

## Connecting Continents

**A**s many of you are aware, my career background has been with electric power utilities, or what I like to refer to as the “muscle” end of our electro-technologies. But, since my retirement I have become fascinated with the story of the migration of peoples on this planet and the role that communications played in establishing and maintaining contact between them.

Winston Churchill is purported to have once said “the further back one looks, the further forward one is able to see.” In preparing this paper I have taken him at his word and consequently I have titled it “Connecting Continents”. In its broadest interpretation, that means I have to cover 100 millenniums of history to tell the real story - no mean chore, even for an engineer.

It all began for us 100,000 years ago when the human race migrated out of Africa. Some tribes turned west, others east. After a few hundred generations, those who'd turned left reached the uncrossable Atlantic Ocean. But the descendants of those who turned right found a larger world at their feet, across Asia. Some crossed the narrow Bering Strait 16,000 years ago, spreading across North America. Some continued on to the Strait of Belle Isle 8,000 years later and then on to the island of Newfoundland. Once again the uncrossable Atlantic Ocean confronted humankind, this time having been reached from the west.

It was the Vikings, driven by ambition and a desire to claim new lands, who finally closed the formidable gap. Aboard sturdy ocean-going knarss, without compass or astrolabe, they ventured farther and farther from mainland Europe, to the Orkneys, the Faeros, Iceland and Greenland. Then in the early summer of 1000 AD, Leif Ericson and his crew, left Greenland and sailed west for unknown lands. Months later Leif sailed ashore on the northern tip of Newfoundland, a vast area where the Viking visitors encountered the aboriginal people they called “Starlings”. Here was the end of a 99,000-year voyage - descendants of those who turned east were met by the descendants of those who turned west. Humanity had come full circle.

The explorer instinct continued in the east but it was not until some 500 years later that the Atlantic Ocean was challenged again, this time by Christo Colombo and Giovanni Caboto and some say the Portuguese before them. Columbus and Cabot had a lot in common. Both were Italians, both went abroad to have their expeditions financed by foreign countries, and both their voyages terminated on islands, not on mainland North America. Although they are written up in the text books as discoverers of North America, that is a bit of a stretch because technically what they discovered were only the islands of Puerto Rico and Newfoundland.

I made a quick reference to a belief that Portuguese navigators may have preceded these two Italians by a few years, but there is no hard evidence on this. Typically, when hard facts do not exist we humans are not beyond inventing supporting stories.

One such story involves the naming of our country, Canada. The official version is that the name “Canada” is of aboriginal derivation but some say it was indeed the Portuguese that were responsible. It seems the driving force behind Portugal's early exploration ventures was to find a land more hospitable than their own. When they came upon my country they called it “ca” meaning “here” and “nada” meaning “nothing” - “here is nothing”. So with that they made no claim and headed further south for warmer climes.

Why have I dwelt on this background of migration and exploration? Really it was to make the point that, just as the Atlantic Ocean was the barrier and challenge to the free movement of peoples in those years, so it would be for the transportation and communication links needed between the Old World and the New World in the future.

The roles of the sailing ships and later the ocean-going steamships have been well documented and for the next 350 years they remained the primary means for contact between the east and west. It was not until the last 150 years of this 100,000 year journey that we would see technological developments which would truly “connect continents” through communications by instantaneous electronic means. Many are the stories that surround these remarkable engineering achievements and many are the numbers of unsung heroes that contributed to their success. Let me just touch on a few of these.

by *Wally Read*  
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### Abstract

The author engages in a lighthearted discussion about the history of the migration of humankind on this planet and the difficulties associated with establishing and improving communications links between the migrants. Those captivated by the progress of our telecommunications technology in the 19th and 20th centuries will read about some of Canada's unique contributions and of its “unsung heroes”.

### Sommaire

Les auteurs se sont engagés dans une discussion de fond sur l'histoire de la migration des humains sur cette planète et sur les difficultés associées à l'établissement des liens de communication entre les immigrants. Ceux qui sont captivés par le développement des technologies de télécommunication du 19 et 20e siècle pourront découvrir quelque unes des contributions canadiennes majeures ainsi que ses héros obscurs.

With the invention of the telegraph in 1832 and subsequently the opening of the first telegraph system twelve years later, a new era of telecommunications had begun that brought all people of the world into contact. As telegraph lines sprung up in Europe and in North America, the uncrossable Atlantic reared its ugly head again. Visionaries on both sides were planning to meet this challenge.

On our side of the “big pond” a gentleman from Lancashire by the name of Frederick Newton Gisbourne, appeared on the scene. Gisbourne was taught mathematics and civil engineering by the local vicar in Broughton. At the early age of eighteen years he toured Australia, New Zealand, Mexico and Guatemala and ended up in Canada where he took up positions with telegraph companies while still in his twenties.

Gisbourne saw the commercial value of undersea communications cables connecting continents and set about the first steps of building the infrastructure needed on the North American side of the Atlantic. The initial plan was to intercept ocean-going vessels off the coast of Newfoundland and telegraph the news of Europe to New York two days in advance of its arrival by ship.

The proposal included constructing a 600-Km telegraph line across the island of Newfoundland, using carrier pigeons for the 170-Km sea crossing to mainland Canada and utilizing the existing circuits to New York. Difficult construction conditions forced a withdrawal of his financial backing and the plan was only salvaged by the intervention of Cyrus Field an American entrepreneur. The carrier pigeon proposal was replaced with an undersea cable and Field's company completed the project. This was the communications system that was in place when the Civil War broke out in the United States and thereby by hangs another tale.

When there was some question as to whether England was going to enter the war on the side of the South to protect its cotton supply, Parliament met, debated and decided it would not. That important news was dispatched by ship to the United States. Off of Newfoundland the canister containing the headlines was thrown overboard at Cape Race and picked up by the “Newsboat”. However the telegraph operator was unable to transmit the message due to ice buildup on the lines.

Realizing the importance of the news he rode on horseback into St. John's and met with the Governor who immediately sent him to the next repeater station to try there. After another lengthy horseback and open boat ride he arrived at Rantem where he found the circuit solid all the way down to New York. The news got there Sunday night ready for the

Monday morning headlines and President Lincoln got at least a couple of good nights rest before the details arrived some two days later.

As for Gisbourne, he did not benefit from the vast enterprise which was established afterwards by the laying of the transatlantic cable and in some cases he was never given the recognition he deserved. Thank you, Frederick Newton Gisbourne and, on behalf of President Lincoln, a special thanks to the telegraph operator of Cape Race.

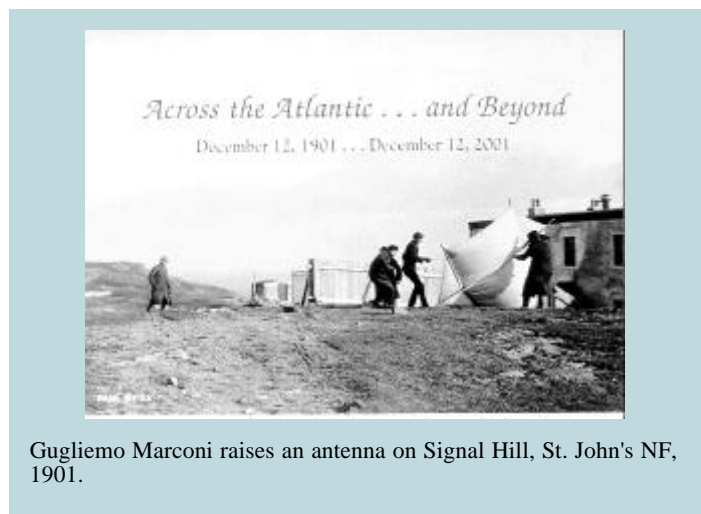
Space does not permit my repeating the tale of the various attempts to lay a communications cable across the Atlantic and the success of the Great Eastern in 1866 in doing just that. Nor is there a need for me to do so. It is well documented. I will tell you though, that a long overdue dedication of an IEEE Engineering Milestone took place in Valentia Bay in County Kerry, Ireland in 2000. The IEEE UKRI Section sponsored the event and it marked the 134th anniversary of the sailing of the Great Eastern with her precious cargo.

Nor does space permit mention the many wizards who worked in the field of voice communication over wires epitomized by that great Scot, Alexander Graham Bell who perfected his inventions in Canada and the United States towards the end of the 19th century. It is enough to say all of these events signaled a new era for us all. Just as the Vikings made people-contact early in the second millennium, just as further exploration and advances in sea transport maintained and improved that contact for the next 850 years, so did the transatlantic cable provide a fast communications link for peoples on either side of Ocean.

By 1900, the question was being asked whether we had achieved all that we wanted to in transatlantic communications? Could even greater accomplishments be envisaged?

Enter the wireless age and the magic of another Italian, Guglielmo Marconi who made history by transmitting the letter "S" in Morse code from Poldu, Cornwall, England to a receiving station on Signal Hill, overlooking St. John's Harbour in Newfoundland on December 12, 1901. Without question this was a startling discovery and a wonderful gift to humankind at the start of a new millennium.

However I want to talk about another one of those "unsung heroes" I spoke about earlier. His name was Reginald Aubrey Fessenden, a Canadian, who was working in the wireless communication field in those days. Stimulated by the work going on in wireless telegraphy he wanted to go one step beyond that and have voices and music carried over high frequency waves. Unable to obtain funding in Canada he went to work for the United States Weather Bureau where he was able to convince the powers that be to support his work.



Guglielmo Marconi raises an antenna on Signal Hill, St. John's NF, 1901.

On December 23, 1900, from his new laboratory at Cobb Island on the Potomac River, Fessenden was experimenting with Morse transmissions to a receiving station in Arlington, Virginia, some 50 miles away, where his assistant, Thiessen was located. He hooked up a microphone to his improved system and spoke into it the words "One, two, three, four. Is it snowing where you are Mr. Thiessen? If so telegraph back and let me know". Thiessen replied by telegraph in Morse code that it was indeed snowing. In great excitement Fessenden wrote at his desk, "This afternoon here at Cobb Island, intelligible speech by electromagnetic

waves has, for the first time in the world's history, been transmitted." This was almost one year before Marconi's transatlantic signal was received in Newfoundland on December 12, 1901.

Obsessed with increasing the range of his long distance voice transmission he experimented successfully with messages from Brant Rock, just outside of Boston, Massachusetts and a receiving station in Armour in Scotland. The Atlantic Ocean had fallen victim to yet another challenger.

Perhaps Fessenden's most satisfying moment came on December 24, 1906 at 9pm when he orchestrated a broadcast to several ships at sea owned by the United Fruit Company. This company had installed wireless systems on their boats so as to control the harvesting and marketing of bananas in Puerto Rico. Fessenden held a contract with them and wanted to give a Christmas present to his customers on the dozen or so ships at sea.

On that cold December night he played a recording of Handel's "Largo" on an Ediphone. Following that he dazzled his listeners with his talent as a violinist by playing "Oh Holy Night". After several readings from the Bible he signed off by extending Christmas greetings and a request to have them write and report to him on the reception of the broadcast wherever they were. The mail response confirmed that Fessenden had successfully invented radio, as we know it today.

In spite of this, the rest of Fessenden's life was a constant struggle for recognition of his inventions and for compensation from his rich partners who had sold his patents out from under him to large American companies. He died relatively unknown, in Bermuda.

Thank you Reginald Fessenden. On the 100th anniversary of your great discovery, we the Canadian members of the IEEE have honoured your contribution to society by establishing the IEEE Canada Reginald Fessenden Medal in 2000. Sorry we were so late.

Well I am going to stop there, The story of the advances in the communications industry since the start of the 20th century is well documented. From radio to television, from wired to wireless, from copper to fiber optics, from earth to satellites and beyond, the progress has been outstanding and worthy of your research. There are lots of "Atlantic Oceans" out there to be challenged and I urge you to tackle them by following Churchill's advice, "to look back occasionally so that you can see further into the future."



St. John's NF site selected by Guglielmo Marconi to receive the first wireless transatlantic signal.

### About the author

**Wally Read** is a former Region 7 Director (1984-85), and a Past President of the IEEE (1996). Currently he is Chair of the 2002 IEEE History Committee and takes particular delight in identifying Canadian achievements in our technologies and honouring those responsible. Wally can be reached at [w.read@ieee.org](mailto:w.read@ieee.org)

