

THE ENGINEERING INSTITUTE OF CANADA

and its member societies

L'Institut canadien des ingénieurs

et ses sociétés membres

EIC's Historical Notes and Papers Collection

(Compilation of Articles, Notes and Papers originally published as EIC Articles, Cedargrove Series, and EIC Working Papers)

ENGINEERING HISTORY PAPER #64

"Engineering in Newspapers"

by Andrew H. Wilson

(previously produced as Cedargrove Series #39/2016 – January 2016)

EIC HISTORY AND ARCHIVES

© EIC 2017

Abstract

This paper makes use of material from the author's collection of newspaper clippings that covered the subjects in which he was interested over a 40-year period - and particularly those relating to the history of engineering. Its intent is simply to illustrate the kinds of information about this history that can - still - be gleaned from newspapers. It has been extensively illustrated.

About the Series

Principally, the Cedargrove Series is intended to preserve some of the research, writings and oral presentations that the author has completed over the past half-century or so, but has not yet published. It is, therefore, the modern-day variant of the privately published books and pamphlets written by his forebears, such as his paternal grandfather and grandmother, and his grandfather's brother John.

About the Author

He is a graduate in mechanical engineering and the liberal arts and has held technical, administrative, research and management positions in industry in the United Kingdom and the public service of Canada, from which he retired almost 30 years ago.

He became actively interested in the history of engineering on his appointment to chair the first history committee of the Canadian Society for Mechanical Engineering in 1975 and has been active ever since in research, editing and writing on behalf of that Society, the Engineering Institute of Canada, and the Canadian Society of Senior Engineers. He has also served as president of EIC and CSME.

By way of Introduction...

This paper was first given as a talk by the author to the Ottawa SAGE Kiwanis Group at Woodroffe United Church on 6 January 2016. It contains more textual material than did the talk, but almost all of the illustrations that were used. The talk and the paper have been based on original newspaper stories that have interested me and that I have clipped and saved over a 40-year period.

When speaking to this particular group in the context of the history of engineering, which I have done several times, I am mindful of the fact that few have been engineers or involved in engineering matters during their careers. They are nevertheless very interested in activities that make the world 'tick' - and engineering certainly does. However, this paper makes no attempt to complicate the technology further than was done during the talk.

As it happens, I also have a small collection of newspapers that were published a very long time ago. I showed one of them to the Group in the form of a framed page of a copy the *TIMES* of London for November 6, 1805 - 210 years ago. As it happens, this particular page has nothing to do with engineering, but it does reproduce Vice-Admiral Collingwood's despatches on the British naval victory at Trafalgar in which Admiral Nelson lost his life. And the gap between the battle (21 October) and the appearance of the despatches in the *TIMES*, emphasises that there were no telephone, radio or Internet services available in 1805!

Engineering in Newspapers...

Some of us still read daily and weekly newspapers, in spite of the Internet and a variety of electronic devices, and so still receive from them information about engineering and engineering-related events and issues - both historical and contemporary. Actually, there's not a great deal about the technical side of engineering that appears in newspapers. Some non-specialist writers seem bored with it, or insufficiently knowledgeable, and some readers likewise. But not surprisingly, most news items that appear about engineering are, to some degree, newsworthy.

Many years ago, I started clipping and keeping bits of newspapers on subjects that interested me. Over these years I learned that, in a historical context, engineering material published in them usually falls into three categories.

The first is material that is being published *as history now* - for example, contemporary articles about artifacts, old pieces of machinery, like a James Watt steam engine, about anniversaries or obituaries, or about disasters and accidents years after they happened.

The second is material that was published originally as 'straight' news but *became historically important* with the passage of time. Examples would be announcements about events, inventions, new structures and pieces of equipment or proposals for them, or about what an individual engineer had just done. Events that later led to accidents and disasters could also be included.

The third category is material about *contemporary* engineering that *may well* acquire *historical status* sometime in the future - for example, the electric automobile, or the bridge, tunnel or other structure that might fail - or succeed - in service. Or, again, it could include a piece about the appointment of an individual engineer to a particular job.

Along the way, I learned that the content of newspaper reports about aspects of engineering should be read with care, since they can be misleading, speculative, biased or even quite wrong. On the other hand, some could be topical 'think pieces' rather than pure news. They could be the work of regular or expert 'science' correspondents or columnists. Or they could be special newspaper sections that appear from time to time, reporting on the activities of engineering organizations by the organizations themselves.

Much of the material described in this paper can be considered as belonging principally to the first of these categories, with others belonging to the second. They have been culled, mostly, from a national newspaper - the *Globe & Mail* - a regional one - the Ottawa *Citizen* - and a local one - the Cobden *Sun* (which no longer exists) - with an occasional 'assist' from overseas newspapers.

Incidentally, wars have been prime sources of engineering news in all three categories but I have stuck with the peaceful uses of it. Also, articles by engineers themselves seldom seem to appear in newspapers!

Historical articles, generally...

Engineering history goes back a very long way indeed and includes the discovery, control and uses of fire. The actual dates may be uncertain, but one article in the *Globe & Mail* for August 15, 2009, suggests that 72,000 years ago people in what is now South Africa were using it to make better tools.

STONE-AGE ENGINEERING

The harnessing of fire

ooking may go back as much as 790,000 years, but until this week the prevailing view was that human beings began to harness fire in order to make artifacts a mere 25,000 years ago. But on Friday, the journal Science published a paper titled Fire as an Engineering Tool of Early Modern Humans,

that the heating was intentional. "This technology required in these early humans," Mr. Brown, Professor Marean and their co-authors write, "a novel association between fire, its heat and a structural change in stone with consequent flaking benefits that may signal a complex cognition." Closer to home and more recently, an amateur Egyptologist from Nepean has been demonstrating how the ancients moved stone blocks for the Great Pyramids. An article about Dominic Raina by Bruce Deachman appeared in the December 11, 2011 edition of the Ottawa *Citizen*. In a nutshell, as the picture shows, the stone block (or its equivalent) has been encased with strips of wood, positioned so that the outer surface of the bundle will be more or less circular. It can then be rolled along a surface, or up a hill, using a rope or two.



An article with drawings by Erica Keller, from *New York Times*, was reproduced in the *Globe & Mail* for April 29, 1983. It depicts how the wheel developed into today's truck tire. In this case it is important to remember that wheels alone are not much good. They need axles to operate properly. The earliest form of wheel required that the load be carried on a sled on rollers, and that the rollers be moved from the back to the front of the sled as the cargo was drawn forward. The next stage was to fit wheels into notches and then to develop axles, usually to form two- and four-wheeled vehicles with solid wheels. Then came the development of wheels with spokes, which lightened the wheel considerably, From the penny-farthing, whose wheel rims were of metal or solid rubber, progress was made to the automobile and the truck and today's pneumatic tires, which can be taller than a person.

The next set of articles describes the raising of the sunken remains of three of the world's first submarines...in order of their discovery.

The first was datelined from Plymouth, England, and appeared in the December 2, 1982 edition of the *Globe & Mail.* It reported that the Royal Navy had brought what was claimed to be "Britain's first submarine" to the surface, after it had been submerged for 69 years, that is, since 1913. Called the *Holland I*, it had been designed by an Irishman, John Holland, launched in 1901 and accepted reluctantly by the British (against whom its use had originally been intended) since their Lordships believed at that time that underwater warfare 'wasn't cricket,' to use the British phrase. It was being sent to the scrap yard when it sank. The article gave no details of its 'vital' statistics.

Pioneer submarine raised to surface



Holland I, the Royal Navy's first submarine, at sea before her sinking in 1913.

The second, by John Ezard in *The Guardian*, appeared in the December 20, 1995 issue of the *Ottawa Citizen* and described the raising of "the very first mechanically-powered submarine," which apparently sank off the North Wales coast in 1880 and was found there 115 years later. The *Resurgam* was 45 feet long, steam-powered and candle-lit. The two-man crew suffered from considerable discomfort. It was intended - in the days before torpedoes - as the means for attaching mines on the hulls of enemy ships. It had no periscope and the breathing apparatus was seriously deficient. It was under tow, en route for the Royal Spithead Review, when the tow-rope broke and the vessel sank.

BRITAIN World's first sub will rise again 115 years after sinking off Wales

By John Ezard The Guardian

LONDON — The wreck of the world's first mechanically powered submarine has been found off the north Wales coast 115 years after she sank on the way to be triumphantly unveiled to Britain's apland, had been seeking help from the National Historic Warships Committee in drawing up plans to raise and conserve the vessel.

The immediate worry was that souvenir hunters or amateur divers would pillage the wreck, whose exact site is being kept secret. The third article, by Schuyler Kropf of Reuters appeared in the *Globe & Mail* on August 9, 2000, and concerned the Confederate sub, the *H.L. Hunley*, which was the first submarine to sink an enemy warship in battle, in Charleston Harbour in February 1864, after which it, itself, sank. Twice, previously, it had sunk but had been successfully refloated. Privately built in 1863, its 40-foot long hull used parts of a cylindrical steel boiler. Its armament was one primitive torpedo. It had a crew of nine, eight of whom worked the crank that turned the propeller. Its post-Charleston resting place was discovered in 1995, off the South Carolina Coast.



The article "Ottawa's Own Polar Express" by Andrew King appeared in the Ottawa *Citizen* on December 13, 2014. It commemorated the opening of the Bytown and Prescott Railway and the first train's unceremonious arrival at Bytown's temporary railway terminus on Christmas Day 1854. Construction of the line had begun in 1852, at Prescott. The steam locomotive used for the Bytown trip had been imported from the United States. Two more American locomotives were soon acquired.



The early Ottawa streets were unpaved, as shown in the Rideau Street time line that appeared in the Ottawa *Citizen* on March 12, 2011. In 1845, the street had its first continuous plank sidewalk. By 1887, the department stores had begun to arrive. In 1895 the street was paved, shop-owners having previously sprinkled water to keep the dust down in summer. In 1912 the Chateau Laurier Hotel and Union Station were opened. In 1983 the Rideau Shopping Centre opened.



An Article by Daniel Drolet on how waterworks came to Ottawa appeared in the Ottawa *Citizen* on January 29, 2005. This happened in early March of 1876, when the city got its first installation of underground waterpipes and sewers, bringing potable water to homes and carrying dirty water away. In these days, the dirty, untreated water poured out of the end of the sewer into the Ottawa River. Meanwhile, the new water system improved the fire-fighting service when street hydrants were installed. As usual, these new services cost too much for some citizens but, on balance, they helped Ottawa improve as a place to live!

Before the turn of the 20th century, Ottawa acquired a street lighting system and a streetcar service. Thomas Ahearn was associated with both of these venture, and with others. The December 1, 1999 edition of the Ottawa *Citizen* published an article by Charles Tepperman and Bruce Ward about Ahearn and several other technically-minded entrepreneurs of that era. Andrew Holland and his brother George were business partners of Ahearn in the electric street railway. They also moved into the marketing of inventions by Thomas Edison under licence. They brought his Kinetoscope to Ottawa, for example, and had a 'peep-show' set up in their Sparks Street store. The brothers also created 'Kinetoscope parlours' in other North American cities. By 1896, the brothers had brought Edison's Vitascope to Ottawa, and showed short, silent films.



Andrew Holland, left, and brother George had the rights to promote several inventions by Thomas Edison in the 1890s. Earlier they brought modern notetaking methods to Parliament and were part-owners of the Daily Citizen for a short time.

One of Canada's least-talked about engineering feats has probably been the two 1000-yard long spiral tunnels, driven in three-quarter circles, into Cathedral Mountain and Mount Ogden on the CPR rail route through the Kicking Horse River valley in the mountains of British Columbia. Dawn Walton wrote an article for the September 19, 2009, edition of the *Globe & Mail*, describing her trip through the tunnels on the Centennial of their opening. Originally, the notorious and dangerous Big Hill had been used. It was eight miles long, with a grade of 4.5%, twice the normal. The Hill, had been put into service to get the line finished sooner, but actually served for 25 years. It was both notorious and dangerous. Speed was restricted in both directions, and safety switches/slips were built into it to protect against runaway trains. Additional, more powerful locomotives were built and were stationed at Field. But the mountain country around it was prone to avalanches and landslides. So in 1906, it was decided to replace the Hill with the tunnels, under the supervision of CPR engineer J.E. Schwitzer. McDonnell Gzowski of Vancouver were the contractors. The tunnels were opened for service in 1909.

Who remembers the heavy, bulky, wireless Walkie-Talkie...as a Canadian invention? Several people and companies appear to have been involved in this development, including Motorola in the United States, beginning around 1934. One of them was a Canadian, Donald Hings, whose obituary received attention in the article by Tom Hawthorn that appeared in the April 7, 2004, edition of the *Globe & Mail*. Born in 1907, Hings, a radio enthusiast and tinkerer, was asked in the mid-1930s by the Consolidated Mining and Smelting Company of Trail, B.C. to devise a means whereby geologists in the bush could contact their bases. By 1937, he had devised, by trial and error, a two-way voice radio for emergency transmissions. While filing his U.S, patent application in 1939, World War II began and the Walkie-Talkie went to war! The early ones were bulky and heavy, but invaluable. During his subsequent career, Hings continued tinkering and registered some 50 patents.



The Cold War began in the late 1940s. Its first serious crisis was the Berlin Blockade of 1948-49. On February 15, 1954, U.S. President Eisenhower approved the creation of a Distant Early Warning (DEW) Line of isolated radar stations across North America, to detect the approach of hostile Russian aircraft and to warn of a possible land/sea invasion. Fully operational by 1957, each station was staffed 24 hours a day by a 28-person crew. The \$600-million line would operate for 30 years as it was intended. It would be the largest Arctic construction project of its time and would contribute to changes in the lives of the permanent residents of the Arctic. The stations also made use of (American) Buckminster Fuller's geodesic domes to house the radar equipment (similar to the dome Fuller made famous at EXPO 67). They also used Arctic vehicles designed and built by the Bombardier Company. The DEW Line was supplemented by two other lines to the south - the Mid-Canada Line and the Pinetree Line. The obsolescence of these lines was hastened when missiles were substituted for aircraft. By the 1980s, the DEW Line was mostly abandoned and replaced by an unmanned, Canadian-owned North Warning System. Tony Atherton contributed a lengthy article on the DEW Line in the Ottawa *Citizen* on February 14, 2004, the 50th anniversary of the Eisenhower decision.



Two buildings in Toronto: the CN Tower; and the Skydome, now the Rogers Centre...

The Tower has been written up in many articles in many newspapers over many years. I want to draw attention to the one by John Marshall, which was published in the *Globe & Mail* on January 29, 1975, the year before the tower was completed. The picture shows the skeleton structure at the top of the Tower and indicates what would be installed there on completion. Apart from being the tallest free-standing building anywhere when it was completed, its construction involved the use, for the first time in such a structure, of the slip-forming of the concrete mass of the Tower.

The article about the Skydome, the CN Tower's neighbour, by Mark Kennedy, appeared in the April 2, 1988 edition of the Ottawa *Citizen* and included a photograph of the structure under construction. The architectural contract went to Rod Robbie, the structural engineering one to Michael Allen, and the construction one to Ellis-Don. It was tailor-made for the Canadian climate, with a retractable roof for fine weather, and was designed to have 56,000 seats. The final design included floors for offices, television production studios, a 600-seat stepped restaurant with field views, various other eateries, a fitness club and an 11-story CP hotel wrapped around its north end, 71 of whose rooms overlooked the field. It had twice as much concrete as its neighbour the Tower.





SKYDOME...Toronto,

Who remembers the National Capital Free-Net? According to the article by Alana Kainz, reporting on a survey of its use in the July 5, 1995 edition of the *Citizen*, Ottawa's Free-Net was once the world's most active community computer network. It was the second largest by membership, the majority of whom were university graduates. It was also the local piece of the growing world-wide number of computer

networks. Free-Net users exchanged mail, messages and information, and there were at least 30 'Nets' across Canada. Begun in 1992, three years later the Ottawa one had 42,000 members, of whom 14,000 used it each week.

Only geeks on Free-Net? Hardly

SURVEY SAYS: The world's most active community computer network, right here in Ottawa, has a wide variety of users, but the great majority is still male.



In 2012 the Deh Cho Bridge was opened - the first to cross the Mackenzie River, linking the NWT capital of Yellowknife with the rest of Canada. This picture appeared in the *Globe & Mail* on December 1. It replaced a summer ferry and a winter ice bridge.



Sometimes, engineering proposals spark active discussions between two or more groups within society as at least three oil pipeline are presently doing in Canada. Another involves Canadians and Americans and is the proposal to build a second bridge between Windsor, Ontario, and Detroit, Michigan, to relieve traffic pressures on the present Ambassador Bridge between them. An article by Steven Chase appeared in the *Globe & Mail* on July 15, 2011.



The Globe & Mail's Moments in Time...

For several years now, the *Globe & Mail* has published a series of retrospective pictures to remind readers of significant international events and people of past years. Some of them have engineering associations: for example....



...Wop May flies mail to the Arctic, on December 27, 1929



...the airship Hindenburg, which exploded at Lakehurst, New Jersey, on May 6, 1937



... the spacecraft Surveyor I, which touched down on the moon on June 2, 1966



...tornado devastates St. Bonaventure, Québec, on July 24, 1975



...Canadarm used for the first time during Columbia space shuttle mission, on November 13, 1981



...the deadly explosion that ripped through the Piper Alpha oil rig, on July 6, 1988

Speaking of Canadians on NASA space missions, several were engineers. In addition to Julie Payette, there was Marc Garneau, who was the first Canadian to travel in space, and did so on three missions. Bob Thirsk was both an engineer and a medical doctor. Icelandic-born Bjarni Tryggvason was an engineering physicist. RMC graduate Chris Hadfield is perhaps the best known of the Canadian astronauts, having the most extensive record for a Canadian in space and having commanded the International Space Station on his last mission.

Emergencies, accidents and disasters...

The most frequent newspaper articles that are engineering-related are likely to be about emergencies and disasters of the natural kind - like earthquakes, hurricanes, floods, fires or volcanic eruptions - which have engineering consequences, need engineers to assist with the clean-up, and apply engineering to recurrence prevention. Press coverage may go on for days, and there could be additional articles during the clean-up, when formal reports become available, or when new regulations are introduced to stop recurrences. They may also cover accidents and disasters more directly related to engineering - for example, those affecting engineered devices such as airplanes, automobiles, bridges and oil rigs...or those that failed due to material fatigue, or to pressure vessels that exploded. The following are some examples...

Globe & Mail, February 15, 2007 - the sinking, in a gale off Newfoundland, of the semi-submersible oil drilling rig *Ocean Ranger* on St. Valentine's Day 1982. 84 lives were lost. A massive wave had smashed a porthole window and flooded the ballast control room.



Ottawa *Citizen,* July 4, 2011 - Shuttle tragedies left space fans stunned - the article by Max Harrold discussed the loss of the *Challenger* and *Columbia* space shuttles in 1986 and 2003, taking the lives of 14 astronauts.

Globe & Mail, August 5, 2011 - a different kind of shuttle rescued 33 miners 70 days after an underground collapse on August 5, 2010 at the Copiapo mine in Chile. The shuttle was designed and built by Chilean engineers, with NASA's help. The rescue captured world-wide television attention. The article by Jonathan Franklin in the *Globe & Mail* for August 5, 2011, however, indicates that life for some of the rescued one year later was not as joyful as the rescue occasion had been.



Ottawa *Citizen*, January 30, 2013 – "Guilty of manslaughter, BP to pay \$4B penalty" - article by Michael Kunzelman on the judicial settlement to be paid by the company responsible for the 2010 Deepwater Horizon drilling rig explosion and consequent massive oil spill, physical damage and loss of life in the Gulf of Mexico.



The cruise ship *Costa Concordia* ran aground on Giglio Island off the coast of Tuscany, Italy, on January 13, 2012. A massive salvage operation followed - the costliest in marine history. It involved the righting of the ship onto a cradle built beneath it - which was completed by September 2013 - prior to refloating. In July 2014, the ship was towed 200 miles to a breaker's yard in Genoa. These operations received continuing press coverage. Articles were published, for example, by Agence France-Press in the May 19, 2012, issue of the Ottawa *Citizen*, and by Frances D'Emilio and Nicole Winfield in the *Citizen* on September 18, 2013. The first photograph below appeared with the Agence France-Press article. The second - with the ship refloated and ready for towing - appeared in the *Globe & Mail* on July 24, 2014.





Ottawa *Citizen*, October 16, 2014 - "Mall collapse a failure of officials responsible for protecting public" - article by Christie Blatchford on the enquiry into the collapse at the Argo Shopping Mall at Elliot Lake, Ontario, on June 23, 2012, in which two women died. Engineers were assigned some of the blame. The photograph below was part of the article on the Mall enquiry by Colin Perkel that appeared in the *Globe & Mail* n October 16, 2014.



Ottawa *Citizen,* April 24, 2014 - article by Dean Nelson and Muktadir Rashid a year after the collapse of the Rana Plaza, a factory building in Dhaka, Bangladesh, that killed over 1000 of the workers using it.



Ottawa *Citizen*, August 20, 2014 - a runaway train of oil tankers crashed in the middle of the town of Lac-Mégantic, Québec, on July 6, 2013, doing extensive damage and starting fires that killed 47 people; the *Citizen* article by Sue Montgomery discusses the report of the Board of Enquiry, which identified 18 factors that played roles in the disaster.



I should mention in passing a notable near-disaster: the inboard explosion that aborted the journey of the Apollo 13 space mission to the moon in April 1970. The lunar module and the crew were brought safely back to earth. The media, inappropriately, credited 'science' with this rescue. However, a six-member team from the Institute of Aerospace Studies at the University of Toronto, at NASA's request, had figured out how it could be done. This team was led by engineering professor Ben Etkin. Judy Stoffman, in her obituary for Ben, includes this information in the *Globe & Mail* on July 24, 2014.

L to R: Phil Sullivan, Rod Tennyson, Irvine Glass, Barry French and Ben Etkin (missing: Peter Hughes)



Anniversaries...

Anniversaries are often the occasions on which newspapers remember *engineering* achievements, although, as I just mentioned, sometimes these are attributed to *science*! Here are a few examples...

The *Globe & Mail* article by David Lancashire published on April 5, 1980, was four years late in commemorating the 1876 arrival of the Bell 'electric voice machine' at Brantford, Ontario. The article appeared when Bell Northern Research was still in the forefront of communications engineering. It described how the current telecommunications might evolve, including how the (then) new communications satellites would improve services world-wide and beyond. But it failed to anticipate the cell-phone revolution.

"From Edison to quadriphonic - in 100 years" was the headline for the anniversary article by Lauretta Thistle in the Ottawa *Citizen*, for December 10, 1977, commemorating Edison's completion of the first working model of the phonograph on December 6, 1877. It successfully ended many decades of experiment, trial and error in the attempt to reproduce sound. What Edison missed, according to Thistle, was the potential his new machine had for entertainment. This was picked up by Emil Berliner, who registered the famous trademark *His Master's Voice*" in 1900. Edison also favoured the recording cylinder rather than the flat disc, a 'battle' that did not end until 1929, post-Edison. The first tape recording was made in 1936, initiating the switch from disc to tape. LP's became available in 1948 and stereo in 1958, tape cassettes in 1964, and quadriphonic sound in 1971 - *almost* the headline's century!

X-rays are still major medical tools, but may have lost their leading place in diagnostics to engineered ultra-sound, CT scan and MRI equipment. John Barbour's article in the October 23, 1995 edition of the Ottawa *Citizen* commemorated the centenary of their discovery by Wilhelm K. Roentgen, in Warzburg, Germany. Roentgen's scientific paper was published a month later and, in 1901, he received the first Nobel Prize for Physics. Nowadays, as Barbour noted, the marriage of more powerful and more precise X-ray machines with computers can produce 3-D images. As he also noted, 50 years after Roentgen's Nobel, Allan Cormack of Tufts University in the U.S. and a British engineer, Geoffrey Hounsfield, received the award for their mathematical model that led to the CT scan. Over the years since 1901, the use of X-rays has diversified from medical applications into, for example, non-destructive testing and product inspection. However, the premature deaths of some early users of X-rays led to the use of shielding.

Tara Brautigam reported in her article in the August 19, 2003, edition of the Ottawa *Citizen* on the 100th birthday of the Harley-Davidson motorcycle. The article's sub-head was, "It was more than beer that made Milwaukee famous." It shared its annual birth-year with the famous flight at Kittyhawk, As well, the Wright Brothers, Harley and Davidson were originally bicycle mechanics. The HD motorcycle was the result of much trial and error, sweat and continuing effort by the two young men, determined to contribute to what was, at the beginning of the 20th century, really a fad. The engine of the original bike developed 3 horsepower, within a bicycle's frame. The carburetor was a tomato can, its sparkplugs resembled door knobs and its wheels were bicycle tires. Producing penny numbers of the machines for

first years of production, it took Harley and Davidson until 1909, when the V-twin engine was installed to allow a top speed of 60 mph, to put it in competition with Ford's Model T. The HD team also took part in races on board tracks to generate attention, with occasional fatal results! These disappeared with the move to dirt tracks. The first big public use of Harleys was by postal and police services, and especially after the introduction of the kick-starter. And the Harley was drafted into World War I. More than 20,000 followed the U.S. troops overseas. By the 1920s the HD Company had become the largest motorcycle manufacturers in the world.



ROBERT BRYE, THE ASSOCIATED PRESS

Peter Fonda and Nancy Sinatra help kick off Harley-Davidson's anniversary by riding with others to Milwaukee, the home of the motorcycle company.

The centennial of the flight of J.A.D. McCurdy and the *Silver Dart* at Baddeck, Nova Scotia, in February 1909 was celebrated in part when former Canadian astronaut Bjarni Tryggvason flew a replica of the original aircraft over ice-covered Bras d'Or Lake. A photograph of the occasion appeared in the *Globe & Mail* on February 23, 2009.

Historic flight of Silver Dart re-enacted



The March 29, 1989 issue of the *Globe & Mail* carried the article celebrating an anniversary by Linda Stewart with the headline 'At 75, it's still a marvel' - referring to the first transit of the Panama Canal on August 3, 1914. She commented that "the very same locks, valves and pumps that were functioning then are still operating."

When the Panama Canal was opened in 1914, it was considered to be an engineering marvel. It revolutionized global trade. But 75 years later it could no longer cope with all of the ships that wished to make the transit. It was already a tight squeeze for some. For example, Ottawa *Citizen* edition of March 29, 2001 shows that the U.S. battleship *lowa* had only a half-metre to spare at the Miraflores Lock. The ship was, in fact, designed for just such a transit. And the *Globe & Mail* article on March 29, 1989, by Linda Stewart describes a blow-by-blow transit of the canal. But it is today's enormous cruise and container (post-Panamax) ships that are setting the pace for the future. According to the article in the July 23, 2005, edition of the *Globe & Mail*, the new locks will be 385.8 metres long and 54.9 metres wide, enough to accommodate a container ships with 12,500 containers. The route taken by the new canal will also changed. New locks will operate in new channels. Water-saving basins will also be built on both sides of the canal and will operate by gravity. Another article, in the *Globe & Mail* for March 24, 2011, provided more details of the two new sets of locks, and the price tag of \$US 5.25B. According to an estimate published in the *Globe & Mail* for December 22, 2011, the job was to have been completed by 2014, but was not. It should be by 2016.

The Ottawa *Citizen* for April 16, 1987, published an article originating with the *New York Times* commemorating the 50th anniversary of the first time the Whittle jet engine sprang into life at a laboratory in Rugby, England. By then, Sir Frank Whittle was living in the United States and, in celebration of the event, went to the Smithsonian in Washington to pose in front of an early version of his engine. As it happened, the competing German jet engine was also tested in 1937. Its inventor, von Ohain, was also living in the U.S. in 1987 and had become friendly with Whittle. Conceived originally as a commercial and not a military project, the British jet engine had little influence on World War II aviation. The German one was more prominent. Their real impact came after the war.

President Eisenhower was involved - along with Queen Elizabeth II - in the opening of the St. Lawrence Seaway, a joint U.S.-Canada engineering project and one of the biggest ever attempted internationally. A long 50th anniversary article for the *Globe & Mail* on June 27, 2009, was contributed by Erin Anderssen. Not only did the Seaway provide access for large ocean-going ships to the Upper Lakes ports, it generated hydroelectric power for wide use throughout the Montréal-Lake Ontario section. Work began on the project almost five years before the opening. It cost almost \$US 500 million (\$7-billion in 2009 USD), was on time and under budget. The main, early negative consequence of the construction was the flooding of stretches of the St. Lawrence River valley and the disappearance of a number of villages



An article by Kevin Brooker celebrating 50 years of microchips - basic components of today's small microelectronic devices - appeared in the May 3, 2011, edition of the Ottawa *Citizen*. Simultaneously, Jack Kilby of Texas Instruments, the inventor of the pocket calculator, working with germanium, and Robert Noyce of Intel, working with silicon, had co-invented the integrated circuit, or chip.

Canada was the third country, after Russia and the United States, to send an earth satellite into space, and did so with *Alouette I* on September 29, 1962 (the Ottawa date). A 50th anniversary article by Tom

Spears appeared in the Ottawa *Citizen* on September 1, 2012. The *Alouette I* was, technically, a topside sounder, an apparatus that could bouce signals off the ionosphere from above and relay the results to earth - essentially in support of cosmic ray physics. The data kept coming for 11 years, after which the satellite was shut down. *Alouette I* also carried four Canadian-designed and -developed STEM antennas, which could be rolled up inside the satellite for launching and extended outside the satellite as required to transmit data from space. The design-build-test team for *Alouette I* was led by John Chapman and Colin Franklin, at the Defence Research Laboratory at Shirleys Bay, Ottawa.



Photo shows John Chapman and Leroy Helms toasting the original launch in 1962

Special engineering sections...

Newspapers publish regular sections devoted to aspects of engineering, and sometimes organizations will pay them to publish material. Regular columnists may also publish. An example of the first is the weekly *Driving* section of the Ottawa *Citizen*, of the second is the annual awards section published by the *Globe & Mail* on behalf of the Professional Engineers of Ontario, and of the third, a column by Harris Mitchell from the Ottawa *Citizen*. Book reviews also appear in the *Globe & Mail* and the *Citizen* and in many other newspapers. But it is seldom that books with engineering content are reviewed! The column...and the review...below are from the *Citizens* of August 5, 1989 and September 2, 1989

Insulation, not ventilation needed to cool upstairs

QUESTION: The upstairs rooms in our 35-year-old, 1½-storey house are terribly hot in the summer. People keep telling me to ventilate the three attic spaces: the side attics behind the short "knee walls," and the space above the small ceiling. If this is the remedy, how should it be done?

ANSWER: The three spaces you refer to should be ventilated, cer-



years old. The first asphalt shingle roof lasted 23 years. The second one has been on for 18 years; it does not leak and is laying about as flat as it was when it went on. But I think it is time to put a new roof on, and I would like to add it to the existing two layers. The vents and flashing are all in good condition and so are the rafters and roof sheathing

wa's lost

Defence of British North America, by Robert Legget; University of Toronto Press; 277 pages; illustrated; \$35

By Jim Robb

ttawa author Robert Legget, well-known for his history of the building of the Rideau Canal, now sets the record straight about the British army unit that constructed the three small military canals between Grenville and Carillon on the Ottawa River shortly after the War of 1812.

The unit was the Royal Staff Corps, not the Royal Engineers as many believe. The RSC was one of the shortest-lived units of the Imperial forces. Formed in 1800 t was integrated into the Royal Ordnance Corps in 1839.

Central to the 15-year Ottawa

Ottawa River Canals and the River project was Captain Henry Du Vernet, whose grasp of the engineering problems involved, imaginative solutions, and tact in dealing with superiors and recalcitrant settlers alike, contributed greatly to its successful completion.

> Legget has produced a masterful if somewhat pedestrian account of the project, deemed necessary for the defence of Canada against a bellicose United States. Not much remains to be seen of the canals. They disappeared under the rising waters following construction of the Carillon Dam by Hydro Quebec in the 1960s, although some heritage vestiges remain.

The small-size lock basins proved unsatisfactory almost from completion of the work in 1834 because of the growing use

of steam boats, and because of low-water levels.

Visionaries saw them as the beginning of a navigable waterway from Montreal to Georgian Bay. That dream has never been fulfilled.

The canals, transferred by the British government to the prov-ince of Canada in 1856, carried a substantial volume of commercial barge traffic until well into the 20th century, despite the problems of size and periodic low-water levels.

This is a valuable reference work for those interested in local and regional as well as military history because Legget's research throws some interesting light on the way settlement and commerce developed along the Ottawa River.

(Jim Robb is a Citizen staff writer.)



Robert Legget Ottawa River Canals

Cobden...

Some years ago I did a piece on engineering developments in the village of Cobden, based on retrospective articles that had appeared in the Sun.

As you know, Cobden is a village of around 900 people and 100 kilometres north-west of Ottawa, on the shores of Muskrat Lake. The Cobden Sun was first published in 1895, and closed down only a few years ago. Towards the end of its life it won several merit awards from the Canadian Community Newspaper Association. It also published, laterly, regular columns with content taken from issues thirty, fifty and sixty years earlier. From my piece, and from some other clippings, I re-discovered some of the village's engineering landmarks, for example...

The village began to generate hydro-electric power in its own plant in 1917. This plant's initial performance was apparently good but if - as the demand for power increased - the weather deteriorated or the supply of water fluctuated, interruptions in the service could result. Such supply problems gave rise to demands for Cobden to be supplied with electricity by Ontario Hydro, whose nearest connection was then at Renfrew, 15 miles away. But this could not happen until December 1934. However, before then - in April 1934 - the hydro dam broke and the village had no hydro at all for eight months!

Highway 17, which passes through the village, was not built until 1921, and was not paved until 1930.

The first automobiles in the village were fair-weather vehicles. In winter. They were put up on blocks

1934: Leak in the Cobden power dam

A Step Back In Time

75 Years Ago - April 19, 1934 * Less than six hours after a small leak was discovered in the face of Cobden power dam the structure undermined and burst asunder last Thursday afternoon, putting the electric power plant out of commission and leaving the village stranded for electrical service. A wall of water estimated from 10 to 20 feet high rushed from the broken dam, through the gorge at its foot, sweeping debris and cakes of ice with in its mad plunge for freedom.

A large cake of ice was shot through the side wall of the power house and crashed an exit through the opposite end wall, leaving a gap that a car could be driven through. Machinery in the opposite end of the room missed damage from the impact. Continuing past the power house the flood waters swept across the highway No. 17, perhaps a hundred yards distant from the power plant, and tore sections of the pavement from the right of way. From this point onward the water spread out in the marshland toward Muskrat Lake.

The first wave of the rushing water snapped guard rails and telephone poles at this part of the highway as if they were pipe stems. Observers state that a two to three foot wall of the water rushed up the highway toward town for 30 or 40 rods to the foot of the hill bordering the village. All this time the family of Mr. Wall, power plant operator, was marooned in the upstairs section of the building. Following partial subsiding of the flood workmen built a temporary bridge from the face of the hill at the rear of the house to the roof of a pent house and the family were rescued. The entire lower floor of the building was flooded

Cobden telephone switchboard...1940

and highwater mark reached nearly to the second-storey windows. Lacking expert advice no estimate of the damage caused is available. A section of the dam nearly 100 feet across by 40 feet deep has been washed away.

Tons and tons of rock, soil and wooden abutments have been swept from this gap. Replacement will be costly, but how costly is yet to be learned, as also has to be learned what council has in mind for re-establishment. First steps would seem to be to secure the best available data on the matter. In the meantime the town is apt to be without its power service some weeks or months, no matter what the ultimate adjustment.

* Cobden's electric generator, damaged by water, left on Tuesday evening by truck for Hamilton, for repairs.

* Mr. Markus, contractor of Pembroke, has been awarded the contract by Cobden council to repair brickwork in the damaged power house.



and people got around in horse-drawn cutters. By 1931, however, improved and winter-ploughed highways encouraged more automobile use, although side-roads, generally, remained unploughed. A few more years and winter freight also came in by truck as well as by the railroad. But even in 1940, there were still frequent complaints from potential road-users that snow-blocked roads were affecting business, mail could not be delivered, nor farmers get to town for supplies. And there were claims that snow plowing techniques led to drifting snow and new highway hazards.

The telephone came first to the Cobden area in 1892; however, it was not until 1961 that the dial telephone arrived, the cranked phone began to disappear, the numbers of people sharing party lines decreased, and subscribers in Cobden were given seven-digit numbers.

The first (float) aeroplane to land on Muskrat Lake did so in the 1920s.

The village's streets were not all paved until the 1960s.

The announcement that broadband was coming to Renfrew County and Cobden did not appear in the *Sun* until September 2010.

Ladies in engineering...

The engineering profession in Canada was, and still is, male-dominated, although the percentage of lady engineers - and engineering students - has increased quite significantly in recent decades.

Canada's first notable lady engineer was Elsie Gregory MacGill, an electrical and aeronautical engineering graduate who was active from the 1930s to the 1970s. The fact that she developed polio while in graduate school in the United States did not deprive her of her degree or a career in engineering. During World War II, she was responsible, among other things, for the design of a complete aeroplane. Her activities were noted by the press, such as in the article by Kathleen Rex that appeared in the June 12, 1978, edition of the *Globe & Mail*. Elsie has since been inducted into the Canadian Science and Engineering Hall of Fame and has been commemorated as a person of national historic significance by the National Historic Sites and Monuments Board of Canada.

Astronaut Julie Payette, an electrical engineer, has participated in two space missions. She has been the subject of a number of newspaper articles and was included in the *Globe & Mail's* Moment in Time series on May 27, 2014

Others who have received recent press coverage include:

Kim Sturgess, in the *Globe & Mail*, July 29, 2010. Kim, an engineering physics and MBA graduate, was when Gordon Pitts wrote his article - CEO of Alberta WaterSmart of Calgary, a water-use consultancy which she had founded, having earlier been both a management consultant and a small company entrepreneur. She also served as the 2011-2012 president of the Canadian Academy of Engineering.

Monique Frize, in the Ottawa Citizen, October 17, 2000. She was the first woman to graduate in

electrical engineering at the University of Ottawa. Later, she received a master's in medical engineering, an MBA and a PhD. Monique has taught electrical engineering at both Carleton and Ottawa Universities. The article, by Marlene Orton was concerned with her leadership activities in the recruiting of women to the engineering profession.

Tyseer Aboulnasr and Elizabeth Croft, in the *Citizen* on November 9, 2011. Aboulnasr was then dean of Faculty of Applied Science at the University of British Columbia, having recently completed a similar appointment at the University of Ottawa and Croft was a professor of mechanical engineering at UBC. Darah Hansen's article was concerned with the small numbers of women engineering students.

Liz Oldershaw, in the *Globe & Mail*, March 19, 2011. Paul Waldie's article was concerned with Liz's contributions as a structural engineer at Halsall & Associates in Toronto to the design and construction of schools in Haiti.

These photographs appeared with the articles cited above, except for the one of Kim Sturgess, which was taken at an Academy function on June 21, 2012...



Julie Payette





Elsie MacGill

Kim Sturgess



Monique Frize

Elizabeth Croft

Unfortunately, in December 1989, 14 women engineering students were killed by a gunman at École Polytechnique in Montreal. This tragedy was widely reported, and has been every December since it happened.

Obituaries...

Obituaries, and especially those written as articles, have listed the achievements of Canadian engineers.

The February 28, 2005, edition of the *Globe & Mail* printed an extensive obituary by Randy Ray for Allan Bromley (1926-2005), a boy from a farm at Westmeath, Ontario, who had been science adviser to U.S. President George H.W. Bush. An engineering physics graduate from Queen's, Bromley received a master's degree in physics from Queen's and, in 1952, a doctorate from the University of Rochester. He then joined the Physics Division at AECL Chalk River to do nuclear research, during which time he acquired an international reputation for his research. In 1960 he joined the faculty at Yale, as associate professor of physics and subsequently founded the A.W. Wright Nuclear Structure Laboratory. From 1972 until 1993 he held the Henry Ford II professorship at Yale, as well as serving for part of this time as chair of the Physics Department and taking leave from 1989 until 1993 to serve President Bush. He served as dean of engineering at Yale from 1994 until 2000. Over the years, his output of scientific papers - and graduate students - was prodigious. He also served as president of AAAS and IUPAP, received the U.S. National Medal of Science, and many honorary doctorates.



D. Allan Bromley Ottawa *Citizen*, February 15, 2005

An obituary article for Philip Lapp, written by Ron Csillag, appeared in the *Globe & Mail* on October 13, 2013. As Csillag wrote;

Virtually a household name in the world of aeronautical engineering in this country, the tireless Dr. Lapp tallied a string of accomplishments. He helped

build Canada's first satellite; worked on the early NASA capsules and on the doomed Avro Arrow project; was chief engineer at de Havilland Canada. and co-founded SPAR Aerospace, which built the first Canadarm.

Dr. Lapp, in a nutshell, helped launch Canada into space. In 1967 he coauthored the so-called Chapman report (of the Science Council of Canada), which kick-started this country's space policy. It recommended using Canadian satellite and space know-how for commercial purposes, such as communications and resource management, instead of focusing solely on scientific research.

Philip Lapp was born in Toronto in 1928 and died there in September 2013. He was an engineering graduate of the University of Toronto and received his doctorate from M.I.T. He was a founding member of the Canadian Academy of Engineering in 1987 and its second president. He was also an Officer of the Order of Canada. For many years he headed his own multi-service consulting company.



Philip A. Lapp



Gerald G. Hatch

Gerald G. Hatch's obituary was published in the *Globe & Mail on* June 14, 2014. He was born at Brockville, Ontario, in 1922 and died in Toronto in 2014. A McGill graduate in metallurgical engineering, Gerry studied thermo-chemistry at M.I.T, gaining a DSc in 1948. His first industrial job was with the Shawinigan Water & Power Company. After M.I.T. he joined the Armour Research Foundation in Chicago, moving in 1952 to be research director and later plant manager with Québec Iron & Titanium at Sorel. By 1957, he was president of W.S. Atkins & Associates, consulting engineers and, from 1965, headed Hatch Associates Ltd., his own global consulting company, which later became HATCH Ltd.. He was the recipient of multiple honours, including membership in the Order of Canada and in the Canadian Science and Engineering Hall of Fame.

Engineering-based Companies, with problems...

Over the past few years there have been many newspaper articles written on the demise of Nortel Networks, formerly the Northern Electric Company and its R&D arm, Bell Northern Research and on the continuing problems being faced by Blackberry/Research in Motion, SNC/Lavalin and the Bombardier companies. Most of them have been critical about the companies' respective falls from grace and lamenting Canada's apparent inability to grow and sustain leading, world-beating engineering companies over the longer haul. I would suggest that the companies' situations were not, and are not, as simple as assumed and that many of the articles deal only with aspects of the larger problem. However, every now and again, an article has appeared - not always in easily understood language - that has helped explain how a relevant technology has developed in Canada, and identified the companies that have done the work.

RSS Discovery...

Finally, an engineering story from abroad that has a Canadian connection.

It was written by Alan Rankin and appeared in the *Courier and Advertiser* edition of March 21, 2001, published in Dundee, Scotland. It describes the recently established museum at Discovery Point, which includes a berth containing the restored Royal Research Ship *Discovery*,



The ship was launched at Dundee in 1901, from the yard of the Dundee Shipbuilding Company. It had three masts and a single funnel, a capacity of 736 gross tons and 1570 tonnes displacement, a length of 172 feet and a beam of 33 feet. Her crew numbered over 40. Because of her limited coal capacity, she travelled mostly under sail.

This was the ship that Robert Falcon Scott took to the Antarctic for his 1901-04 expedition. In 1905 she acquired her Canadian connection when she was sold to the Hudson's Bay Company and used as a cargo ship between London and the Bay until 1912. She was idle until 1914 and some war service on the Russia run, and was used in 1916 in an abortive attempt to rescue the Shackleton Expedition from the Antarctic. Then more Russia work. After the war, she was laid up for several years until recommissioned in 1923 for Antarctic work and based at the Falkland Islands. Laid up again in 1930 in London until bought by the Boy Scouts as a training vessel. During World War II, the engines and boilers were removed for scrap. She was transferred to the Admiralty in 1954 for use as a training facility. In 1979, the Maritime Trust saved her from being scrapped and made her into a museum. In 1986 she was restored and transported in another ship back to Dundee, again to become part of a museum, first in a specially-built dock and eventually at Discovery Point. The *Courier* article had this to say about the construction of the *Discovery*:

When *Discovery* slipped into the waters of the Tay in 1901, she was the strongest wooden-hulled ship ever built. Her outer skin was two layers of dense greenheart timber, respectively six and five inches thick. Next there was an inner skin of five-inch thick pitch pine. Within the hull there were chambers to be filled with rock salt which, when damp, would literally pickle the timber and increase its strength. The timbers of the main frame, the hull's skeleton, were a foot square and made of solid oak.

Captain Scott boasted that in places it would take a breach of 26 inches to pierce the hull. Incredibly, the steel-lined bow, designed to ride up over pack ice and to crush it as the ship inched forward, was even stronger.

Discovery's 500-horse-power steam engines, supplied locally by Gourlay Brothers, could drive her at nine knots and push her through huge ice packs. Her two-bladed bronze propeller and rudder could be raised through the hull to avoid ice damage....

Discovery was effectively a re-designed Dundee whaler, modelled on her predecessors that could handle the worst weather nature knew.

To conclude...

There's not much I can say in conclusion. I've covered a great deal of ground, helping hopefully to illustrate four things: one, that engineering may be applied universally; second, while its impact can be

traced back thousands of years, it is only in the last 100 that people have become especially dependent on it in their daily lives; third, that newspapers are one vehicle through which lay people can learn something of engineering's current and past contributions to society; and fourth, that newspapers pay most attention to engineering when there has been a disaster...or an anniversary.

Thank you for your kind attention.

Acknowledgements:

To the Woodroffe Kiwanis SAGE Group and Alan Brookbank for the opportunity to present the original talk.

Sources:

All sources have been mentioned in the text.

Photo credits:

All credits, with the exception of the RRS *Discovery* (Wikipedia), with the museum building in the background, have been given in the text.