the competencies and the identification of reference and resource materials to assist Candidates in understanding the individual areas.

A completely new assessment process meant to support CBA was developed. This process allowed Candidates to receive as much recognition of their previous learning and experience as possible while ensuring the rigour and standards of the OLS Profession in Ontario. The new assessment process provided Candidates with options and supports that were previously non-existent.

The initial change within the process begins with the intake process that among other features and applications, identified Candidates with Language issues, and offered assistance and support to organize their documentation into a Portfolio format. Pre-assessment meeting(s) between Candidates and the assessor allow for a direct assessment of the Candidate's command of the various competencies and competency groupings and provide an opportunity to identify areas where further study and or experience is required.

With these changes in assessment, new competency based reporting forms were developed for use by the AERC. Previously, assessments listed only required courses which meant that Candidates were taking full courses, when in reality they may only be missing a handful of the competencies covered by a particular course. The option and means now exist which allow Candidates to participate in partial courses and focus on those knowledge areas identified by the competency based assessment.

Another key process that has been implemented is the Learning Plan developed in collaboration with the Candidate, Assessor, and AOLS Case Manager and designed to develop a path or map to achieve what is required for the Candidate to undertake to complete his/her academic requirements.

The Pathways Project's approach incorporated Adult Learner Friendly Institutions (ALFI) principles which denote that adults learn and adjust differently to mastering competencies than do young students taking the traditional path through the educational system.

Most adults and virtually all IEPs have families and survival jobs and taking courses imposes extra stress on them. In addition to the cost of enrolment, there is the cost of time off work,

transportation, and supply costs. Virtually all post-secondary organizations require a learner to be in a particular geographic location, at a specific time for the opportunity to have a "professor" lecture. Oh and, by the way, if there aren't enough students to cover the costs, the course isn't offered.

Pathways started the movement to reduce the negative impact of courses by addressing four key factors: Place Bound; Time Bound; Role Bound and Efficiency Bound. Municipal Planning, Professional Communications, Introduction to Canadian Common Law as well as Survey Law 1 and 2 are now offered in Blended/Hybrid configurations. These courses are offered in a blended format with some Learners in a class and others on-line thus easing the impact on Candidates.

Pathways attempted to infect the AOLS membership and head office with a beneficial virus that stressed the absolute need for moving learning, knowledge, and development into a top priority. As a Social Enterprise whose mission is to: Protect the Public, Support Membership and Advance the Profession, becoming a Learning Organization is critical. Pathways advocated for the use of competency systems, not only for IEPs but for Professional development and recruitment.

Of note is the wonderful initiative by the AERC with respect to the Articling Process. Essential Areas of Knowledge are yet another way of describing "competencies". The migration of Learning Plans into this process is unique, effective and commendable.

The future is now in the hands of the membership. There will be resources required to continue to implement and refine the tools, methodologies and processes that were introduced during the Project's 3 phases. There will need to be a resolve on the part of champions, to continue to modernize and rethink the importance of learning support and relationship building for members and aspiring members. It will require resource decisions and process decisions to ensure that the hard work of the Pathways Team does not stall. The Team has worked hard to get this change started. Like all aspects of change, things tend not to happen as quickly as the Team would have liked, but the change has started.

The AOLS has an opportunity here. This is only the end of the beginning. Public support has gotten the AOLS over the costly hump of initiating change and now success will be measured in an improvement in the number of IEPs achieving licensure with the AOLS and in the reduction of the time it takes for an IEP to join the profession.

Bruce Millar has been the Project manager for the Pathways to Fairness and Equity Project for the past five years. He has been involved in Adult Learning and Recognizing Prior Learning (RPL) for more than 30 years. As President of Kente Bay Holdings, he served as CEO of seven companies, including serving as the founding President of First Nations Technical Institute. Bruce can be reached at **brucemillar@sympatico.ca**

Maria Tretiakova joined the Pathways Project team in March 2013 as a Project Coordinator. She is a recent Queen's University graduate who has previously worked at the Canadian Defence Academy with the Department of National Defence.

The Municipal Resurvey: The Resurrection

By John Barzo and Chester Stanton

Introduction

After an almost 40 year long slumber and left for dead, the municipal resurvey provisions in Sections 48 - 49 of the Ontario *Surveys Act* have recently been born again with the release of Surveyor General, Susan F. MacGregor's decision on October 24, 2013 in "Case No.: 883".

Within this decision one can find much to mull over, including the difference in approaches and statutory mandates when compared with the *Boundaries Act*, the rejection of the notion of equitable division of boundaries in relation to accreted lands when involving an original road allowance and perhaps introducing a principle of "the intended lot fabric".

Background

The subject properties are situated on the shores of Georgian Bay in the Township of Tiny, and in particular the Road Allowance between Concessions 18 and 19, to the water's edge at what is locally known as Thunder Bay. Initially, the waterfront landowners on the west side of the road initiated an application under the *Boundaries Act*, with a proposed plan of deflecting the road towards the east. The landowner on the east side of the road was not in favour. The Township, as the literal meat in the sandwich was dragged into the fray.

The BA application was abandoned at the 11th hour, and shortly thereafter a lawsuit commenced against the Township, in part on the basis of alleged bad faith in maintaining the position that the road should continue in a straight line without deflection. The litigation was put on hold to allow the applicants to recommence a BA application, but when they did so, they advanced a new theory on the basis that an entire segment of the original road allowance was in fact in the wrong place.

Faced with this escalation in the dispute, the Township turned to the provisions of the *Surveys Act.* The *Boundaries Act* hearing was placed in abeyance.

The end result of the *Surveys Act* decision was that it was found that the road was in the correct locale, and further in circumstances of accreted lands, a road allowance is to continue along in a straight line, without deflection, to maintain the intended lot fabric.

The Lawyer's Perspective

Since there are two statutory routes to resolve the issue at hand, a comparison of the wording of the respective legislation was a natural starting point. Under the *Boundaries Act*, there is a statutory mandate to the Director to *"dispose of any objection in such manner as he or she considers just and equitable under the circumstances"*.

Under the *Surveys Act*, the Minister, upon the evidence submitted *"may direct such amendments to be made as he or she considers necessary"*.

Surveyor General MacGregor found that *"introducing a bend into a road allowance creates unnecessary confusion for landowners"*. When addressing the issue of equitable distribution of accreted shore lands in the context of the *Surveys Act*, she reasoned as follows:

> *"After considering the evidence and the law provided, I find that reliction/inundation, erosion/accretion have no impact on the location of the road allowance. The Surveys Act in Ontario was written to ensure the lot fabric is restored according to best evidence principles when lost. The objective is to put the lot fabric back where it was, providing certainty to land owners. If the common law principle of equitable distribution of accreted shore lands applies at all, it should be confined to the lot within which the property sits."*

The question that is left, is whether the above noted principles as outlined by Surveyor General MacGregor would have been applied if the hearing was held under the *Boundaries Act?*

The Surveyor's Perspective

This situation has been ongoing for many years including two Boundaries Act Applications, two lawsuits and a hearing under the *Surveys Act*.

For Surveyors it emphasizes the fact that the original evidence of lot fabric for the townships in Ontario is disappearing. Long gone are most of the original blazes, bearing trees, stone mounds, wood posts and pits and mounds set during the course of these surveys. We now have to look for other evidence of the position of the original road allowances, side roads and lot corners. The priorities of evidence are well documented and the methods for re-establishing the lot fabric are set out in the *Surveys Act*.

As Surveyors we need to keep in mind that there may be extrinsic evidence available as there was in the case at hand. Old field notes from surveys carried out at a time when the original evidence was still in existence were reviewed, as were the field notes and plan from the original survey. A review of the field notes for the original survey indicates that the lines in Tiny Township were all run in an orderly fashion, however, a detailed review of the Surveyor's diary indicated a completely different scenario with lines being run from different directions to a common base line. This of course resulted in jogs where the original plan and field notes did not indicate jogs and distances measured for the

lots which were not in accordance with the original plan and field notes.

Some of the evidence introduced in support of the position of the boundary included soils tests by geo-technical engineers to determine what may have constituted wind-borne alluvium and what was original ground, historical air photos, historical by-laws of the Municipality and experts who helped determine the age of old trees in the area of the subject lands.

In light of the deteriorating original evidence, it is important to keep in mind that there is an avenue, besides the *Boundaries Act*, available under the *Surveys Act* to confirm the position of the original lot fabric.

John Barzo is a lawyer practicing in Barrie, Ontario and represented the Township of Tiny. He can be reached by email at **jbarzo@barzolaw.com**

Chester Stanton, B.Sc., O.L.S., O.L.I.P., C.L.S., is a principal of Dearden and Stanton in Orillia, Ontario and represented one of the land owners. He can be reached by email at **cstanton@encode.com**

Case No.: 883 can be found at the following website:
http://www.township.tiny.on.ca/Shared%20Documents/Surveyor%20General's%20Decision%20,%20Moranis.pdf

Editor's note: After preparation of this article, the decision in this matter has been appealed to the Ontario Divisional Court. The hearing date has not yet been set.

NEWS FROM 1043

Changes to the Register

Members Deceased

George J. Wegman	998	Sept. 13, 2013
Robert R. Smith	652	Oct. 20, 2013
Beverley G. Cook	1149	Oct. 27, 2013
Harold Macklin	746	Nov. 16, 2013
Kenneth Matthews	1272	Dec. 7, 2013
Gordon F. Mackay	1162	Dec. 8, 2013

Retirements/Resignations

Anil Agnihotri	1772	Dec. 31, 2013
Eugene Marshall	CR8	Dec. 31, 2013
Michael T. Franey	CR77	Dec. 31, 2013
John Knowles	CR121	Dec. 31, 2013
Robert Naraine	CR71	Dec. 31, 2013

CofA's Relinquished

Rowan-Stanciu Ltd.	Mar. 25 2013
W.R. Wollerman Surveying Inc.	May 1, 2013
D.J. Cullen Limited	Aug. 1, 2013
P.J. Thorpe Surveying Limited	Oct. 31, 2013

CofA's Issued

David Horwood Limited
Markham, ON, November 20, 2013

CofA's Revised

Was: Vladimir Dosen Surveying
Is: Vladimir Dosen Surveying Inc.
Toronto, November 5, 2013

Licence Reinstated

Stephen Vollick	1765	Nov. 1, 2013

Surveyors in Transit

Ertl Surveyors in Richmond Hill has acquired **Rowan-Stanciu Ltd.**

Timothy Hartley is now with the **Association of Ontario Land Surveyors** as the Manager of the Survey Review Department.

David J. Pesce Surveying in Alliston has acquired **D.J. Cullen Limited.**

Christopher Oyler is now with **Surveyors On Site Inc.** in Windsor.

Thomas Gondo is now with **MMM Group Limited** in Mississauga.

Marcus Nouwens is now with **J.D. Barnes Limited** in Toronto.

Peter Thorpe is now with **Van Harten Surveying Inc**. in Orangeville. **P.J. Thorpe Surveying Ltd.** has been acquired by **Van Harten Surveying Inc**. in Orangeville.

Greg Bishop Surveying and Consulting Ltd. has moved to 121 Mallard Road, P.O. Box 309, Haliburton, ON, K0M 1S0. Phone: 705-457-2811.

Dan J. Cormier is now with **McElhanney Associates Land Surveying Ltd**. in Surrey, BC.

The Belleville office of **Ivan B. Wallace Ontario Land Surveyor Ltd.** is now located at 5503 Highway 62, Prince Edward Square, Belleville, ON, K8N 4Z7. Phone: 613-966-9898.

Wayne Wollerman is now with **Ivan B. Wallace Ontario Land Surveyor Ltd.** in Belleville. **W.R. Wollerman Surveying** has been acquired by **Ivan B. Wallace Ontario Land Surveyor Ltd.** in Belleville.

The offices of **Ivan B. Wallace Ontario Land Surveyor Ltd.** in Picton, Trenton, Peterborough and Cobourg are now closed.

Kerry Boehme and **Roger Pickard** have transferred to the Belleville office of **Ivan B. Wallace Ontario Land Surveyor Ltd.**

Dwayne Cummings and **Crystal Cranch** have transferred to the Bowmanville office of **Ivan B. Wallace Ontario Land Surveyor Ltd.**

David Horwood Limited is located at Unit 16 – 3980 14th Ave. Markham, ON, L3R 0B1. **David O. Horwood** is the managing OLS.

Sarah J. Cornett is no longer with **Professional Surveyors Canada.**

John D'Amico is no longer with **Donevan Fleischmann Petrich Limited.**

Sexton McKay Limited (a Division of J.D. Barnes Limited) has moved to 140 Renfrew Drive, Suite 100, Markham, ON, L3R 6B3.

Scott McKay has transferred to the Markham office of **Sexton McKay Limited (a Division of J.D. Barnes Limited).** Phone: 905-477-3600, ext. 291.

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EDUCATIONAL FOUNDATION NEWS

Congratulations to the Fall 2013 Educational Foundation Award Winners

On November 21, Deputy Registrar Maureen Mountjoy attended the Department of Civil Engineering 2013 Awards Evening at Ryerson University. She presented awards to the following students: **Scott Blakely** and **Huimin Zhou** who are students entering the third year of the Civil Engineering program who have demonstrated academic excellence and an interest in pursuing Geomatics Engineering; **Marina Bostros** and **Anthony Vas** who are students entering the fourth year of the Geomatics Engineering option who have demonstrated academic excellence in third-year engineering courses and are contributing to social activities at the university or the broader community; **Omar Darwich** and **Neil Pinto** who are students entering fourth year of the Geomatics Engineering option whose fourth-year project involves survey law, cadastral studies, land tenure or land and geographic information systems; and **Piotr Banaszak** and **Oleg Grigoriev** who are students entering fourth year of the Geomatics Engineering option whose fourth-year project includes aspects of surveying, GPS, digital mapping, geospatial information systems or remote sensing.

On November 7, the Eastern Regional Group Award was presented to **Andrew Belanger** who is a student in the 2nd year of the Survey Technician Program at Loyalist College.

Mark your calendars

The Educational Foundation Annual Meeting of Members will be held on Thursday, February 27, 2014 at the Sheraton on the Falls Hotel in Niagara Falls, Ontario from 7:30 a.m. to 8:30 a.m.

The Educational Foundation would like to recognize with thanks donations made in the memory of George Wegman and Harold Macklin.

Focusing on Science, Technology, Engineering, and Mathematics (STEM) in the 21st Century

By Isha DeCoito, PhD

Defining STEM

STEM, coined at the National Science Foundation (Howard-Brown & Martinez, 2012), is the intersection of science, technology, engineering, and mathematics. It is an approach to solving problems in a holistic way; seeing how the components of STEM interact with and inform each other (Figure 1). STEM education is critical to and supportive of many education reforms being undertaken today, from adoption of common international standards to better teacher preparation to enhanced coordination across the entire K–12 education system. STEM emphasizes a multidisciplinary approach, including inquiry and problem-solving, for better preparing all students in STEM subjects, and increasing the number of post-secondary graduates who are prepared for STEM occupations (Mishagina, 2012; National Research Council, 2012, 2013). A major goal of the STEM agenda is to improve the proficiency of all students in STEM, regardless of whether or not they choose to pursue STEM careers or post-secondary studies, while fostering 21st century skills identified as being crucial for success, including critical thinking, problem solving, creativity, collaboration, self-directed learning, and scientific, environmental and technological literacy, to name a few (DeCoito, 2012). The ability to understand and use STEM facts, principles, and techniques are highly transferable skills that enhance an individual's ability to succeed in school and beyond, across a wide array of disciplines. Hence, STEM elements are viewed as fundamental in the preparation of our next generation.

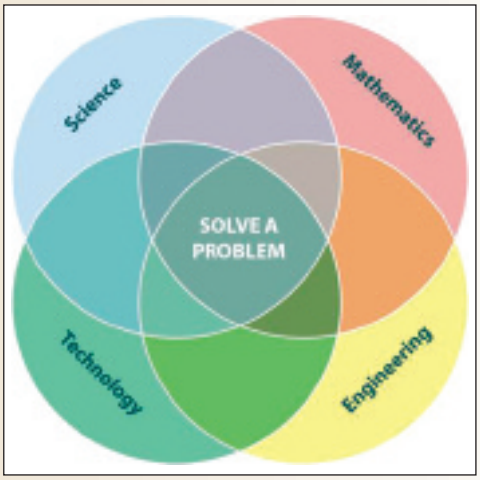

Figure 1. The intersection of STEM (Howard-Brown & Martinez, 2012)

Canada and STEM Education

Achieving greater STEM proficiency begins in the K–12 system, where in many countries including Canada, students have not demonstrated significant gains in math and science.

In 2007, based on PISA results and other factors, the Conference Board of Canada determined the following ratings for education and skills in Canada (Table 1).

Table 1

Report Card: Education and skills in Canada 2007

Overall	A
High-school completion	A
College completion	A
University completion	B
Ph.D. graduates	D
Science, math, computer science, and engineering graduates	C

As evidenced in Table 1, Canada's participation in STEM education at the post-secondary level is awarded a "C" grade, based on Canada's relatively low proportion of graduates in these fields (Mishagina, 2012; Orpwood, Schmidt, & Jun, 2012). In addition to receiving a D grade for the number of Ph.D. graduates, more disturbing is the ratio of male to females at the graduate level. Male and female participation in areas related to STEM continue to demonstrate a gender disparity, especially prevalent in science and engineering fields, as illustrated in Figure 2. In terms of educational attainment, the number of graduates in STEM fields has not increased. Statistics Canada (2013) indicates that at the post-secondary level, STEM fields represent 18.6% of all fields of study. Interestingly, women held a higher share of university degrees among younger STEM graduates than among older ones, but men still held the majority of university STEM degrees. In 2011, men represented the majority (67.4%) of adults aged 25 to 64 with STEM degrees at the university level. In comparison, among adults with a non-STEM university degree, 6 in 10 (60.6%) were women. The gender disparity continues in STEM graduates.

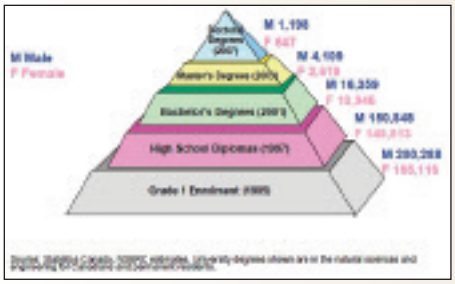

Figure 2. The Natural Science and Engineering Supply Chain

Globally, when it comes to STEM graduates Canada is awarded a "C" and ranks 12th out

of 16 peer countries (Figure 3). In 2010, Canada's proportion of overall graduates emerging from science, math, computer science and engineering disciplines was 21.2 %, the third year of decline. These trends have ramifications in terms of satisfying labour demand and promoting business innovation. The Conference Board concluded that Canada needs more graduates with advanced qualifications and more graduates in STEM fields as these graduates are necessary to enhance innovation and productivity growth, and ultimately to ensure a high and sustainable quality of life for all Canadians (Conference Board of Canada, 2013). In response to Canada's overall ranking, Employment and Social Development Canada commissioned the Council of Canadian Academies to assess Canada's preparedness to meet future skills requirements in STEM. The main focus was the role of STEM skills in fostering productivity, innovation, and growth in a rapidly changing demographic, economic, and technological environment, as well as the demand for STEM skills in the global market. Additionally, the focus included the evolution of STEM skills, which skills are likely to be most important for Canada, and how well Canada is positioned to meet future STEM skills needs through education and international migration. The Council was also charged with exploring factors affecting Canada's supply of STEM skills, especially through the Canadian learning system and international migration.

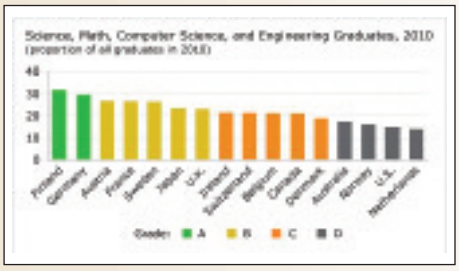

Figure 3. STEM Graduates (Conference Board of Canada, 2013)

The Importance of STEM

There is general consensus that one of the origins of the underrepresentation of STEM in our education system, combined with a 'negative image', resides in engaging curious young minds in the early grades, specifically at the elementary level. As a result, elementary science education has come under increased attention as educators, researchers, and policy makers have united around the notion of the important foundational role elementary science plays in later success in STEM education (Duschl, Schweingruber, & Shouse, 2007). Issues with inadequate STEM preparation in the early grades ultimately play a role in high school course choices, and ultimately post-secondary and career choices.

Integrating STEM subjects can be engaging for students, can promote problem-solving and critical thinking skills, and can help build real-world connections. However, STEM has long been an area of some confusion for some educators. While they can see many of the conceptual links between the various domains of knowledge, they often struggle to meaningfully integrate and simultaneously teach the content and methodologies of each these areas in a unified and effective way for their students (NRC, 2012; Thomasian, 2011).

Essentially the questions are: How can the content and processes of four disparate and yet integrated learning areas be taught at the same time? How can the integrity of each of the areas be maintained and yet be learned in a way that is complementary? These are ongoing challenges faced by educators, and are among the many factors affecting STEM preparation in the early grades. For example, failure to motivate student interest in math and science is prevalent in most K–12 systems, as math and science subjects are disconnected from other subject matter and the real world, and students often fail to see the connections between what they are studying and both their everyday world and STEM career options (AAAS, 2001). Yet these students rely on science and technology every day in smart phones, computers, televisions, medicines and everyday products, without understanding the underlying connections to math and science (NRC, 2012). This can potentially affect students' career choices as they typically form notions of their career path in secondary school. Without the pertinent information, fully capable students may circumvent STEM studies because they could not foresee the applications of STEM knowledge.

Similarly, the lack of STEM engagement and preparation in the early grades jeopardizes a student's ability to enter and complete a STEM post-secondary degree because the student did not enroll in the appropriate courses in high school or spend enough time practicing STEM skills in exciting, real-world hands-on activities. Clearly, determining factors that lead to better STEM preparation is important, including programs and initiatives that ignite the 'science spark' and encourage students to continue their studies in mathematics and science and to consider careers in engineering, science, and technology. Helping students see the connections between math and science and future career opportunities is a critical aim of the STEM pipeline. Motivating interest in math and science requires improved teaching strategies in the classroom and opportunities within and outside the classroom to demonstrate linkages between math and science, real-world applications, and future careers (Singh, Granville, & Dika, 2002; Tela, 2007). Five domains have been proposed for promoting STEM involvement including: interest and engagement; competence and reasoning; attitude and behavior; career knowledge and acquisition; and content knowledge. These domains will require integrating a STEM focus in teacher education programs, as well as sustained professional development of teachers in order to prepare students for success in STEM education. Furthermore, opportunities for students to interact with professionals in STEM fields are vital.

STEM Outreach

There has been widespread support for outreach programs and informal learning opportunities focusing on STEM enrichment. Outreach programs provide valuable experiences that ignite interest and demonstrate how math, technology, engineering and science connect to everyday

cont'd on page 36

life and careers, and allow students to expand their skills (Thomasian, 2011). *Go ENG Girl* is an example of the type of outreach program currently being advocated by the scientific community to promote STEM skills and interest for students. Through this initiative, grades 7-10 girls across Ontario interact with mentors in STEM professions, engage in STEM hands-on activities, and are exposed to STEM career choices at their local university. This year's event at Lassonde School of Engineering, York University introduced participants to the world of geomatics and real-world applications, such as land surveying. Currently, Ontario is experiencing a shortage of land surveyors. Once deemed a male-dominated profession, this is a career choice available to both boys and girls, and students should be exposed to and encouraged to pursue this STEM profession as an option. Research (Alvarez, Edwards, & Harris, 2010) indicates that exposure to outreach programs, such as *Go ENG Girl*, has the potential to positively affect STEM interest and achievement, and can support young people to develop increased interest in STEM and productively engage in STEM learning activities, value the goals of STEM and STEM learning activities, and develop an appreciation of the world of science and consider future STEM pathways.

Dr. Isha DeCoito is a Lecturer in Science Education in the Faculty of Education at York University. She can be reached by email at **IDeCoito@edu.yorku.ca** for further discussion.

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Advertiser's News

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Early Observations - The Beginning of Surv.ca

By Blake van der Veen, O.L.S.

Having used many different systems from different provinces and states, including some familiar ones in Ontario, friends, colleagues and I observed that none solved the frustration we continuously ran into. What was needed was a good map-based system, not only to sell plans and field notes from, but to manage our project documents, for example, CAD's, site pictures, total station downloads, laser scan files, invoices, etc. So we created a system that does just that, and as it turns out, there are very good reasons why this type of system hasn't been created yet, but I'm getting ahead of myself, allow me to start from the beginning.

Curiosities in surveying for me began as a farm boy South of Ottawa. I wondered where my family's fields ended and how we knew where our limits were, basically, where we stopped planting. We moved to another farm, this one in Port Stanley where it got even more confusing because our fields now bordered several kilometers along lake Erie, our limits where changing constantly due to erosion at a rate of several feet per year, losing the same area as several city lots per year. For these reasons I decided to get into surveying, unfortunately my first property law course wasn't until the 3rd year, so it took a while in the program before I understood that our underwater property was no longer ours, I wish I'd had Izaak de Rijcke as a neighbour, he could have saved me some time.

After studying survey engineering (geodesy and geomatics engineering) in New Brunswick and articling in Ontario, I received my commission which was just a few years ago. Compared to most OLS's my 15 year survey history is short, it began as a bubble boy for Kim Husted Surveying Ltd, then I worked in the east coast, Boston, London, Ottawa, and Toronto. Early on my classmates, colleagues and I, who are now spread out in North America and exposed to different systems, observed the following:

1. In office research can be very time consuming. As more firms absorb older records, they also absorb their index systems, which are usually different from their regular routine of indexing. Doing research often necessitates a 'legal fabric' competent employee in order to search all records.
2. Communication between staff was often an issue. It can be frustrating not knowing where draftsmen (or women) saved their drawing, or where field staff saved their total

cont'd on page 38

station download or put their field notes... so many disconnects.

3. Since many systems aren't map-based, they are dependent on coders to fill out information for each plan properly. If a Lot or Concession or Township is entered incorrectly, then it's potentially very difficult to retrieve that plan; it may become 'lost'. Other issues include entering 37R-1234 and not being able to retrieve the plan unless you type in the dash, for example, when entering (or accidentally entering) 37R1234 the plan may not be found.
4. Many current systems have simple frustrating issues, for example, small buttons, or when clicking nothing happens, or too many buttons, or complicated uploading procedures without drag and drop, or no place where drafters can store their CAD's or any other information, or no place to put a simple comment like the client called and wants the house layout to reflect a recent change.

As I was finishing up in Toronto a couple of years ago I began to develop the site with my brother Jon, who was then a PhD candidate at Concordia University and working with the faculty in the Department of Geography at Western University on experimental visualizations. When we began to plan the site out, we found that while it had been possible for a while to create a complex site that required users to run proprietary software on powerful machines, we were able to prototype a site using more open, web-based technologies that could run on many devices efficiently, and wouldn't require users to download any special software or read long instructions.

We are currently uploading Kim Husted Surveying Ltd. data including Ken Matthews data, J. Weston Surveying Ltd. data, Jewitt and Dixon Surveying Ltd. data, Mcdowell and Jewitt Ltd. data, including Fairchild and Yeo data. This covers practically the entire areas surrounding Aylmer to east of Simcoe, including parts of Elgin County, Oxford County and most of Norfolk County, meaning anyone who needs information from these areas will soon be able to purchase this data very easily. In this system, it is very clear what information you have and where it is located. Research for a new project or doing an estimate takes a fraction of the time when you can clearly see all your data on a map. Communication is improved. It also eliminates the need to respond to a request for information from another firm. It's not only a smooth efficient system for busy offices, but a perfect system for an OLS considering retirement.

As a final note, I should add that we noticed that the current systems are liked by some users, however, if you share our frustration and our system interests you, don't take my word for it, type www.surv.ca.

First Annual Boundary Case Law Conference Parcel Title and Parcel Boundaries Where Lawyers and Surveyors Meet

By Patrick Floyd

On November 22, 2013, Four Point Learning held its *First Annual Boundary Conference* at the Delta Hotel and Conference Centre in Guelph. It was well attended by lawyers and surveyors alike. The room was full with over 104 registrants to listen and learn from the interesting and experienced nine speakers. The event was the result of the spectacular effort by Izaak de Rijcke and the staff of Four Point Learning.

I am writing this article from the perspective of being a lawyer with a previous career as in-house counsel for a national institution, which leased and licensed over 2500 properties in all jurisdictions of Canada, including all variations of boundary issues arising from lakeside, riverside, oceanside and First Nation properties. I found the conference and the various subjects very interesting and very helpful from the legal and practical perspectives.

The first speaker, Bill Snell, provided an informative and interesting overview of the different types of land title categories from "LT Absolute", and "LTCQ" to "LT Plus". The analysis and description in his paper was very insightful and provided clarification of what title means in the *Land Titles* system in Ontario.

Jeffery Lem gave a practical and light-hearted overview of the practical issues of the "neighbour that you will soon hate" and the battle for the "most expensive property in Ontario". Mr. Lem gave a great presentation on the problems in *MacIsaac v. Salo*, and how the Courts looked at rectification and actual notice under the Land Titles system. The perspective of how inter-neighbour dynamics elevate a few square feet of property to the extreme value caused by the expenditure of tens of thousands of dollars in legal costs was helpful. In addition to his presentation, the written material provided great references with regards to how to treat easements, prescriptive rights and other aspects relating to dominant tenements, etc. The analysis provided in the paper would be extremely helpful in any neighbour dispute or easement issue.

Jeff Buisman gave an interesting practical review of the issues of navigability of water courses. While dealing principally with the severance of a property due to the intersection of that property with a navigable water course, this aspect affects other areas in my practice relating to the navigability of water courses; principally, dealing with the Federal scope of authority relating to navigable waterways and Canadian maritime law.

The practicality of navigating the waterway by a canoe and how the Court looks at that practical evidence was very helpful in understanding the applicability and proving of the "navigability" of waterways.

Roger Townshend and Michael McClurg provided a review of the *Mining Act* and the Duty to Consult and Accommodate Aboriginal Peoples. I found this part of the seminar interesting since I have had to negotiate licence and lease agreements with First Nations across Canada. The updating of the duty to consult and how rights are defined under Treaty or under traditional territory analysis, and how those rights trigger the duty to consult and accommodate was very helpful.

Russell Raikes presented an entertaining overview in dealing with natural boundaries in the Post-*Ellard* and *Battaglia* regime. In addition, Mr. Raikes provided an interesting practitioner's perspective in how to deal with the issues of latent ambiguity versus patent ambiguity in Court. Having been tangentially involved in such matters, I found his perspective very enlightening in looking at the (historical) intention of the developer. The paper he provided will be very helpful in any upcoming historical analysis of the Developer (Sub-divider's) intent with regards to beach access - especially in the Township of Tiny.

Virginia Tinti was entertaining and enlightening in the "Role of a Survey" in due diligence in the post-title insurance era. In addition, she provided an interesting perspective of how a proper survey plays into due diligence, and how the lack of a survey could be seen as not fulfilling proper due diligence. Her paper was very good in linking to the issues in standard form purchase agreement templates and was quite insightful.

Robert Fenn addressed issues of "Processes and Remedies for Resolving Uncertainty". The paper provided a very good overview of common law and equity in dealing with proper legal process. Furthermore, the analysis of how the *Surveys Act* could be used to fix boundaries was insightful and very helpful.

The analysis by Mr. Fenn of the two different procedural routes in administrative law (appeal vs. judicial review) would be very helpful to any practitioner in understanding what each route provides and what is necessary to prepare for each forum. Finally, the practical and strategic suggestions in dealing with boundary litigation and the associated costs were informative – if not frightening.

The paper provided by J. Anne Cole on "Ethical Issues and Resolving Neighbour Disputes" was helpful, especially in light of Jeffrey Lem's description of the "most expensive

cont'd on page 40

property on the earth" when dealing with neighbour disputes. Although Ms. Cole was not available to present the paper and to provide practical insight, she was well served by her replacement, Bob Halliday.

As an attendee, I found it one of the best conferences as it was forward thinking and provided valuable and practical practitioner's advice regarding many of the issues surrounding boundaries, whether it be inter-neighbour boundaries, water courses or First Nations. I, for one, will attend the Boundary Law Conference next year as it is progressive, insightful, and helpful and it will be well received, and worth the time, effort and cost.

Patrick Floyd of Rohmer & Fenn has an interest and practise in the problems caused by boundary disputes, due to his previous position at NAV CANADA which focused on the real property and environmental problems relating to airport and other aviation properties (including radar and communication sites). Since joining Rohmer & Fenn, Mr. Floyd has continued his aviation and real property focus. Mr. Floyd is a member of the Bars of New York, Ontario and Nunavut. He can be reached by email at **floyd@rohmerfenn.com**

Advertiser's News

The Numbers Don't Lie

By Michael Cunningham

State-of-the-art surveying technology is capturing the attention of criminal justice professionals and revolutionizing the science of forensics.

Surveyors and engineers have been using 3D laser scanning to document as-built conditions of structures since the late 1990s. Surveyors, especially, were quick to appreciate the laser scanner's ability to capture highly accurate measurements of complex environments. Now this state-of-the-art surveying technology is capturing the attention of criminal justice professionals and not only revolutionizing forensic investigation but also the way evidence is presented in court.

Laser scanning surpasses conventional methods of forensic investigation

Conventional forensic investigation methods are time-intensive and dependent on a subjective human decision making process. Photographs are taken. Measurements are made—usually with a tape or other manual devices. Drawings and diagrams are sketched. Evidence is documented and collected, and the scene is released. Hours in the field are followed by days or sometimes weeks in the office analyzing data and creating exhibits for courtroom use. It is a slow, cumbersome and inexact process.

"When I saw what laser scanning can do, I was completely convinced that this was the way to go for the future," said Steve Holloway, deputy director of the Wyoming Crime Laboratory, which adopted laser scanning technology more than two years ago. "It's a tremendous piece of technology," Holloway said. "It has so many benefits that it is hard to comprehend them all in a single conversation."

Fast & Accurate

While investigators can collect, perhaps, dozens of measurements over the course of an investigation, a laser scanner captures millions of highly accurate data points in minutes.

"I've been a sworn officer now for almost 34 years, and over that amount of time, I've seen very simple crime scenes that take 30 minutes to an hour and you're done with everything that can realistically be done. I've seen crime scenes that we've had to hold on to and work on for weeks," Holloway said. "But I have never seen a crime scene that, using this technology, couldn't be completed (as far as all the scanning and capturing of data) in a matter of one, two days at the most—if it was some horrific thing—because it is so fast."

"When you are talking about that kind of speed in gathering this data, the amount of time and effort you save is so great that it's hard to get your mind around how thorough this is and how quickly it's done."

Objective & Comprehensive

Experienced crime scene investigators are highly observant and very good at picking up on small clues. Yet even the best investigators cannot measure everything or predict what might become significant after a crime scene has been released and new facts develop.

In contrast, a laser scanner is objective, not subjective, about what gets documented, which protects investigators from overlooking key evidence. It impartially and comprehensively captures everything in its line of sight and within its range, even areas surrounding the main crime scene, which may later come into play.

Say, for example, that a person unexpectedly comes forward claiming they "saw the whole thing" from a motel room down the street. "Well, you wouldn't have captured that data in your diagrams and measurements of what windows were where in a building down the street that's not involved," Holloway said. "Whereas, this technology, if it was within the range of it, may allow you to turn around and look back and see if they could have seen what they are claiming."

"That's why this technology is so valuable—it captures *everything* in the vicinity so that you have that information in the future when something new becomes important that you hadn't anticipated."

Virtual & Permanent

A bedrock principle of forensic investigation is that you only get one shot at the crime scene. However, if the scene has been laser scanned, it remains pristine forever in a virtual environment. As a result, investigators and other criminal justice professionals can revisit the as-scanned crime scene to re-analyze and confidently extract survey-quality measurements long after the scene has been released, even decades in the future.

Laser scanning is taking the science of forensics to a new level. "It is going to affect forensic investigation very much like DNA affected the world of biology," Holloway said. "Laser scanning is going to become the gold standard for processing crime scenes across the country in perhaps 10 years. It may not even take that long."

3D visualization software enables juries to make informed decisions

Laser scanning technology is also revolutionizing the way in which evidence and exhibits are presented in the courtroom.

For decades, juries have made life-altering decisions based, in part, on static two-dimensional photography and diagrams. Today, highly accurate 3D visualization software transforms scan data into an informative, interactive and compelling alternative.

In California, a jury is transported virtually into a vivid 3D crime scene along a rural country road. They are shown undeniable forensic evidence that leads them to convict a known gang member for the assassination of a sheriff's deputy. In a New Jersey court, a homicide detective uses a single 3D image to utterly destroy the defendant's claim of self-defense in the killing of his neighbor.

Virtual scene reconstructions such as these are made possible with 3D, 360-degree visualization software such as Leica TruView. The software combines panoramic scene photography with millions of data points and acts as a canvas onto which text,

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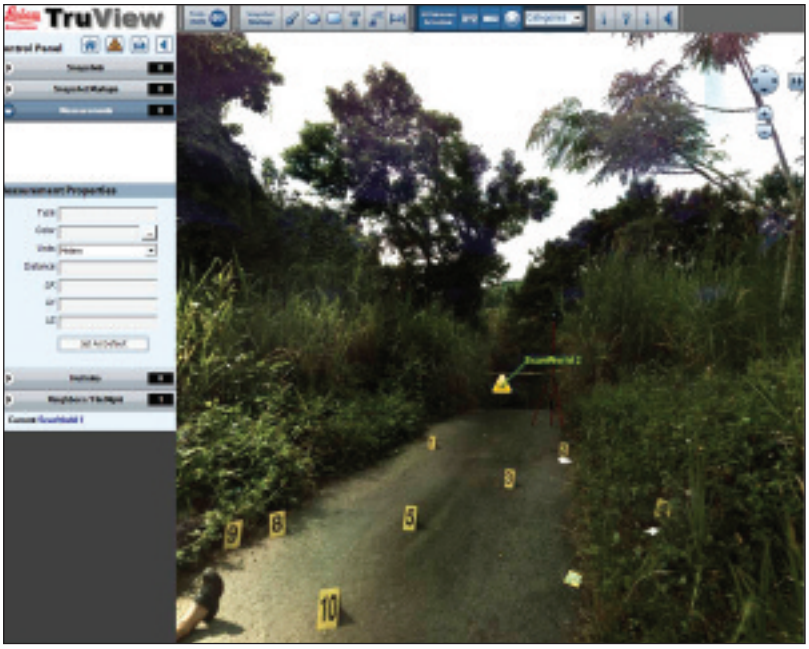


Leica Geosystems TruView Screen Capture.

measurements, and links to things like scene photos, audio and surveillance video files—can be positioned exactly where they were found in the crime scene.

Users can view, pan, zoom, measure and mark up the point cloud data over the web on their Internet browser. If, during the trial, an attorney wants to know the distance from a doorway to a body, the measurement can be instantly displayed in the courtroom on a computer screen. Regardless of what data someone may request, it has all been captured. "So you're not in a situation where somebody says, 'Gee, we didn't measure that when were at the scene' or 'It's approximately this far just based on this scale drawing,'" Holloway said. "We can know exactly. We can pop it up right there on the computer, and it tells you instantly what those measurements are—which might be very critical to supporting or disproving the theory of a crime."

And with the advent of CSI-based television entertainment, today's juries expect to see physical evidence that supports the argument the attorneys are making. "It's a question of having an increased reliance on the information being the truth and not being swayed by a possibility argument," Holloway explains. As a result, lawyers are becoming increasingly reliant on compelling images and scientific 3D animations created with the laser scan data and visualization software to make their case. It's a powerful way to communicate what really happened at the crime scene.

Verifiable accuracy of laser scan data ensures admissibility in court

But even the most compelling evidence is useless if it fails to be admitted in court. As any crime scene investigator knows, data must present a fair and accurate representation of the scene to be accepted as evidence. These considerations are especially important in a criminal trial where lives hang in the balance.

As a result, guidelines created by the National Forensic Science Technology Center recommend on-the-scene measurements to be accurate to within 0.25 inch, and the accuracy of all measuring devices, including laser scanners, to be ensured by comparison to a measure of certified accuracy such as a National Institute of Standards and Technology (NIST) traceable ruler. Leica Geosystems laser scanners not only meet these accuracy recommendations but also provide measurement validation as needed through the use of the Leica twin-target pole, a NIST traceable scanning artifact.

In 2013, Leica Geosystems introduced a new NIST-traceable twin-target pole that definitively validates the accuracy of 3D laser scans captured with the Leica ScanStation PS20 (the public safety model of the Leica ScanStation P20). The validation tool was developed through close collaboration with NIST and is designed specifically to help forensic labs and investigators comply with ASCLAD and ISO 17020 and ISO 17025 accreditation standards. "It's the 3D laser scanning equivalent of introducing a scale into a crime scene photograph to provide a control," said Tony Grissim, Leica Geosystems public safety and forensic account manager.

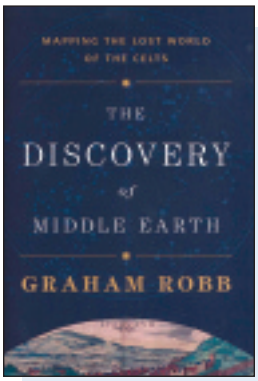
Verifiable accuracy helps ensure that scan data evidence will hold up in court against the Daubert Standard, a rule of evidence regarding the admissibility of expert testimony regarding scientific evidence in federal legal proceedings. One such ruling took place on Sept. 30, 2013. Federal Magistrate Judge Gregory Wormuth, presiding over the U.S District Court for the District Of New Mexico, issued an order granting a Daubert Motion to affirmatively admit Leica Geosystems ScanStation evidence and related expert testimony in the case of Stephan Cordova v. City of Albuquerque, et al. "The provable accuracy of 3D laser scanner measurements to a known standard is key to forensic credibility in the courtroom," Grissim said.

State-of-the-art 3D laser scanning is quickly becoming the new standard for documenting crime and accident scenes with accuracy, objectivity and fidelity and then presenting those findings in court. With highly accurate scan data and sophisticated 3D visualization tools, criminal justice professionals and jury members can be confident that justice has, in fact, been served.

To learn more about the use of 3D laser scanning technology in crime scene investigation, crash investigation, and other public safety applications, visit psg.leica-geosystems.us.

About the author: *After a 26 year career,* **Mike Cunningham** *retired from the New York City Police Department in 2012 as a Detective 1st Grade and the senior ranking Investigator in the Crime Scene Unit. In addition to his many years of CSI experience, he was a forensics instructor for the NYPD and is a Certified Instructor for Department of Homeland Security course "Advanced Forensics for Hazardous Environments" and "Integrated Response to WMD Incidents" As a contractor for the U.S. State Department, he served as an International Police Instructor for "Forensic Examination of Terrorist Crime Scenes" delivered to US anti-terrorism partner nations. Mike served his country with distinction and professionalism for 10 months at Ground Zero in the aftermath of September 11th. An IAI Certified Crime Scene Investigator and a New York State Certified Police Instructor, Cunningham serves as training and service operations manager for the Leica Geosystems Inc. Public Safety Group. Additional articles by Cunningham can be found in the Leica Geosystems Ready Room at* **psg.leica-geosystems.us/ready-room.**

BOOK REVIEWS



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The Discovery of Middle Earth

Mapping the Lost World of the Celts

By Graham Robb

A treasure hunt that uncovers the secrets of one of the world's great civilizations, revealing dramatic proof of the extreme sophistication of the Celts, and their creation of the earliest accurate map of the world.

While planning a bicycling trip along the Heraklean Way, the ancient route from Portugal to the Alps, Graham Robb discovered a door to that forgotten world – a beautiful and precise pattern of towns and holy places based on astronomical and geometrical measurements: this was the three-dimensional "Middle Earth" of the Celts. As coordinates and coincidences revealed themselves across the continent, a map of the Celtic world emerged as a miraculously preserved archival document.

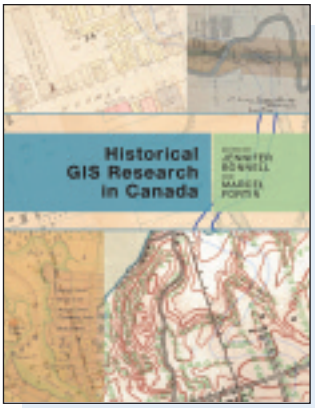
Information taken from inside the front cover.

Historical GIS Research in Canada

Edited by Jennifer Bonnell and Marcel Fortin

Fundamentally concerned with place, and our ability to understand human relationships with environment over time, Historical Geographic Information Systems (HGIS) as a tool and a subject has direct bearing on the study of contemporary social and environmental issues and realities. To date, HGIS projects in Canada are few and publications that discuss these projects directly even fewer. This book brings together case studies of HGIS projects in historical geography, social and cultural history, and environmental history from Canada's diverse regions. Topics explored include religion and ethnicity, migration, indigenous land practices, rebuilding a nineteenth-century neighborhood, and working with Google Earth.

Information taken from the back cover.



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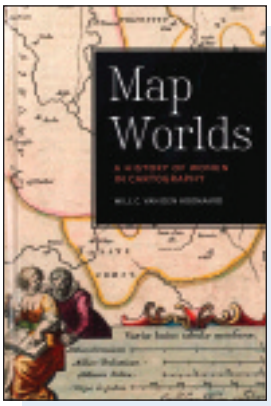
Map Worlds

A History of Women in Cartography

By Will C. van den Hoonaard



Published by Wilfred Laurier University Press

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Map Worlds plots a journey of discovery through the world of women map-makers from the golden age of cartography in the sixteenth-century Low Countries to tactile maps in contemporary Brazil. Author Will C. van den Hoonaard examines the history of women in the profession, sets out the situation of women in technical fields and cartography-related organizations, and outlines the challenges they face in their careers.

The book explores women as colourists in early times, describes the major houses of cartographic production, and delves into the economic function of intermarriages among cartographic houses and families. It relates how in later centuries, working from the margins, women produced maps to record painful tribal memories or sought to remedy social injustices. In more contemporary times, one woman so changed the way we think about continents that the shift has been likened to the Copernican revolution. Other women created order and wonder about the lunar landscape, and still others turned the art and science of making maps inside out, exposing the hidden, unconscious, and subliminal "text" of maps. Shared by all these map-makers are themes of social justice and making maps work for the betterment of humanity.

Information taken from the publisher.

The Last Word

Tomorrow is Now

Tomorrow is Now is the theme for the 2014 Annual General Meeting in Niagara Falls. It is appropriate because it is time to aggressively recruit the young surveyors of the future. Worldwide, there has been one positive initiative launched to encourage young professionals to choose surveying as a career. The **Federation of Surveyors (FIG) Young Surveyor's Network (YSN)** is growing. One of their goals is to create connections between "older" and "younger" surveyors. In 2012, the first FIG Young Surveyor's Conference was held prior to the FIG Working Week in Rome and 140 motivated young professionals attended from around the world (none from Canada or the U.S.)

The December issue of Professional Surveyor magazine published an article titled *The Next Generation*[1] written by Eva-Marie Unger, the incoming YSN Network Chair elect from Austria and Paula Dijkstra, the co-founder of Jong Kadaster and JongGeo in the Netherlands. In their article they posed this question, "Where are the young surveyors from the U.S. and Canada?" The FIG Foundation is awarding eight fellowships to cover the costs to participate in the 2014 FIG Congress in Kuala Lumpur, Malaysia and one of them is for North America. Perhaps we should be sponsoring one of our own young professionals to attend. Information on the Young Surveyors Network can be found at http://www.fig.net/ys/.

At home we have our own group to support, the **Geomatics Club at York** (geocyu.ca) is a self governing Geomatics student body located at York University and closely associated with the Lassonde School of Engineering. Their main objective is to create a home for all Geomatics, Environmental, Surveying and GIS students to gather and connect with each other and provide them with multiple research and networking opportunities. The club is holding a Geomatics Career Fair on January 31st followed by a social gathering hosted by GoGeomatics Canada and sponsored by the AOLS. Contact geoc.yorku@gmail.com to see how you can get involved to support our future professionals.

[1] Professional Surveyor, December 2013, Vol.33, No. 12, page 28, http://www.profsurv.com

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