Background to the 1858 telegraph cable
by
Donard de Cogan
School of Computing Sciences, UEA, Norwich

Introduction
Andrew Grove one of the founders of Intel coined the term "Strategic Inflection Point" [1]. I would argue that the 1858 trans-Atlantic telegraph cable represents an inflection point in the history of technology. Canals had given way to railways. The Crimea was either the last of the old type of wars or the first of the new type. Photography was in its infancy, so that what was recorded in 1858 was done by way of drawings, while much of what happened eight years later was photographed as well as painted and engraved. We see changes in materials science, some of which facilitated the venture, some of which was stimulated by the venture. We see the development of big project contracts from the left-hand/right-hand lay fiasco to a very tight specification and quality control that was a feature of the 1866 cable.

We should ask about the background to the 1858 telegraph cable and a comprehensive answer would occupy a entire book. Suffice here to examine just a few aspects which should help to provide a context. I propose to look at the external pressures, the barriers, the enablers and the locations for the cable landings.

External pressures
We should not forget that North America was undergoing a massive demographic change due to massive migration from Europe. People on both sides were eager for news and the rapid transmission of news was a major benefit of telegraphs. Business was a major beneficiary of rapid communications and arbitrageurs were dependent on making profits on the small margins created by trade imbalances. The stock markets in Europe and North America were expanding rapidly and there were those visionaries who foresaw the benefits of linking these with London and New York having one hour overlap in their trading days.

Barriers
Until the arrival of gutta-percha electrical conduction over wires came to a halt whenever the expanse of water was such as to prevent an aerial span between poles. There were sceptics such as the influential astronomer royal, Sir George Airey who did not believe that the electric fluid was capable of flowing through a conductor when subjected to the hydrostatic pressures of the ocean floor. In fact the understanding of electricity itself was the major obstacle to progress at that time.

The enablers
Sir William O'Shaughnessy-Brooke or Brooke-O'Shaughnessy (an Irish man) while organising telegraphs in India coated wires with gutta percha (trans-polyisoprene) as a means of transmitting telegraphs over rivers. When news of this development was delivered in London it was taken up by the Siemens brothers who patented a machine which operated like a spaghetti extruder. This would have remained an exclusively Prussian technology were it
not for the contribution of a Dublin lead pipe manufacturer, Henry Bewley who adapted a lead pipe extruder in a way which did not infringe the Prussian patent. In need of funds to develop his patent he approached his friend and fellow Quaker, Samuel Gurney of Earlham Hall, Norwich (a member of the Overend and Gurney Banking family).

Willow Park, the home of Henry Bewley. Now a preparatory school of Blackrock College

Earlham Hall, Norwich, the home of Henry Bewley. Now the Law School of the University of East Anglia.

The scientific enabler was of course William Thomson, later Lord Kelvin, an Ulster man who was declared to be one of the few people at that time (1857) who understood the techniques of Monsieur Fourier. His calculations gave a precise interpretation of what might be expected of a particular length of cable, with a specific geometry and of course he predicated his results with an admonition to use the highest purity of copper conductor that could be obtained.
At the other side of the Atlantic we have Cyrus Field, the business man who saw the potential of a link across the Atlantic and who had the courage, or possibly arrogance of pursuing his vision when everything seemed to conspire against him. He had high level contacts in the US. Lieut. Matthew Maury, the hydrographer and founder of the US meteorological service gave much support and technical advice. The feasibility of ocean cables was addressed in several editions of his seminal book [2]. The US government was willing to lend some of its most modern ships to assist. Field also had the guts to march into Whitehall where most British people would fear to tread. The Navy undertook deep ocean surveys. HMS Agamemnon, fresh from the Crimea war was made available. Perhaps most surprising of all, Field managed to convince the normally conservative Treasury to provide financial support. Of course sceptics might argue that he was lucky in having a brother who wrote a best selling book about the cable venture [3]

The locations
The arguments that determined the landing sites of the cable were a confused mixture of science and self-interest. William Thomson's calculations confirmed that the strongest, least dispersed signal was the one that travelled the shortest distance. In the case of North America there is no doubt that Newfoundland is the closest land-fall on the great-circle route from Europe, but in the case of Ireland, why Valentia island and not the nearby mainland? Sir Peter Fitzgerald, 19th Knight of Kerry had an early career in banking. He was a resident landlord on Valentia island during the potato Famine and was remembered for his great concern for and attention to the welfare of his tenants. He was well connected and made much use of the argument of the need for the shortest distance for the cable as a basis for choosing his island as the landing site. Certainly he lavishly entertained all those connected with the cable enterprise.

Valentia island (marked A) on the Co. Kerry (bottom left) coast in Ireland
Sunnyside, previously Bay Bull Arm in Newfoundland

A consultation of any book at the time cites that the 1858 cable was landed at Bay Bull Arm in Newfoundland. This does not appear on any modern map but it is reported to be Sunnyside at the edge of the Avalon peninsula. The land-line ran along the South Shore to Port aux Basques where a cable spanned the Gulf of St Lawrence to Cape Breton island and thence to Nova Scotia. This is a very sparsely populated region where many communities are accessible only by sea. The establishment, yet alone the maintenance of the wires must be seen as a major feat of engineering.

**Conclusion**
Here we have a very brief background to the 1858 trans-Atlantic telegraph cable. That Ireland was a part of this technological upheaval and that there was a significant contribution by its people to this pivotal endeavour in international communications has for many years been obscured by isolationist politics. Does the recent issue of a commemorative stamp suggest a belated recognition of this omission?
References

1. Andrew S. Grove "Only the Paranoid Survive" Doubleday 1996

2. Matthew Fontaine Maury "Physical Geography of the Sea" (first edition: Harper and Brothers, New York 1855 does not mention the cable, but it does appear in later editions)

3. Henry M. Field "History of the Atlantic Telegraph" (1866 edition was printed for private distribution. Published editions appeared in 1867, 1869 and 1892)