21st Century…19th Century…6th Century BC Skills

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REFLECTION

During July I spent some time in Ireland; in the beautiful, south-west corner that is Kerry. Whilst there, I was reading a bit of the local history and came across some quite mind-boggling technology. In a gently shelving sandy cove by Waterville lies the remains of an astonishing leap of faith by a group of Victorian entrepreneurs. Sticking out of the cliff is the tattered end of a telegraph cable that ran across 2000 miles of ocean to Newfoundland and thereafter overland to New York. The south-west tip of Kerry (Valentia island) was chosen (in the 1850s) as the take-off point and 'Hearts Content' bay in Newfoundland the receiving point. But in between lay 2000 miles of wild ocean that is variously 2-3 miles deep.

The story of this awesome undertaking is brilliantly brought to life in a book by John Steele Gordon, *A thread across the ocean* (Simon & Schuster 2002), and the central figure in it is one Cyrus Field.

Naturally enough the story is rich in technology, particularly of materials and the emerging world of electrics. Gutta percha from Malaya (a kind of natural rubber with interesting polymer properties) was an important insulator and copper was the conducting core, but there was much debate about how thick this core should be. Morse (of Morse code fame) argued that it should be a fine wire while others said thick. The uncertainty turned on their hazy conceptual model of electric current which they expressed as "how much current does it take to *fill the wire* before the signal can be detected'. The iron/steel reinforcing binding was also at the cutting edge, as Bessemer was only just getting his new steel production process operating, offering much greater strength than the iron reinforcement used in early cables. There was also a mass of technology involved in surveying a route for the cable – establishing the depths and the ground conditions across the 2000 miles of ocean floor.

But overriding all these technology problems was a very simple logistical one. The 1st cable (about 25mm dia) was 2,500 miles long consisting of 340,500 miles of copper and iron wire (more than enough to reach the moon) and 300 tons of gutta-percha. It weighed – more-or-less – a ton per mile, ie 2,500 tons. There was not a single ship afloat that could come near to carrying such a load. So two ships were commandeered (one British and one American) and the cable split between them. But should they start from shore and meet in the middle, or navigate to the middle – splice the cable – and sail apart to Ireland and Newfoundland? The latter option was chosen and, within a few days, the enterprise had come to grief with most of the cable lost on the sea-bed. Just the cable had cost £225,000 – which at today's rates would be about £22.5m.

A year later, the 2nd attempt came to a similar watery end, and a year after that, the 3rd attempt was only partially successful – carrying signals for only a few days – but then it died and transmitted no more. It was later established that some of the iron reinforcing fibres had broken and been somehow forced through into the copper core, shorting out the current into the conductive sea-water. Nearly a decade of huge effort and massive costs – and virtually nothing to show for it.

Between each of these disasters it was Cyrus Field who showed what technological innovation requires, beyond technology. He was neither a scientist nor a technologist. He was born in 1819 and by 16 was apprenticed to a retailer on Broadway, New York. He grew to become one of the most successful … like Woolworth and Macey, and a gifted entrepreneur. He had made his fortune by 1850 and was looking for other adventures. He was introduced to a Canadian engineer Frederick Gisborne, who wanted funds to complete an overland cable from New York to Newfoundland. Since Newfoundland sticks out so far into the Atlantic, ships docking there from London could then send their messages by telegraph to New York. This would cut a few days off the time it took to get messages between London and New York. Cyrus bought up the Canadian's whole venture and got that running – but only as a start. Because immediately he saw that carrying the cable on across the ocean would shorten the message time not by a few days but by weeks. From a single meeting with Gisborne, Field became the driving force that bulldozed the idea of a Transatlantic cable through any number of disasters.

He built a consortium to fund the 1st attempt and when it failed he re-built it (some pulled out and others were recruited) to fund the 2nd attempt. But when that failed, virtually all the Board of the Atlantic Telegraph Company was looking to get out with as much of their investment as possible. 'Sell all the remaining cable and kit and get what we can from this disaster'. But not Field. He was astonishingly effective at persuading his wealthy backers to hold to the ambition of the project…dig a bit deeper…and press on with a 3rd attempt. In 1858, this did partially succeed and – when the cable was spliced and completed, a message was sent by Queen Victoria to the President of the United States and a reply duly received. But the signal was so broken and halting that it

took nearly a day to send the Queen's 1st message of a couple of sentences and within a few more days the signal died completely. Another disaster – except that this time, enough people had seen what might just possibly be possible. A news service was opening up. Mr Cunard had been able to send a message about the collision of one of his ships…the King of Prussia was too ill to visit Queen Victoria…the Chinese empire was open to trade. The world had shrunk by an order of magnitude.

So when Field went looking for new backers for his fourth attempt, he found a more receptive group and moreover he found Isambard Kingdom Brunel. On the far bank of the Thames from Goldsmiths in Deptford lay the solution to Field's cable-laying problems. The Great Eastern was another mind-boggling Victorian venture. She was many times bigger than any existing ship. At 700 ft long it was another 50 years before any ship was bigger, and she was capable of carrying the whole cable in her enormous holds. As Brunel showed Field around, he announced… 'Here is the ship to lay your cable Mr Field'. And the rest is history.

There are some worthwhile lessons in this story, that say much about the nature of technological innovation. And the first thing to acknowledge is that the critical part of the story is not the technology. Certainly the technology made it possible – but it didn't make it happen. Field made it happen. I have always valued stickability as a quality in students' performance; those with the stubborn staying power to see things through when their project starts to unravel. But Field had more than just stickability. He had the vision to see the world in a new way and – critically – the ability to persuade others to stick with it when all their instincts were to quit. This was the root of his entrepreneurial genius.

When Aristotle opened his school in the 6th C BC, one of the corner-stones of his curriculum was 'rhetoric'.

> Rhetoric: "the art of discourse, an art that aims to improve the capability of writers or speakers that attempt to inform, persuade, or motivate particular audiences in specific situations" (Wikipedia)

Rhetoric was so valued that it was part of the western classical curriculum for 25 centuries – eventually disappearing only in the 19th C. But even then it continued to feature in the debating societies that I was part of at school and university. I was taught how to fashion an argument…how best to deploy my strongest points and how to defend against attacks on my weaker ones. Invaluable skills – still obvious in places like the Oxford Union (where Boris and his mates learned their trade) and the church (where Lloyd George and Bevan modelled themselves on the great rhetorical preachers).

Looking at lists of 21st century skills – teamwork, creativity and the rest – I am struck by the glaring lack of any mention of the quality of persuasiveness. Persuading others to do things that they don't (initially) want to do is a *really* important quality. And it's learnable. And it's not just useful for parliamentarians. The next time you need a planning consent, or a bank loan, or a neighbour to cut her hedge – you will need the skills that Field deployed so effectively in the 1850s.

"I have a dream …" "We will fight them on the beaches…" "Ich bin ein Berliner…" The power of words, cleverly deployed, has changed our world every bit as much as the power of technology.

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