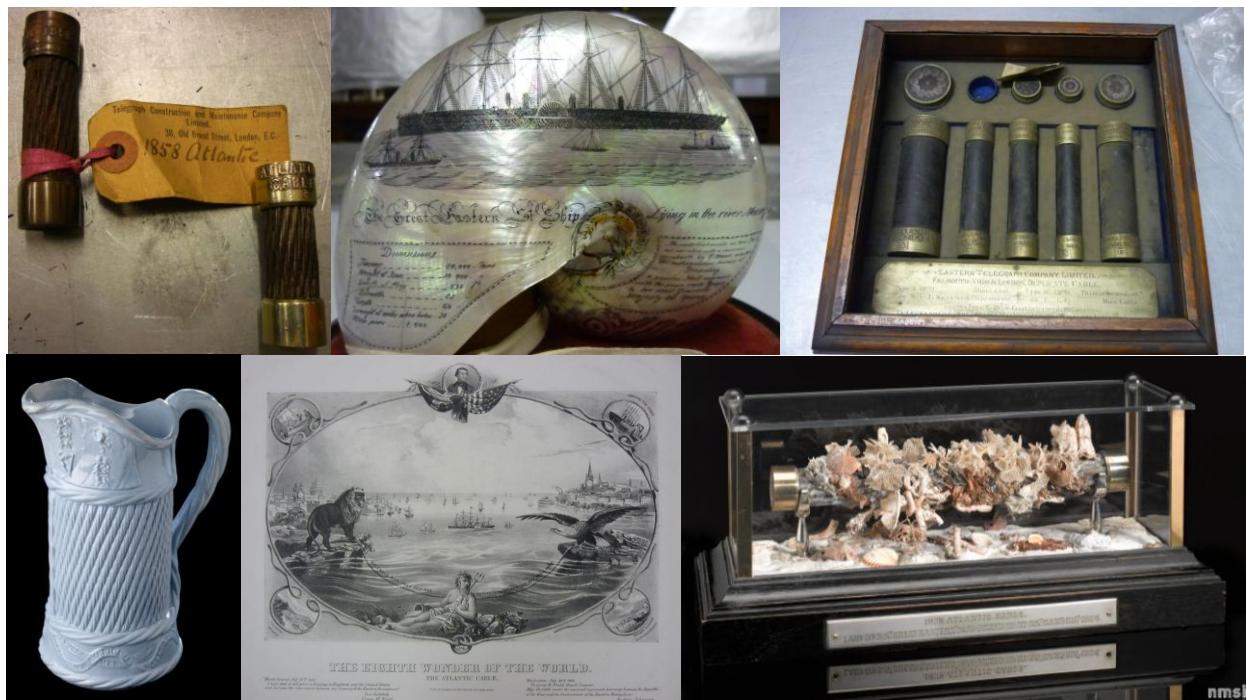


# From Experiment to Relic: The Transitional Identity of the Atlantic Telegraph Cable and the Creation of Cable Communities through Submarine Cable Collections



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## Introduction



Fig. 1 Imperial Institute, South Kensington, *Victorian Web* website

On a clear summer July evening in 1894 the newly built Imperial Institute in South Kensington, London, was illuminated with a large and extravagant celebration. A lavish banquet for almost 500 guests was followed by a night-time reception ten times its size, with a guest list comprised of eminent men of industry and science, as well as delegates from British and foreign governments including the Prince of Wales. The evening marked twenty-five years since the establishment of communication with the Far-East via submarine telegraph cables, and was hosted by Sir John Pender, the Chairman of the Eastern and the Eastern Extension Telegraph Companies, and arguably the most powerful man in the submarine telegraph cable industry. At approximately half past twelve in the morning guests were invited into the Upper Central Gallery to inspect an 'Exhibition of Deep Sea Curiosities and Electrical Apparatus'. Guided by Eastern Telegraph Company officials, guests had the opportunity to marvel at a range of exhibits that included cable related curiosities, cable ship models, maps and working contemporary scientific instruments.<sup>1</sup>

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<sup>1</sup> Porthcurno Telegraph Museum object no. 6.1.05.

Amongst the curiosities were sections of cable, including one that had been recovered from the Red Sea and was covered in marine growth. This section of cable had been laid in 1860 to establish communication between Aden and Bombay. However, the full line never completely worked and had been abandoned, leaving the cable lying at the bottom of the sea. Following the failed 1858 Atlantic cable, this cable had been hailed as having the largest conductor and best insulation of a cable to date, the height in cable science and technology.<sup>2</sup> However its expensive failure demonstrated the gaps in the industry's knowledge and understanding of laying and maintaining submarine telegraph cables and resulted in a government enquiry. This Red Sea cable section is a good example of Kopytoff's theory that states an object takes on 'various singularizations' throughout its life time, constantly classified and reclassified in accordance to its context, moving through different identities.<sup>3</sup> This section of cable was originally part of an experimental period, failure of the cable led to its reclassification as an unsuccessful cable, a redundant technology. However once submarine telegraphy became a secure technology, with the achievement of enterprises almost guaranteed, the section of unsuccessful cable would become a curiosity, suitable for display as a relic of the technology's past, a final transition that brought it to be displayed at the Imperial Institute. Using the social anthropologist Edmund Leach's terminology,<sup>4</sup> this section of recovered Red Sea cable is a *sign* of the failed 1860 cable, it is an intrinsic part of a failed design, demonstrating the evolution of submarine telegraph cable. But, as a *symbol*, the cable section reinforces the achievement of the successful submarine cables across the empire, an arbitrary association that puts the technology at the heart of the aims of the Imperial Institute, to develop 'commercial and industrial resources of the Empire'.<sup>5</sup> In addition, by being displayed in an exhibition for the jubilee of the Far-East cable, at the Imperial Institute, the associated communities, represented by the Eastern Telegraph Company and the Imperial Institute, become affiliated to the cable and to each other. In this one object three stages of a transitional identity can be identified; experiment,

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<sup>2</sup> 1860 [2744] *Report of the joint committee of Privy Council for Trade and the Atlantic Telegraph Company to inquire into the construction of submarine telegraph cables*: [http://0-gateway.proquest.com.catalogue.urls.lon.ac.uk/openurl?url\\_ver=Z39.88-2004&res\\_dat=xri:hcpp&rft\\_dat=xri:hcpp:fulltext:1860-036730](http://0-gateway.proquest.com.catalogue.urls.lon.ac.uk/openurl?url_ver=Z39.88-2004&res_dat=xri:hcpp&rft_dat=xri:hcpp:fulltext:1860-036730) (11 July 2011 15:00).

<sup>3</sup> I. Kopytoff 'The Cultural biography of things: Commoditization as Process', A. Appadurai, ed., *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge, 2007) p.89.

<sup>4</sup> S. M. Pearce, ed., *Interpreting Objects and Collections* (London, 1994) p.23.

<sup>5</sup> F. H. W Sheppard, 'Imperial Institute', *Survey of London*, vol 38 (1975), pp. 220-227. <http://www.british-history.ac.uk/report.aspx?compid=47529> (31 August 2011 13:00).

achievement and relic, and through its display as part of a collection, it reinforces a sense of community among those strongly associated with the submarine telegraph enterprises.

The historiography of submarine telegraph cables has tended to focus on the submarine cable as an experiment or achievement within their role or influence in the history of science, technology and Empire. These histories have been particularly useful in understanding the impact of the communication revolution, provided by the submarine telegraph cables; for the first time intelligence could be passed on faster than the fastest mode of transport between countries, having significant political and economic implications.<sup>6</sup> The important flow of international and commercial news persuaded Julius Reuter, the founder of Reuters news agency, the world's largest international multimedia news agency today, to open offices at both ends of the first international cable between France and England.<sup>7</sup> Also the submarine cables relationship with the British Empire was significant. Like other new technologies it was able to trigger as well as reinforce imperial motive by 'making the desired end possible or acceptably inexpensive': along with steam ships, railways and the Suez canal, cables worked to tie colonies to their European rulers enabling faster communication and economic expansion.<sup>8</sup> Conversely, the submarine telegraph has also been seen as contributing to the demise of Empire, providing greater power to the periphery and described by Bektas as a tool of protest and as a symbol of infidel intervention in the Ottoman Empire.<sup>9</sup>

Influenced by our contemporary communication revolution, the internet,<sup>10</sup> with the literary and cultural turns, recent historiography has also begun to look at how Victorian society came to terms with the new and experimental technology in the electric telegraph. Rhys Morus has highlighted the use of nervous system analogies in describing electric telegraphy, underlining the invisible transfer of intelligence, the breakdown

<sup>6</sup> P. M. Kennedy, 'Imperial Cable Communications and Strategy, 1870-1914' in *The English Historical Review*, vol. 86 (Oct. 1971).

<sup>7</sup> D. R. Headrick, *The Invisible Weapon: Telecommunications and International Politics 1851-1945* (New York, 1991) p.15.

<sup>8</sup> D. R. Headrick, *The Tools of Empire: Technology European Imperialism in the Nineteenth Century* (New York, 1981) pp.10-2.

<sup>9</sup> R. Kubicek, 'British Expansion, Empire, and Technological Change', in A. Porter ed., *The Oxford History of the British Empire: The Nineteenth Century*, Vol. 3 (Oxford, 1999), p.248 & Y. Bektas, 'The Sultan's Messenger: Cultural Constructions of Ottoman Telegraphy, 1847-1880' in *Technology and Culture*, vol. 41 (2000) p.696.

<sup>10</sup> T. Standage, *The Victorian Internet* (New York, 2007), also the Porthcurno Telegraph Museum often uses the phrase 'Victorian Internet' in their publicity.

of time, and more importantly the element of power and control.<sup>11</sup> Similarly, Menke has shown how the Victorians often used the natural world and natural structures to make sense of developing networks and technological structures.<sup>12</sup> However both works tend to focus on the inland telegraph without fully addressing the separate identity of submarine telegraphy. Nature and biology may have been useful devices for Victorian society to deconstruct and understand the new inland electric telegraphy, but submarine telegraphy was distinctly different in terms of science, scale and political implications and capable of developing its own discrete identity. This has been partly addressed by cultural histories of technology such as Ben Marsden and Crosbie Smith's *Engineering Empires*, which describes the intrinsic link and co-dependency between the identity of the scientists and engineers and their telegraphic inventions. Gillian Cookson has also argued that by 1870 the submarine telegraph cable was no longer seen as a novelty technology as it had become an established and understood technology for commerce and had little obvious effect on the public's lives.<sup>13</sup>

This dissertation aims to address an area underexplored by existing historiography, namely, the identity of the submarine telegraph cables. I will attempt to demonstrate the extent to which the identity of the submarine cable is transitional starting as an experiment moving through achievement, and latterly being identified as a relic. This transition is the consequence of its changing context and relationships with different cable communities which can be recognised through their close association with the objects collected or exchanged in rituals of commemoration. To do this, I will be using a body of evidence largely underused by historians of submarine telegraph cables, i.e., the material culture produced through the commemoration and celebration of the cables. Material culture can be described as any form of cultural expression in the physical environment, but for the purpose of this dissertation, I intend to use Susan

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<sup>11</sup> I. Rhys Morus, 'The Nervous System of Britain': Space, Time and the Electric Telegraph in the Victorian Age' in *The British Journal for the History of Science*, vol. 33, 4 (2000).

<sup>12</sup> R. Menke, *Telegraphic Realism: Victorian Fiction and Other Information Systems* (Stanford, 2008) p. 12.

<sup>13</sup> B. Marsden & C. Smith, *Engineering Empires: A Cultural history of Technology in Nineteenth-Century Britain*, (Chippenham & Eastbourne, 2005) pp. 178-225 & G. Cookson, 'Submarine Cables: Novelty and Innovation, 1850-1870', in *Trans Newcomen Society*, vo. 76 (2006).

Pearce's definition of material culture as the moveable and 'discrete lumps', items that can also be described as things, objects, artefacts, and sometimes goods.<sup>14</sup>

Analysing material culture is useful for highlighting transitional identities as it allows areas of study that traditional sources may not always allude to, areas such as value and commemoration, and can isolate associations that may not have been as clear without them. The material culture of the submarine telegraph cable aligns it with other events, experiments and achievements that became 'shrines of "technological tourism"',<sup>15</sup> exemplified in iconic projects such as Brunel's Thames Tunnel, the *Great Eastern* and the International Exhibitions. Waves of interest dictated the material produced, for example artwork from the late 1840s reflected that 'public interest shifted from the railways themselves to the great bridges that carried them'.<sup>16</sup> These artworks, merchandise, souvenirs and other items of material culture were produced to be sold or exchanged and could be described as 'commodities of destination', giving the items intrinsic value and significance.<sup>17</sup> Appadurai describes how the 'tournaments of value' for objects can change through their 'life time'; whether items are sold or exchanged or preserved they can represent value, along with the changing uses and trajectories of an object. These changes can guide an object's transition through or between identities, and are particularly useful in pinpointing the transition to that of a relic. Using the definition provided by Appadurai and Geary, relics 'belong to a particular economy of exchange and demand in which the life history of the particular relic is essential, not incidental, to its value'.<sup>18</sup> For objects in private collections, the provenance of many of the submarine cable sections, their value rests in the significance projected onto them by the collector, a value dependent on their history and on how they came to be in the collection.

The examples of material culture I will be looking at share a context as objects of commemoration of an event, an experiment, or an achievement and consequently can be used to identify communities associated

<sup>14</sup> S. M. Pearce, *Museums, Objects and Collections*, (Baldock, 1992) pp. 4-6.

<sup>15</sup> Marsden & Smith, *Engineering Empires*, p. 228.

<sup>16</sup> F. D. Klingender, *Art and the Industrial Revolution*, (New York, 1968), p. 160.

<sup>17</sup> A. Appadurai, 'Introduction: Commodities and the Politics of Value', A. Appadurai, ed., *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge, 2007), p.13.

<sup>18</sup> Appadurai, 'Introduction: Commodities and the Politics of Value', p.23.

with the submarine telegraph cable. Acts of commemoration, such as memorials, cultivate collective memories, thus developing an association and a separate identity. The link between commemoration, objects and communities was comprehensively started by Pierre Nora in the *Les Lieux de Mémoire* series, and has been used by Benedict Anderson to look at the creation of national identity and by Jay Winter to look at the use of war memorials.<sup>19</sup> More recently Clare Midgley has looked at commemoration of the Bengali religious and social reformer, Rammohun Roy, through the circulation of texts, images and relics, in creating a transoceanic community.<sup>20</sup> Similarly, I will look at how the commemoration of the submarine cables contributed to the transition of the cable's identity and reinforced cable communities in different locations and at different levels of society through acts of exchange and preservation.

Today these objects are predominantly found in museum collections, this has added to the transition of the cable's identity as a relic, but also has implications for the interpretation and analysis of the objects. As sites of cultural and collective memory, museums can affect the meaning of objects through practices of classification, research and collections management, as well as display.<sup>21</sup> For the purpose of this dissertation, I will be focusing on the National Maritime Museum's collection, which has historically collected objects from a naval and nautical perspective.<sup>22</sup> Within this context, the submarine telegraph objects have come from former Naval museums, those who worked on cable ships or people with strong connection to the sea or ships, and there is also a substantial cross over in their collection to the *Great Eastern*. Until 1907, the *Great Eastern* was the largest ship ever built; it was a feat of engineering, described by contemporaries as 'the floating city' and the 'crystal palace of the sea'.<sup>23</sup> It was the brain child of the famous engineer, Isambard Kingdom Brunel, and was launched in 1858 to be a passenger ship. However failure to be a passenger vessel, led to the *Great Eastern's* reinvention as a cable ship, seen as the only vessel large enough to carry an entire

<sup>19</sup> J. Winter, 'Historians and Sites of Memory', P. Boyer & J. Wertsch, ed., *Memory in Mind and Culture*, (New York, 2009) pp.252-268 & B. Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, (London, 1991).

<sup>20</sup> C. Midley, 'Transoceanic Commemoration and Connections between Bengali Brahmos and British and American Unitarians' from *The Historical Journal*, 54 (2011) pp. 773-796.

<sup>21</sup> Pearce, *Museums, Objects and Collections*, p.119.

<sup>22</sup> National Maritime Museum website <http://www.nmm.ac.uk/about/history/national-maritime-museum/history-of-the-national-maritime-museum> (23 August 2011 15:25).

<sup>23</sup> J. S. Gordon, *A Thread Across the Ocean: The Heroic Story of the Transatlantic Cable*, (Bath, 2002) pp.147-158.

length of cable to be laid across the Atlantic.<sup>24</sup> This connection with the cable helped reinforce the sheer scale of the Atlantic cable project as well as affiliate it with a famous engineer whose achievements include the Great Western Railway and the Thames Tunnel.

To put this collection in perspective and context, I will compare it to collections held by the Science Museum and the Porthcurno Telegraph Museum. Historic connections to International Exhibitions has meant that parts of the Science Museum's collection has come directly from the scientists and engineers who exhibited at these exhibitions, and its longevity and prestige has encouraged other historic institutions like Wellcome and Siemens to donate objects. The Science Museum is the direct product of the Victorian desire to educate through exhibitions and 'has been dedicated to using the past to illuminate the present and the future of the ingenuity of our own culture', consequently its collection has focused on the progression of technological and scientific discovery.<sup>25</sup> In contrast, the Porthcurno Telegraph Museum holds the archive and collection of Cable & Wireless. The telegraph office at Porthcurno, South-West Cornwall, was established in 1870 by a conglomerate of submarine telegraph companies, all run by John Pender. It was established to manage the direct submarine telegraph to India but was soon the hub for Britain's 'All Red' cable routes around the world, and after several company merges and take-overs Cable & Wireless was born. Consequently, the collections held by the Porthcurno Telegraph Museum range from cable samples and company merchandise to working equipment and employees belongings, representing the different associated submarine telegraph companies as well as their employees.<sup>26</sup>

To examine the submarine telegraph cable's transitional identity I will be looking at three of the most famous cables; the Anglo-French cable between Dover and France; the Atlantic cable that united Britain and America through a continuous cable from the Irish island, Valencia, to Newfoundland; and the Red Sea cable that established communication between Britain and India, by connecting Bombay and Aden. These were all early cables, laid by 1870, and all failed at least once, for varying reasons, before eventually being laid

<sup>24</sup> B. Marsden & C. Smith, *Engineering Empires: A Cultural history of Technology in Nineteenth-Century Britain*, (Chippenham & Eastbourne, 2005) p. 213.

<sup>25</sup> R. Bud, 'Collecting for the Science Museum: Constructing the Collections, the Culture and the Institution', P. Morris, ed., *Science for the Nation; Perspectives on the History of the Science Museum*, (Chippenham and Eastbourne, 2010) p.250.

<sup>26</sup> Porthcurno Telegraph Museum website <http://www.porthcurno.org.uk/page.php?id=1> (23 August 2011 15:25).

successfully. Though their separate geographic locations brings separate representations and connotations, the three different cables were all identified as experimental and successful cables, symbols of achievement for the technology, industry and respective nations, particularly the British, but they were also associated with failure.

Failure is a consistent theme through the cables' transitional identity, and particularly important in how these cables came to be remembered and commemorated within cable communities. As demonstrated in the Red Sea cable displayed at the Imperial Institute, failure could be used to reaffirm achievement as well as justify experiment. Experimental cables failed for various reasons, but successful cables failed due to fixable faults or damage which enabled the industry to develop even further through engineering expertise to repair cables. Additionally though the cables were often represented as symbols of British Industry and British Empire, both were in decline by the twentieth century. As the cable's identity was in transition, notions and understandings of Empire were also transitional. Greenhalgh addresses this transition by describing the change in display of the British Empire at International Exhibitions by the end of the nineteenth century from 'complacent pride' to 'propagandistic defence', a defence made all the more fierce as the demise of British industry and the scramble for Africa made the British Empire essential to maintaining Britain's global position.<sup>27</sup> By the middle of the twentieth century Britain's imperial monopoly of the cable industry had disintegrated, symbolically demonstrated by the renaming of the Imperial Communications Advisory Committee to the Commonwealth Communications Council in April 1943.<sup>28</sup>

With the underlying theme of failure in mind I will focus on the Atlantic Cable, as, in addition to its strong representation within the NMM's collection, its strong association with the *Great Eastern* creates a sharper focus to explore the transitional identity of experiment, achievement and relic. It was one of the biggest experiments, being the longest continuous piece of submarine cable to be laid, having experienced the biggest celebrations for the laying of a submarine cable, and often perceived as one of the biggest cable failures. Moreover, the second laying of the cable, in 1865 and 1866, involved the largest ship ever made.

<sup>27</sup> P. Greenhalgh, *Ephemeral Vistas: The Expositions Universelle, Great Exhibitions, World Fairs 1851 – 1939*, (Glasgow, 1994), p. 58.

<sup>28</sup> Headrick, *The Invisible Weapon*, pp. 265-267.

This supersized cable is consequently best placed to reveal the cable communities converged in the transitional identities of the submarine telegraph cables. The Atlantic cable was also the most fruitful in producing items that could be considered ‘commodities of destination’, providing an opportunity to demonstrate the contrasting uses of sections of cable and how some have come to assume an identity akin to that of relics.

Consequently, I will look at the Atlantic cable’s identity as an experiment first, how this relates to the identity of the respective engineers, scientists and projectors, strengthened by the cables’ representation in the press as well as the International Exhibitions, and embraced by some through debates and a fascination with the unknown. I will then look at the Atlantic cable’s identity as an achievement, principally focusing on the celebration of the cable and the creation and circulation of cable commodities as well as the display of cable sections and how this reinforced certain cable communities that had been created. Finally I will look at how sections of cables became relics, an identity assumed due to the increased desire of cablemen as a response to having become more specialised and geographically isolated. As part of private collections, these sections of cable were used to reaffirm their identity as cablemen, and now in museum collections, this veneration has been replicated reaffirming a distinct cable identity.

## Launching the Atlantic Cable: a Great Experiment

The Atlantic telegraph was seen as the greatest possible experiment in submarine telegraphy, contributing to the establishment of specialised communities of scientists, engineers and projectors, as well as making the laying of the cable appeal to a wider public. The 1850 attempt to lay cable between Dover and Calais caught the press' imagination described as the 'interesting experiment'.<sup>29</sup> Eight years later the *Scientific American* went even further describing the proposed Atlantic cable as 'the most gigantic electrical experiment ever made'.<sup>30</sup> From the early days of electric telegraphy there was a strong desire to lay a cable under the Atlantic, but it was the scale of the project rather than doubt over its possibility that helped it to be seen as the greatest possible experiment. In 1842 Professor Morse was conducting experiments in the harbour of New York and the canal at Washington to prove his idea that a cable across the Atlantic was possible.<sup>31</sup> Also the Brett brothers, who were the first to establish an international submarine telegraph to France, had initially planned to take the cable to America. In 1845 Jacob Brett registered a company to unite Europe and America, however this was deemed too risky and large a scheme for such a young business, their fate was eventually sealed when an agreement was made with the French government to lay a telegraph cable between Dover and Calais.<sup>32</sup> Bernard Finn argues that these early entrepreneurs' ambitions to span the Atlantic derived from their belief that they weren't 'doing anything remarkable from a technological point of view', that the political and financial hurdles were greater obstacles.<sup>33</sup> This attitude could have been inherited from the railway projectors of the 1840s, for whom it seemed 'nowhere was out of reach' and their plans stretched to expansion internationally as well as nationally.<sup>34</sup> It was almost justified by the quick establishment of the Anglo-French cable, which was more of a political achievement than scientific or technological, but also demonstrates the infancy of the science as well as the possible naivety of the first

<sup>29</sup> *Illustrated London News* 31 August 1850, p. 186.

<sup>30</sup> *Scientific American* in Marsden & Smith, *Engineering Empire*, p. 178.

<sup>31</sup> W. H. Russell, *The Atlantic Telegraph*, (Wiltshire, 1972), p. 3.

<sup>32</sup> R. Bridgman, 'Brett, John Watkins (1805–1863)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edn, Jan 2011; <http://www.oxforddnb.com/view/article/3345?docPos=4> (28 June 2011 11.30am).

<sup>33</sup> B. Finn, 'Submarine Telegraphy: A Study in Technical Stagnation', B. Finn & D. Yang, ed., *Communications under the Seas: The Evolving Cable Network and Its Implications*, (Massachusetts, 2009) p. 9.

<sup>34</sup> P. Young, *Globalization and the Great Exhibition: The Victorian New World Order*, (Chippenham and Eastbourne, 2009) p. 164

entrepreneurs whose maturity had to be reached after a number of large cable failures and an 1860 government enquiry.<sup>35</sup>

Many of those who became telegraph engineers, or projectors of submarine telegraph enterprises, did not come from engineer or scientific backgrounds. Morse and John W. Brett had both enjoyed successful careers in the art world,<sup>36</sup> Cyrus Field who was to become the figurehead of the Atlantic cable enterprises was a successful New York businessman in the papermaking business, and John Pender who initially invested in the Atlantic cables and was to become the chairman of the world's biggest cables companies had started out as a textile manufacturer.<sup>37</sup> With a variety of backgrounds and fortunes there was a greater need to legitimise the experimental technology and so secure their reputation and prosperity. Marsden & Smith argue that engineers promoted a particular identity of the telegraph and consequently created an identity for themselves as the experimenters of this new technology, as 'telegraphic' or 'electrical engineers'.<sup>38</sup> Consequently their reputation was dependent upon the reputation of the telegraph, a relationship that had to be represented as exclusive to justify the projector or engineer's superior knowledge. This can be seen in the personal letters to *The Times* from engineers; on 24 April 1857 a letter from Charles T. Bright, Engineer to the Atlantic Telegraph Company who was later knighted for his work on the 1858 Atlantic telegraph cable, appeared in *The Times* refuting challenges made regarding the quality and design of the submarine telegraph cable. His tone was more than a little condescending, dismissing his antagonist, Mr Allan, by concluding:

'It would be more graceful for those who are without that knowledge of telegraphic matters which practical experience alone can teach to pause before they thrust forward their theories so positively'.<sup>39</sup>

Needless to say the 1858 Atlantic cable failed, and after the failure of the 1860 Red Sea cable there was a government enquiry to determine the 'best form for the composition and outer covering of submarine

<sup>35</sup> 1860 [2744] *Report of the joint committee of Privy Council for Trade and the Atlantic Telegraph Company to inquire into the construction of submarine telegraph cables*, hereafter *Report of Joint Committee on the construction of submarine telegraph cables*.

<sup>36</sup> Bridgman, 'Brett, John Watkins (1805–1863)', *Oxford Dictionary of National Biography*.

<sup>37</sup> Finn, 'Submarine Telegraphy', p.19.

<sup>38</sup> Marsden & Smith, *Engineering Empire*, p. 179.

<sup>39</sup> *The Times* 24 April 1857.

telegraph cable'.<sup>40</sup> This enquiry was to put an end to the experimental nature of submarine telegraphy enterprises, and also helped to reinforce the close-knit community of telegraphic and electrical engineers, determining conclusions through numerous experiments and interviews with 'gentlemen conversant with the subject'.<sup>41</sup>

In contrast to these select communities, the cable's identity as an experiment, at a time when the popularised view of science equated experiment with entertainment,<sup>42</sup> enabled it to appeal to a wider public. This was seen in the public interest in the material qualities of the cable, and the public debates on cable routes, as well as its relation to the unknown and dangerous. The Anglo-French cable demonstrated the initial intrigue produced by the submarine telegraph cable; reports were published of the Duke of Wellington's request for a cable specimen the day after the cable's failure,<sup>43</sup> furthermore members of the public, took slices of the cable as it lay in the dock in Dover.<sup>44</sup> Displays of the cable also underlined the public confusion and interest; in his book retelling the 1865 attempt to lay the Atlantic cable, W. H Russell recounts an urban myth in which the fisherman who accidentally cut the first Anglo-French cable believed he had discovered a new type of seaweed and displayed it as such in Boulogne.<sup>45</sup> A slightly more reliable story from the *Illustrated London News* described how a section of the cable was put on display in the Museum of Calais 'in juxtaposition with the balloon of the celebrated aeronaut, Blanchard, who, in 1795, made his first supramarine voyage from Dover and Calais'.<sup>46</sup> Both of these displays were in France, and so it is not surprising that the sections are not displayed as examples of British expertise. The display in Calais is alongside that of a French inventor, Jean-Pierre Blanchard, and is a display of progress as well as experiment, the balloon trip took two and half hours, and despite Blanchard's success, ships were still the main method of communication over water.

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<sup>40</sup> 1860 [2744] *Report of Joint Committee on the construction of submarine telegraph cable*, p. v.

<sup>41</sup> *Ibid*, p. v.

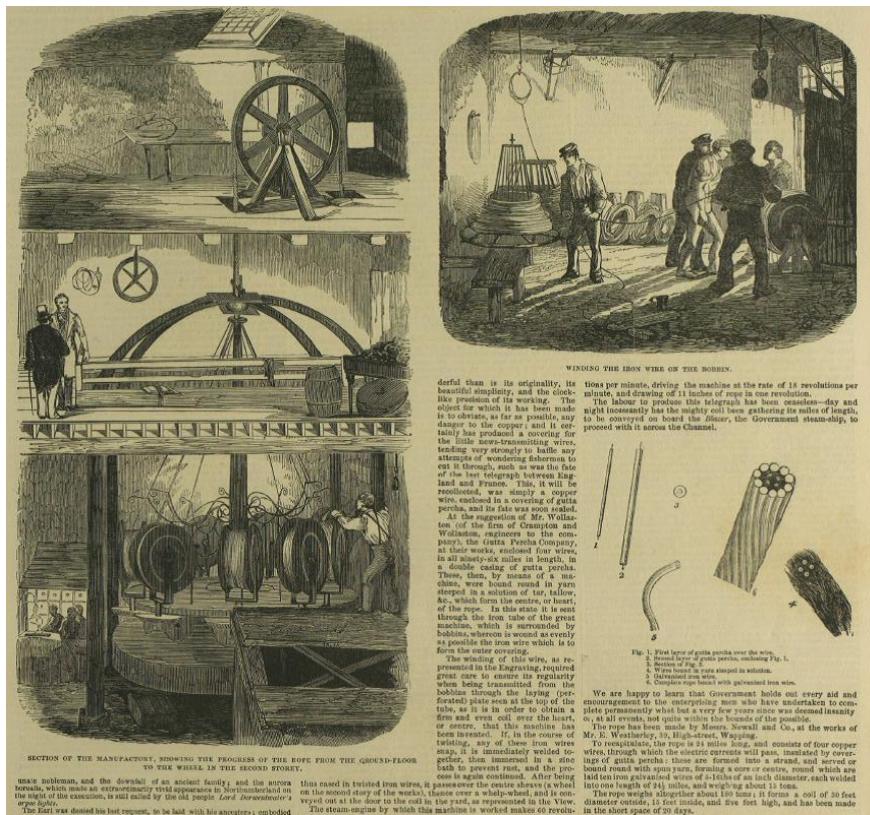
<sup>42</sup> A view cultivated through the Royal Institution lectures and the British Association for the Advancement of Science's annual scientific jamborees – see J. Gregory & S. Miller, *Science in Public: Communication of Culture and Credibility*, (New York, 1998) pp.21-3.

<sup>43</sup> *Illustrated London News* 7 Sept 1850, p. 250.

<sup>44</sup> *The Telcon Story 1850-1950*, (London, 1950) p. 31.

<sup>45</sup> Russell, *The Atlantic Telegraph*, p.4.

<sup>46</sup> *Illustrated London News* 4 October 1851, p. 410.

Fig. 2. *Illustrated London News* Demonstrating the Anglo-French cable

The cable as an experiment can also be seen in newspapers as well as the International Exhibitions. The *Illustrated London News* championed the British invention in the reports of the 1851 Anglo-French cable, printing extensive details and engravings of the newly invented equipment to make the cable, along with images of the cable itself broken down into components.<sup>47</sup> Including this detail suggests the paper believed their readers would want to know and understand the material and science behind the cables, a belief that possibly stemmed from the popularity of the International Exhibitions in the second half of the nineteenth century. These Exhibitions had helped to create a forum for science education and popularisation, and so facilitated an interest in the material workings of the cable.<sup>48</sup> Submarine telegraph cables had a strong presence at many of the International Exhibitions after the Great Exhibition of 1851, where Thomas Crampton, a successful Railway engineer who financially supported the Bretts and their submarine

<sup>47</sup> *Illustrated London News* 27 Sept 1851, p. 397.

<sup>48</sup> R. Brain, *Going to the Fair: Readings in the Culture of Nineteenth-Century Exhibitions*, (Cambridge, 1993) p. 17.

telegraph, announced that the Anglo-French cable had been laid successfully.<sup>49</sup> The preceding exhibitions were used as an arena to promote and publicise recent innovations or potential rivals to the established submarine telegraph cable materials, giving an impression of a persistent experimental edge to the technology. Even after the 1860 enquiry we can see exhibits from companies like Wells & Hall at the 1862 London International Exhibition with specimens of submarine cables complete with patented crisscrossed steel wire ropes, designed to 'prevent twisting, kinking or any perceptible elongation'.<sup>50</sup> Furthermore at the Paris Universal Exhibition in 1867 a French and British company were both separately exhibiting alternatives to the established insulator for submarine telegraph cables, Gutta Percha, and S. E. Morse exhibited models of newly proposed methods of laying and picking up submarine cables.<sup>51</sup>

The route of the submarine telegraph cables also invited public interest and, occasionally, public debate. The failure of the Anglo-French cable, due to the cutting of a cable by a local fisherman, highlighted the importance of a well-chosen route.<sup>52</sup> This encouraged public debate on the route of the Atlantic cable, fuelled by a basic knowledge of the cable's electrical properties. The longer the cable the weaker the signal, and so the argument focused on whether it should be one continuous cable or if it should have stop offs along the way.<sup>53</sup> In 1854, a continuous cable was eventually decided upon, made possible by Lieutenant M. F. Maury's discovery of a plateau on the seabed, of a regular depth and also not greatly affected by currents and waves.<sup>54</sup> Furthermore Kelvin's Mirror Galvanometer, an instrument that could read a very weak electrical signal, was patented in 1858 and made the relay of a message in the middle of the ocean unnecessary.

Science made a continuous cable possible, but it was politics that also decided the route, and set the pattern for future submarine telegraph cable routes. The Atlantic cable ran from Ireland to Newfoundland, two outposts of the British Empire; such routes became known as 'All-Red routes' and during 1858 there was a

<sup>49</sup> Bright 1898 p.10 from Marsden & Smith, *Engineering Empires*, p. 203.

<sup>50</sup> *The International Exhibition of 1862. The Illustrated Catalogue of the Industrial Department*, Vol 2 (1862) p. 42.

<sup>51</sup> R. Sabine, *Reports on the Paris Universal Exhibition 1867*, Vol 4 (1867) pp.521-530.

<sup>52</sup> *Illustrated London News* 21 Sept 1850, p. 250.

<sup>53</sup> 'An Electric Telegraph Round the World', *The Illustrated Magazine of Art* Vol 3 (1854) p.250-251.

<sup>54</sup> 'Lieut. M. F. Maury on the Feasibility of Oceanic Telegraphs', A Letter given to secretary of the Navy 22 Feb 1854, published in Briggs, *The Story of the Telegraph*, (New York, 1858) pp.221-224.

vibrant debate in *The Times* on whether the best route for a telegraph cable to India was over-land or submarine. Letters were published voicing a variety of opinions, either supporting a land or submarine cable, some supporting both. The people voicing these opinions spoke from experience of traveling in the region, and often came from the higher levels of British society and establishment.<sup>55</sup> In contrast liberal papers like the *Daily News* were more likely to be critical of the British government's conduct with the Turkish Empire than discuss the best route for laying a telegraph cable. In February 1858 they criticised violations of the British government in the Ottoman Empire, accusing it of being 'ignorant of the state of Mesopotamia and its inhabitants, of their relations to the [Ottoman] Porte, and of its views with respect to the admission of foreign influence into that country'.<sup>56</sup> Though *The Times* backed a submarine cable, and in doing so was able to give greater credence to the technology, it is clear that other sections of British society were not included in this debate and were perhaps still critical of the continued British and East Indian Company interference in the region since the Crimean War, which had only finished in 1856.

Engaging in debates of scientific, political and or economic relevance to the submarine telegraph cable was not the only attention-grabbing aspect of the cables. The submarine telegraph cables dealt with the unknown and mythical for many people, being laid hundreds and thousands of fathoms under the sea and being operated by electricity. Marsden and Smith describe electrical telegraphs as coming out of a 'context of philosophical experimentation' competing for public attention 'alongside shocks and sparks associated with the demonstrations and displays much beloved by popular lecturers and showmen of electrical science'.<sup>57</sup> Rhys Morus also points out that to some the 'telegraph's capacity to convey intelligence at a distance seemed positively magical', to do this across oceans probably seemed doubly so.<sup>58</sup> Many prints and cartoons associated with the cables featured mythical underwater beings, such as mermaids or Neptune, as well as translating the power and possibility of the cable; they could also be used to explain the apparently unexplainable. One such example was *Punch*'s cartoon suggesting that mermaids could have been the

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<sup>55</sup> See letters from Rev G. P. Badger, *The Times*, May 25 1858, pg. 7 & responses from F. R. Chesney & W. P Andrew, *The Times*, May 26 1858, pg. 10.

<sup>56</sup> *Daily News*, Feb 3 1858, p. 3.

<sup>57</sup> Marsden & Smith, *Engineering Empire*, p. 187.

<sup>58</sup> Rhys Morus, 'The Nervous System of Britain', p. 457.

reason for the failure of the 1865 cable.<sup>59</sup> In reality the cable had been dropped whilst being picked up to fix a fault, highlighting the absence from news reports on the practicalities of laying the cables, instead focusing on possible dangers.<sup>60</sup> Some of these dangers lay in the power of currents or the interference of sea creatures: the 1858 Atlantic Cable had nearly been snapped by a passing whale, and there was still some uncertainty about steamships. Though the projectors of steamships promoted them as symbols of technological and scientific progress, in the mid-nineteenth century they were still seen as liable to 'run ashore, [or] go missing with all passengers and crew'.<sup>61</sup> The unpopularity of the *Great Eastern* as a passenger vessel had led to it becoming a cable ship, bringing two of the biggest engineering experiments together in the laying of the 1865 and 1866 Atlantic cable.

The Submarine telegraph cable as an experiment had encouraged communities of projectors, engineers and scientists to converge around it, but it had also provided it with a larger public audience intrigued by the dangers as well as the science behind this new technology. The scale of the Atlantic cable project grabbed the public's imagination and the possibilities seemed endless.

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<sup>59</sup> Marsden & Smith, *Engineering Empire*, p. 215.

<sup>60</sup> Russell, *The Atlantic Telegraph*, p.77.

<sup>61</sup> Marsden & Smith, *Engineering Empire*, p. 98.

## Celebrating the Atlantic Cable: a Great Achievement

Between the success of the first international submarine telegraph cable in 1850, and the government enquiry of 1860, or even the sucessful laying of the Altantic cable in 1866, the transition of the cable's identity from experiment to achievement was a slow process. The identity of achievement was reinforced through celebration rituals among those individuals closely associated with the telegraph cable and with invested interests in its success, namely the projectors, scientists, engineers and investors. Alternatively public attitudes towards the cable as an achievement suggest that the achievement was greater if the experiment was also great. Through these acts of celebration, different communities strengthened their identity with the submarine cables, and the production of cable related commodities demonstrate a brief, but broad, appeal for cable merchandise.

The early establishment of the rituals of celebration among the projectors, investors and engineers was important to reaffirm the business relations as well as the achievement, prestige and importance of the submarine telegraph cables. This ritual normally consisted of celebratory dinners and congratulatory telegraph messages between countries. The 1851 Anglo-French cable saw congratulatory messages were sent to the President of the French Republic 'direct from England to Paris' as well as to the King of Prussia and Emperor of Austria at Berlin and Vienna, with 'messages ... also transmitted to London from the principal cities in Europe who were included in the Continental system of telegraphic communications'.<sup>62</sup> That evening 'entertainment was given' to 'those English gentlemen, promoters of the undertaking, who were on the spot, and had assisted in its completion' as well as other international representatives from French and Prussian governments and science establishments, at the Hôtel de Ville.<sup>63</sup> Similar celebrations for the preceding cables are seen, and as the political and financial significance of the cables grew, so did the private celebrations. The celebrations of the 1858 Atlantic cable saw a banquet held at the Metropolitan Hotel in New York hosted by the Mayor and attended by British government officials as well as those directly

<sup>62</sup> *Illustrated London News* 4 October 1851, p. 410.

<sup>63</sup> *Illustrated London News* 4 October 1851, p. 410.

involved in the laying of the cable. In 1866 there were a number of celebrations including banquets held by the Liverpool Chambers of Commerce and then another hosted by the Lord Mayor of London a few weeks later.<sup>64</sup> The Red Sea cable of 1870 saw a party at the house of John Pender, the chairman of all the cable companies established to lay the long cable across Europe between Bombay and England. The political importance of this cable is demonstrated by the presence of royal guests including the Prince of Wales and the Duke of Cambridge, alongside eminent men of science and the Captain of the *Great Eastern*, confirming the established partnership between politics, science and industry.<sup>65</sup> Part of the evening's entertainment included a telegraph office being set up and friendly message sent across the world including to the Viceroy of India and the President of the United States.<sup>66</sup> These rituals were used to reassure financial and political backers of the efficiency and capability of the technology as well as reinforce the relationships established to build and lay the cable and run the submarine telegraph business.



Fig. 3 Albert Norris Cable Brooch, © NMM

As an extension of these rituals, gift giving and exhibitions were an extra way of publicising the achievements of the cable as well strengthening ties and association with the growing cable community. Unique or personalised gifts were a way to create a personal connection to the cable and the extended cable community, and the more extravagant the gift the greater the associated achievement. Through the NMM's

<sup>64</sup> *The Times*, 2 October 1866, pg. 7 & *The Times*, 31 October 1866, pg. 12.

<sup>65</sup> *Illustrated London News* 2 July 1870, p. 18.

<sup>66</sup> *Illustrated London News* 2 July 1870, p. 18.

collection we can see items that were given to those involved in the laying of the Atlantic cable of 1866. Two of the most unusual and beautiful objects the National Maritime Museum holds, connected to the submarine telegraph cable, were made for Albert Norris, an engineer on Brunel's *Great Eastern* during its transatlantic cable-laying voyages in 1865 and 1866. They include an engraved nautilus shell depicting the *Great Eastern* and a brooch which holds a sepia photograph of Norris and a section of cable.<sup>67</sup> The brooch contains a cross section of the Atlantic cable and not only gives Norris a personalised souvenir it provides a tangible reminder of the cable and the work carried out. The connection between engineer and the technology on an item designed to be worn is very personal. The cable section and photograph are on a pivot, but the use of the engineer's photograph suggests that the object would have been made for a spouse of another close female relative to wear, rather than the engineer himself. The act of giving gifts for a man's extended family is also seen within Porthcurno Telegraph Museum's collection, which hold photographs of two silver pendants with sections of Atlantic cable encased, reportedly given to Sir Culling Eardley for his two daughters.<sup>68</sup> Though these items are for female family members of engineers or investors, it reaffirms the homogeneous community around the cable. The attempt to associate the cable with jewellery gives a section of cable greater aesthetic and monetary value, and producing a physical and intimate symbol of the projects prestige and wealth.

<sup>67</sup> NMM object no. ZBA4448 & ZBA4449.

<sup>68</sup> PTM object no. DOC//10/71.



Fig. 4 Nautilus Shell, © NMM

In many ways the shell is similar, it is an overtly beautiful object, something to be admired, however it has a narrower audience, focusing on an established cable community. The engraving reads:

'The embellishments on this shell are executed with a common penknife by C Wood who had the distinguished honour of presenting a similar shell engraved with the same rude graver to her Majesty the Queen.'

The other side has the Royal Standard and American stars and stripes and the inscription:

'Presented to Mr Albert Norris by Mr George Tansley as a tribute of respect for his kind and gentlemanly behaviour towards myself and all shipmates who had the pleasure of enjoying his company on board the *Great Eastern* Stm Ship during the two eventful voyages in laying the submarine telegraph cables across the Atlantic.....'

.....Signed Capt J Anderson Commander George Beckwith Engineer.<sup>169</sup>

This suggests that there were more than one made, at least one was made for Queen Victoria, which suggests that the receivers were to feel extremely honoured in being associated with the Queen. It also is being given for nothing more than 'kind and gentlemanly behaviour' suggesting that those involved firstly

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<sup>169</sup> NMM object no. ZBA4448.

had the money to buy gifts for small gestures of kindness, but are equally, if not more, 'kind and gentlemanly' in giving the gift. The depiction of the *Great Eastern*, along with a list of its dimensions, emphasises the scale of the project and the centrality of the ship in the enterprise. The strong presence of the *Great Eastern*, with the shell, not only aligns Norris with the cable but with the Atlantic Ocean, portraying the laying of the cable with maritime significance. It is an object that puts esteem and status on both the giver and the receiver and reaffirms their position within the small homogeneous cable community, in addition to confirming the individual's distinct role and importance, which objects like the brooch and pendant also do.



Fig. 5 1858 Atlantic Cable Medals, © NMM

The NMM also holds medals made to commemorate the 1858 and 1866 Atlantic cable; these objects are similar to the nautilus shell in that they can be seen to reaffirm the giver and receiver in their relationship to a prestigious and important achievement, and also present strong maritime links. However they also represent the strong commercial links the submarine telegraph needed and developed, and consequently demonstrate the aspect of the cable's identity as a commercial achievement. The 1858 medal was made by Tiffany & Co and contains classical and mythological imagery that can also be seen in many of the celebratory lithographs created around the same time. On one side there is a large globe showing the Atlantic, across which the figure of Science and a sailor draw a cable, to emphasise the point there are scientific and naval emblems behind them. Below the globe are three round medallions, on the larger,

central one, the god Mercury is surrounded by merchandise; the other two bear the British Royal arms and the American eagle. Finally above the globe there is a dove with an olive branch in its beak. On the reverse there are two men-of-war, stern to stern, with cable between, the American steaming to the left, the British to the right and there are two other ships in the distance. Similar to the shell and brooch this medal was specifically made for someone, John B. Mitchell R.N, and his name is engraved, as is the name of the organisation that had the medals made, the New York Chamber of Commerce. The medal, made in 1866, was also made by an American Chamber of Commerce based in Liverpool. This has less classical imagery, but more Latin script and the laurels of peace make an appearance, also a prominence given to coats of arms possibly signifying the elite audience, and the *Great Eastern* has a central role. This medal is not engraved with a name, but according to a report in the *Illustrated London News* the Chamber of Commerce made the medals to present to 'Sir Samuel Canning, the chief engineer; Mr Cyrus Field of New York, the original projector of the Atlantic Telegraph; Sir James Anderson, the commander of the *Great Eastern* steamship;; and Mr Willoughby Smith, the electrician in commemoration of the successful laying of the Atlantic Telegraph cable.'<sup>70</sup> The role of the Chamber of Commerce and the location of Liverpool, the location for many of the investors, clearly point to money and trade as being the main motivation of the medal.<sup>71</sup> This motive may be draped in classical and mythological jargon, but ultimately these medals are small shiny reminders of the money and investment involved in making and laying these cables, as well as, the potential profits. The economic value of the telegraph industry in the nineteenth century can be seen in the Croll Testimonial, and the Pender trophy.

The silver Croll Testimonial is a large silver plated rose-water fountain, it was made under the instructions of the shareholders of the United Kingdom Electric Telegraph Company to show their appreciation to Colonel Angus Croll for his role in negotiating favourable terms for them during the nationalisation of the domestic telegraph system, between 1868 and 1869.<sup>72</sup> It was commissioned from Stephen Smith & Co. of London and

<sup>70</sup> *Illustrated London News* 30 March 1867, p. 318.

<sup>71</sup> Marsden & Smith, *Engineering Empire*, p. 207.

<sup>72</sup> Present given to Angus Croll for negotiating a good deal for stakeholders when the national telegraph system was nationalised. White, 'The Croll Testimonial', *Friends of the Clockmakers' Museum Newsletter*, issue 4 (2009) pp.2-3.

cost one thousand guineas, complete with glazed showcase it stands four feet square and seven feet high and is now in the care of the Clockmakers Museum. The Pender Trophy was made to celebrate the Silver Jubilee of the establishment of submarine telegraph lines to the Far East and to honour the submarine telegraph magnate, John Pender.<sup>73</sup> The trophy contains 1500 ounces of silver and measures four foot six inches in length and four foot high, and was presented by the Staff Representatives of the Eastern, Eastern Extension, and Associated Telegraph Companies, it is now in the collection of the Mozzafarin Jewellery.<sup>74</sup>



Fig 6. Atlantic Cable Case, © NMM

With the establishment of the submarine telegraph cable identity as an achievement, the arrangement of the cable sections in a presentation box became a lot more popular. These are objects strongly associated with the cable companies and were a popular representation of the prestige and importance of the achievement of the submarine network. These were carefully crafted items of display, presenting the cable as a luxury item, as well as, the scientific and technological ingenuity that was involved, seen in the variety of cable size and design often represented. There are few or no presentation cases for the early Anglo-French

<sup>73</sup> <http://atlantic-cable.com/Books/1894ETFestivals/Pender-01.jpg> Atlantic-cable.com (26 July 2011 7:41).

<sup>74</sup> <http://atlantic-cable.com/Books/1894ETFestivals/index.htm> Atlantic-cable.com (26 July 2011 7:41).

cables, they appear to have come into fashion, or use, after the first Atlantic cable. This may have been because more investors were needed for the bigger projects like the Atlantic Cable and the Red Sea Cable, and so more elaborate gifts to encourage and thank investment. Alternatively they could have been used as a way to demonstrate the successful cables already in use and the different types of cables available. This can be seen in one of the cable cases at the Porthcurno Telegraph Museum which holds 40 cable samples made by the cable manufacturer Glass Elliot & Co. showcasing 32 contracts.<sup>75</sup> Looking at the provenance of the National Maritime Museum's cases it seems that though they had a strong role within the cable community, they were also present in the public domain. A case of Atlantic Cables was acquired with the oil painting 'From Sheerness to Valentia' by Robert Dudley one of the dignitaries invited on to the *Great Eastern* to record the journey. The painting and the cable display case were acquired from the great-granddaughter of Sir George Elliot, one of the founders of Glass Elliot & Co, which later merged with the Gutta Percha Company to create the Telegraph Construction and Maintenance Company, of which Elliot became director.<sup>76</sup> There is also a display case for the Suez-Aden cable dated 1883, it is the latest of the cable display cases, and appears to have been a mark of prestige within the cable company. The donor had received it from a manager whilst working at Cable & Wireless, who in turn had been given it whilst working for Cable & Wireless' predecessor, The Eastern & Western Telegraph Company.<sup>77</sup> In both these circumstances the trajectory of the object was restricted within the cable companies; though from a cable case of the Falmouth, Vigo and Lisbon cable, made in 1871, we can see that these cases did venture out into the wider public. It came to the NMM through the Mercury Collection, a museum collection put together by Sir Charles Hoare. Hoare never travelled far outside the United Kingdom, but together with his wife Margaret, he collected furniture, paintings, ship models and antiques, including the cable display case, housed in a private museum associated with the training ship, *Mercury*, founded in 1885.<sup>78</sup> The other cases owned by the NMM, unfortunately, do not have much information on the objects' provenance, however through Hoare it is clear they were able to get into the public domain, all be it in a heavily maritime focused domain. Anyhow these

<sup>75</sup> Porthcurno Telegraph Museum object C290.

<sup>76</sup> NMM object ZBA001 for documentation see X95/023.

<sup>77</sup> NMM object ZB2294 for documentation see X2002/005.

<sup>78</sup> NMM object AAB0151.

cases are ultimately linked to the company that commissioned them, they may not always have an association to a specific cable line, or ship, but they always detail the company. This is best demonstrated by the sheer number and variety owned by the Porthcurno Telegraph Museum, which of course preserves the Cable & Wireless archive, and exemplified by a silver cable case, inscribed as being presented to the Prince of Wales in 1906, it contains samples of the Aden to Bombay cable, or Red Sea cable, but the biggest inscription is the company name, the Eastern Telegraph Company.<sup>79</sup> It is a perfect example of the powerful relationship the cable company's came to hold with the British government. Once the system was established cables were able to sustain 'British wealth and power', not only controlling naval and military forces, but also controlling news flow and dispatches that could be used to manipulate public opinion, furthermore they 'reinforced London's position as the banking, investment and insurance capital of the world'.<sup>80</sup> These cases act as portable reminders of this achievement.

Besides developing rituals of celebrations, giving of gifts and the presentations of cable sections, exhibitions were used within celebration events, and can demonstrate the transition of the submarine cable's identity. The exhibition arranged as part of the Pender party in 1870 did not include any cable sections, according to the 'Souvenir of the Inaugural Fete in Commemoration of the Opening Direct Submarine Telegraph with India', the exhibits were all 'scientific instruments never seen by the public before'.<sup>81</sup> After the government enquiry and successful laying of the 1866 Atlantic Cable and the 1870 Red Sea cable the achievement of the cable itself was secure, instead the exhibition demonstrated the scientific difficulties overcome by some of the great minds at the party in the establishment of submarine telegraphy to America and India. It celebrated scientific ingenuity, and more importantly the great men associated with these scientific experiments and achievements. Exhibits included Sir William Thomson's submarine cable recording instrument, Lord Lindsay's electro-magnet, and Thomson's mirror galvanometer. The exhibition of electrical scientific instruments can also be seen at the celebrations of the 25<sup>th</sup> anniversary of submarine telegraph

<sup>79</sup> Porthcurno Telegraph Museum object C290.

<sup>80</sup> B. Hunt, 'Doing Science in a Global Empire: Cable Telegraphy and Electrical Physics in Victorian Britain', in B. Lightman ed., *Victorian Science in Context* (Chicago, 1997) p.320.

<sup>81</sup> Porthcurno Telegraph Museum Archive DOC/BISTC/6/2.

communication with the Far East in 1894 however sections of cable had been added to the display under the title of 'Deep Sea Curiosities'. In this exhibition 'specimens of types of cable' from various lines laid by the Eastern Telegraph Company, possibly quite similar to those seen in the mahogany cases, were exhibited next to specimens of 'recovered' or 'picked up' cable, some with marine life growing on them and examples of deep sea wildlife including boring worms and snakes. Alongside maps and models of cable ships including the *Great Eastern* this exhibition is clearly aimed at interesting a wider audience than that just interested in science, (the number of guests was far greater than those at Pender's 1870 party), but it again presents the submarine telegraph cable industry as an achievement against adversities found in many guises including deep sea worms. Ultimately it displayed the conquering of an unknown world under the sea, an example of the imperial narrative that came to dominate the cable's representation towards the end of the nineteenth century.

The objects associated with private celebrations represented the cable as a great maritime or mythological achievement, capable of world peace, in order to strengthen the identity of a financial and industrial achievement. Similar representations were used to stimulate popular celebrations and cultivate a market for cable souvenirs. These representations can be seen in the public celebrations but it was the cable's transition between experiment and achievement that cultivated the biggest public celebration in 1858. Compared to other cables this saw an unprecedented outpouring of popular jubilation, exercised through public processions in American cities, the selling of a vast amount of souvenir sections of cable, and the creation of lithographs and engravings. Reports of the festivities singled out New York City as having the 'most remarkable popular demonstration' and saw military and civic processions, including a torchlight parade from the Firemen, a spectacle considered so brilliant it was depicted in the engraving, 'Torchlight Procession around the World',<sup>82</sup> created to celebrate the new cable uniting the Old and New Worlds. The illumination of cities through fireworks, bonfires and electricity were the principal feature of the celebrations, the *ILN* reported 'not only the unparalleled thoroughfare, Broadway, was illuminated and decorated for two or three miles of its length, but the lesser streets were also brilliant in many-coloured

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<sup>82</sup> NMM object no. PAG8264.

'fires', City Hall became the centre of the activities 'lit up like never before' and the venue of a large firework display.<sup>83</sup> The clear relationship between electricity and the desire to illuminate celebrations, seen in the American festivities, underlined the excitement surrounding the possibilities of electricity as a new and experimental utility. The boisterous festivities in New York exemplified the atmosphere of danger and progress when the celebrations ended in disaster. The wooden tower next to the City Hall caught fire, and was completely destroyed leaving the City Hall badly damaged.<sup>84</sup> This could have been an omen for the eventual fate of the Atlantic cable itself, but did not discourage entrepreneurs intending to capitalise on the popularity of the technological achievement. Charles Tiffany of Tiffany & Co, the prestigious New York jewellers, was selling souvenir sections of Atlantic cable. Tiffany's had arranged to buy the surplus cable from Cyrus Field and advertise them for sale, according to an advert in *Frank Leslie's Illustrated Newspaper* the sections of cable were cut into sections four inches long and sold for fifty cents each 'in order to place it within the reach of all classes and that every family in the United States may possess a specimen of this wonderful mechanical curiosity'.<sup>85</sup> Tiffany's wasn't the only company to see an opportunity and soon adverts were appearing in London of Atlantic cable 'set as a charm in gold or silver gilt' by Edwards and Jones of 161 Regent Street and A. H. Williams of 46 Cornhill, both listed in the London Trade Directory as ordinary stationers, underlining the availability and perceived market of these objects.<sup>86</sup> Considering the range of cable souvenirs that survive in museums today we can also assume that these weren't the only companies selling cable sections. The Porthcurno Telegraph Museum has several sections of the Tiffany cable sections, however neither the National Maritime Museum or Science Museum have one of these, though the Science Museum does have a section of 1858 cable with a certificate of authentication from Cyrus Field, underlining one of the fears that other, unauthorised, cables were being sold.<sup>87</sup> The collections of the Porthcurno Telegraph Museum and Science Museum demonstrate the variety of display, including a cable-tree and

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<sup>83</sup> *Illustrated London News* 25 September 1858, p. 296.

<sup>84</sup> *Illustrated London News* 25 September 1858, p. 296.

<sup>85</sup> As quoted by C. Philips, 'Tiffany's Early Transatlantic Style', *Journal of Antique Metalware Society* No. 14 (June 2006), p. 48.

<sup>86</sup> *Illustrated London News* 14 August 1858, *Illustrated London News* 4 September 1858 & *Post Office London Directory* 1858 p. 975 & p. 1413.

<sup>87</sup> Science Museum object no. 1974-443.

sections of cable on watch chains,<sup>88</sup> however these have only been collected fairly recently, demonstrating the change in collecting policies to look at the social stories of objects and misrepresenting the possible numbers that were produced. Items still appear on eBay occasionally, where one of the staff members of Porthcurno Telegraph Museum bought the section of cable on a watch-chain, and at the time of writing a Tiffany & Co. section of cable was on sale.<sup>89</sup>



Fig. 7. Bacon's Chart of the Atlantic Telegraph, © Cable and Wireless Archive

These sorts of cable section souvenirs appear to disappear after the 1858 cable failed, and what is notable in the objects produced to celebrate the later 1866 cable is the prominence of the *Great Eastern*. Though the government enquiry had attempted to remove the experimental identity of the submarine cable the presence of the *Great Eastern*, a ship yet to prove its worth, there was still an experimental edge to the enterprise.<sup>90</sup> The involvement of the great ship made the project appear on a grander scale and shifted the representation of the cable. Similar to the early projectors whose reputations were intrinsically linked to that of the cable, the identities of the *Great Eastern* and the submarine telegraph cable became one of

<sup>88</sup> Science Museum object no. 2000-578 & PTM object no. 2000PK009.

<sup>89</sup> eBay website [http://www.ebay.co.uk/itm/TIFFANY-1858-ORIGINAL-ATLANTIC-TELEGRAPH-CABLE-C-FIELD-190566106215?pt=UK\\_Collectables\\_RadioTelevision\\_Telephony\\_SM&hash=item2c5ea00467#ht\\_2600wt\\_1139](http://www.ebay.co.uk/itm/TIFFANY-1858-ORIGINAL-ATLANTIC-TELEGRAPH-CABLE-C-FIELD-190566106215?pt=UK_Collectables_RadioTelevision_Telephony_SM&hash=item2c5ea00467#ht_2600wt_1139) (16 August 2011 17:00).

<sup>90</sup> Marsden & Smith, *Engineering Empire*, p. 213.

experiment and achievement. Consequently the British-made images and memorabilia of the 1866 Atlantic Cable often put the *Great Eastern* at its heart. The American lithograph ‘The Eighth Wonder of the World’ has a very small *Great Eastern* in the centre of the image, dwarfed by the giant Lion and Eagle, but it plays a bigger role in the British produced images, such as ‘The *Great Eastern* Leaving Sheerness with the Atlantic Telegraph Cable on Board June 1866’, an engraving by Thomas Goldsworth Dutton published by Day & Son,<sup>91</sup> or the ‘Bacon’s Chart of the Atlantic Telegraph’ which was a fold out history of the Atlantic Cable that included maps, sections of cable, and a large image of the *Great Eastern* as a centre piece.<sup>92</sup>

The popularity of *Great Eastern* imagery, or the representation of the cable as an experiment or achievement were not the only factors that developed a popular desire to be part of the achievement by owning a souvenir. The Atlantic cable was the only cable to produce mass marketed souvenirs; this was related to the relationship between Britain and the United States of America, as well as the perceived benefits the cable would bring. This relationship was based on the strong trade, migration and intellectual transfers that had been established for centuries, and was exemplified by the many Atlantic coastal cities, which by the 1880s, Harvie asserts, were more closely bound by trade and work than they were with their national hinterlands.<sup>93</sup> In addition, by bringing these two countries together, the Atlantic cable was portrayed as being capable of bringing world peace and spreading liberty. Demonstrated by the number of broadsides and lithographs such as the ‘Eighth Wonder of the World’ and the ‘Torchlight Procession around the World’,<sup>94</sup> which I will look at more closely in the next chapter, as well as the cartoons such as the image published in *Punch*, issue 35 in 1858, which shows John Bull (England) and Jonathan (America) capsizing Neptune using the Atlantic cable over the title ‘The Atlantic Telegraph – A Bad Look Out for Despotism’<sup>95</sup>. Though this wasn’t an original representation of the cable and the peacekeeping and civilising nature of the cable is also seen in the Anglo-French cable when *ILN* readers were reminded that the village of Sangatte,

<sup>91</sup> NMM object no. PAH9040.

<sup>92</sup> Porthcurno Telegraph Museum archive DOC//10/48/.

<sup>93</sup> C. Harvie, *A Floating Commonwealth: Politics, Culture and Technology on Britain’s Atlantic Coast 1860-1930*, (Norfolk, 2008) pp.58–85.

<sup>94</sup> NMM object no. PAG8263 & PAG8264.

<sup>95</sup> R. Noakes, ‘Representing ‘A Century of Inventions’: Nineteenth-Century Technology and Victorian *Punch*’, in L. Henson, G. Cantor, G. Dawson, R. Noakes, S. Shuttleworth, J. R. Topham, ed., *Culture and Science in the Nineteenth Century Media*, (Cornwall, 2004) p. 156.

the French location for the cable's landing was also the location from which Caesar's army launched his invasion of Britain, consequently describing the submarine telegraph cable as an 'emblem of the kind feelings and sympathies that now so happily unite the two most civilised and most powerful nations of our own times'.<sup>96</sup> However on the whole the cable to France was seen to simply connect Britain to Europe, and the Red Sea cable was seen to benefit the country, to a lesser extent, by bringing the colonies closer to Britain, and hopefully move away from the concept that 'News from India is like news from another world, and another age'.<sup>97</sup> And, to a greater extent, it was seen as important by certain sectors of British society, such as banking firms and the great commercial and mercantile houses for financial reason, best demonstrated by a petition from these sectors to Parliament asking for the establishment of telegraphic communication with the colonies to be established.<sup>98</sup> However these benefits were less appealing to the wider public, though of great interest to some readers in *The Times*, and didn't produce the amount of imagery or public celebration associated with the Atlantic cable.

The submarine telegraph cable was only identified as purely successful after 1866. Up to this point its dual identity, as an experiment and achievement, enabled it to be celebrated on a large scale; paired with experiments and achievements in electrical science and the maritime engineering, a mass market for souvenirs emerged. On the other hand the growing reliability and commercial possibilities encouraged a selective homogenous cable community that reaffirmed its identity and affiliation with the cable through celebration rituals, gift giving and exhibitions. After 1866 the public audience began to dissipate as possibilities of world peace and great ships became old news, whereas the select cable communities grew stronger.

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<sup>96</sup> *Illustrated London News* 25 Oct 1851, p. 514.

<sup>97</sup> *The Leeds Mercury*, 18 May 1858, p. 2.

<sup>98</sup> Hansard Lords 19 July 1859 vol 155 cc5-11.

## Commemorating the Atlantic cable: becoming a Maritime Relic

The 1894 'Exhibition of Deep Sea Curiosities and Electrical Apparatus', held at the Imperial Institute to celebrate the 25<sup>th</sup> anniversary of communication with the Far East, demonstrates how cables laid thirty-four years previously had already evolved into an object considered historical. The marine growth and associated items, such as boring worms and star-fish, were designed to incite curiosity but also to reaffirm the security and reliability of today's technology. Whether on display or placed in a private collection, these types of 'recovered' sections of cable assumed a role in reaffirming a collective memory of what was becoming an increasingly isolated industry both geographically and in terms of public awareness. Acting as sites of memory they supported and endorsed the establishments of smaller communities of cable men, in both the higher and lower reaches of society, in addition to satisfying a curiosity of the wider public. This final section will look at the ways the submarine telegraph cable has been commemorated and how this has contributed to its transition to be identified as a relic, furthermore how this act of commemoration has contributed to the creation of increasingly invisible cable communities.



Fig. 8. 'Torchlight Procession Around the World', © NMM

As one of the most popularly celebrated submarine telegraph cables, the Atlantic cable, has been one of the most successful in sustaining a presence in popular memory and consequently powerful in shaping how we view all submarine telegraph cables. This has been partly due to the amount of material that was produced to celebrate the cable and the amount written about the cable as a commemoration. An example of this is seen in the many lithographs and other engravings produced. The National Maritime Museum has two, 'Torchlight Procession around the World' and 'Eighth Wonder of the World'.<sup>99</sup> The Atlantic-cable website, a website devoted to the history of the Atlantic Telegraph cable, and a treasure trove of sources and articles, showcases many more.<sup>100</sup> The two held by the NMM were published in America and with objects like the Tiffany cable sections underline the nature of these objects as 'commodities by destination', they were designed to be sold, and subject to 'tournaments of value' they have found their way across the Atlantic.<sup>101</sup> These objects are designed for circulation, consequently they have an image of the cable to project, one ultimately designed to help the print sell. The 1858 lithograph, 'Torchlight Procession around the World', is openly dedicated to 'Young America' and uses the renowned image of the American fire-fighters' procession from the New York celebrations as the central image. These fire-fighters have taken their procession around the world, presenting the abstract idea of the submarine telegraph cable uniting the world as being facilitated through the fire-fighters. The image also displays four American men as the pillars of this achievement, Benjamin Franklin, pioneer of the use of electricity; Samuel Morse whose Morse Code was used to communicate on the telegraph line; Cyrus Field, the man often considered as the spearhead of the Atlantic cable project, and Captain Hudson of the US warship *Niagara*, one of the steam ships used to lay the transatlantic submarine cable. Besides their personal contributions, they are personifications of the four overriding themes in the history of the submarine telegraph cable, science, technology, business and the military. The lithograph shows the submarine telegraph as an American innovation and was now in place to promote American values around the world. The physical nature of the cable joining Britain and America is a

<sup>99</sup> NMM object no. PAG8264 & PAH9040.

<sup>100</sup> <http://atlantic-cable.com/Ephemera/Broadsides/index.htm> (16 August 2011 12:05).

<sup>101</sup> Appadurai, 'Introduction', pp. 13-21.

common feature in these lithographs and in this image the cable is used to frame the images joining Queen Victoria and Liberty as well as Neptune.



Fig. 9. 'Eighth Wonder of the World', © NMM

The later 'Eighth Wonder of the World' lithograph, produced in 1866, is less overtly American, though Cyrus Field is the celebrated figure at the top of the picture, and it also uses the physicality of the cable to join the countries, this time the mythical imagery focuses on the two powers, the giant lion and eagle symbolising England and America stand facing each other, emanating power but standing as equals across the Atlantic. These sorts of images contributed to the impression that the submarine telegraph cable was an Anglo-American and North Atlantic affair, an impression reinforced, as Bruce Hunt describes, in later accounts of Victorian Submarine telegraph.<sup>102</sup> The continual circulation of Atlantic cable artefacts has assisted the continued fame of the Atlantic cable, it is normally artefacts related to the Atlantic cable that you find on EBay, for example, but this was not the case for all the other cables.

After the 1866 Atlantic cable, the submarine telegraph cable started to become an increasingly distant achievement. Without universal benefits such as world peace, the relevance to the wider public seemed further away, and in general the public perception of the submarine telegraph cable followed the fate of

<sup>102</sup> Hunt, 'Doing Science in a Global Empire', p.318.

many other new inventions and innovations from the nineteenth century, as they became ‘normalised’ and an accepted technology they receded from the public realm. In the popular satirical journal, *Punch*, aside from the ‘flurries’ of interest around the 1865 & 1866 Atlantic cables, there had been a significant decline in telegraph news by the 1860s, suggesting they were ‘no longer seen as such newsworthy and effective sources of comedy or criticism’.<sup>103</sup> In other newspapers the style of reporting changed, reports of the Indian telegraph attempts in the late 1860s and in 1870 include familiar descriptions of cable innovation and British engineering expertise, but there is more emphasis on the exotic nature of the locations. Underlined in the *Illustrated London News* illustrations where machinery and ships were no longer the main subject, but instead, vast and exotic depictions of ports such as Elphinstone or Telegraph Bay, one image of the ‘Working Party at Argore’ in September 1863 features the Afghan Coolies doing a war dance in the camp.<sup>104</sup> The report of the successful laying of part of the Red Sea cable from Bombay to Aden was occupied by an elaborate description of Aden’s lofty volcanic ranges of ‘dead red colour like bricks that have been over baked’, and ‘jagged mountain summits stand out in a thousand fantastic shapes’.<sup>105</sup>

As a secure technology by 1870, and growing industry, submarine telegraph cables also became a physically distant technology. The invention of submarine cables had created a large industry, with technical colleges and factories with thousands of people working for the few large companies.<sup>106</sup> However cables were being laid in places further away and increasingly unfamiliar to the general public, demonstrated by the news coverage of the Red Sea cable. Also Porthcurno, in South-West Cornwall, had been established at the best place to land international submarine cables due to its remote location and sandy beach, free from dangerous rocks or fishermen. The growing desire to ring the world in cables had helped develop a ‘new imperialism’ which gave remote and sometimes deserted islands increased political significance as they became telegraph outposts, necessary to relay a signal on a long telegraph line.<sup>107</sup> In the public domain, as we have seen the news coverage had decreased, furthermore electric telegraphy only entered into fictional

<sup>103</sup> Noakes, ‘Representing ‘A Century of Inventions’, p. 153.

<sup>104</sup> *Illustrated London News* 19 Sept 1863, p.281.

<sup>105</sup> *Illustrated London News* 19 April 1870, p.368.

<sup>106</sup> Hunt, ‘Doing Science in a Global Empire’, p.320.

<sup>107</sup> Headrick, *The Tools of Empire*, p. 163.

literature after 1870 when most of the great experiments and publicised achievements were over.<sup>108</sup> Then when written about, in works such as *The Battery and the Boiler* or *Adventures in the Laying of Submarine Electric cables* by R. M. Ballantyne published in 1883, the isolation of the submarine telegraph worker was emphasised as are the exotic locations and dangers of foreign interference, helping to create a new myth and story around the cables as well as underlining their imperial utility.<sup>109</sup>

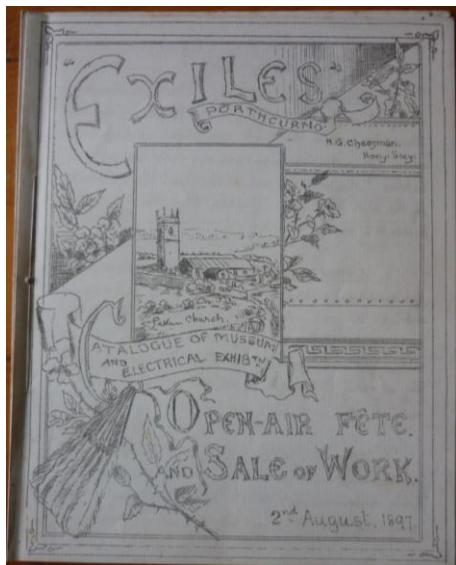


Fig. 10 Front Cover of the 'Catalogue of Museum and Electric Exhibition', © Cable and Wireless Archive

The remote identity of the cable and the men that worked so closely with it is emphasised, not only in the works of fiction, but by the cablemen themselves. The cablemen working for the Eastern Telegraph Company called themselves 'The Exiles', a reflection of the nature of work which took them to Porthcurno for training and then would send them to various outposts across the Empire.<sup>110</sup> This is demonstrated further at a small exhibition held at Porthcurno as part of an open-air fete to celebrate the Queen's jubilee in August 1897. A carefully hand crafted 'Catalogue of Museum and Electrical Exhibition' was produced and remarkably is still held in the Porthcurno Telegraph Museum archive. Through this catalogue we see that along with the 'Electrical Exhibits', there was a 'Collection of Curios', which included a section of cable first laid in the Red Sea, lent by Mrs Ash, the wife of the Superintendent at Porthcurno Telegraph station, however most of the exhibits appears to be souvenirs from foreign lands either acquired through foreign

<sup>108</sup> Menke, *Telegraphic Realism*, p. 163.

<sup>109</sup> Menke, *Telegraphic Realism*, pp.178-9.

<sup>110</sup> Nerve Centre of the Empire online exhibition, <http://www.porthcurno.org.uk/nerve-centre/empire> (31 August 2011 13:00).

postings or by other means. For example Mr J. W. Milward, an electrician who had previously been stationed at Carcavellos, Suez and Bombay, contributed items including a representation of an Indian idol, and an Arab brooch from Tripoli, whereas Mr Weaver, who had only been stationed in London and Marseilles before coming back to Porthcurno, exhibited silver bracelets made by the natives of British Guinea, a Chinese brooch, and a collection of Arab spears.<sup>111</sup> The workers in Porthcurno appeared to embrace this identity acquired by working with the cables.

Events like the open-air fete would have been useful for creating a feeling of community within Porthcurno, where those stationed could share stories of voyages and remote postings. For the wider community there was a cable journal, *The Zodiac*. *The Zodiac* was a staff magazine started in 1906 and distributed to workers around the world, and is evidence of a cable community around the world with a need to have a material connection with the company and each other. The importance of the identity and community's heritage is seen in 1912 when the magazine traced its origin back to the journal produced on-board the *Great Eastern* during the laying of the Atlantic cable, describing it as 'fitting the first Cable Journal (was) born pari-passu with the first Atlantic Cable, even more fitting it was born at sea'.<sup>112</sup> Not only does this repeat the actions of early projectors who sought the affiliation of the *Great Eastern* and Brunel, but it also places the origins of the cablemen community at the laying of the 1866 Atlantic cable. The nostalgic affiliation with the Atlantic cable reaffirmed their present identity working on the cable and their relationship with the sea; it aligned them with the greatest achievement in cable history enabling these cablemen to see themselves as the direct successors of the men on the 1866 voyage.

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<sup>111</sup> Porthcurno Telegraph Museum Archive DOC/EXC/9/1.

<sup>112</sup> *The Zodiac: The Cableman's Paper* Feb-March 1912 p.250.



Fig. 11. Founder's jewel for Telegraph Cable Lodge, No. 2470, 1893, © Library and Museum of Freemasonry

For the higher reaches of society within the cablemen community more exclusive and formal cable networks were desired, seen through the creation of a Telegraph Cable Freemasons lodge in 1893. The lodge was started with 11 founding members, including the Marquis of Tweeddale and Sir George Elliot as the Grand Master and Senior Warden respectively.<sup>113</sup> To establish a lodge the Grand Master had to have already been at least a Warden in another lodge, and from the petition to establish a lodge it is clear that most of the members, including Sir George Elliot were already members elsewhere. Despite already being Freemasons, it was felt a specific lodge specifically for cable men was needed, the lodge's declared aim was:

'to unite in brotherly association members and friends of the several telegraph companies and others interested in the advancement of submarine telegraphy and electrical science from various parts of the world'.<sup>114</sup>

The draft of the by-laws details the plan to restrict membership to men who worked or had worked in the cable industry; this was prohibited by the Grand Lodge, but simply became an unwritten understanding. Previously the establishment of identities such as 'telegraphic engineer' had been used as a way to associate the scientists or engineers with the experiment and potential achievement of the submarine cables. However by the end of the nineteenth century submarine telegraphy was an established industry and the

<sup>113</sup> Petition Papers for Lodge 2470 – The Telegraph Cable Lodge.

<sup>114</sup> A. H. Hooker, 'Telegraph Cable Lodge No. 2470. Centenary Souvenir', BE166(2470)HOO.

creation of this Lodge is evidence of the feeling of segregation within the industry in relation to other electrical engineers. The Society of Telegraph Engineers had decided to change its name to Institute of Electrical Engineers in 1887, bringing an increase in membership by 170 per cent between the years 1895 and 1914, nonetheless there was clearly a desire for an exclusive cable society.<sup>115</sup> The Lodge's opening speeches emphasised the contradictory nature of the higher levels of cablemen' identity, it celebrated the universality of the telegraph and the freemasons, but also demonstrated a demand for exclusivity.<sup>116</sup> The symbol used on the Freemason jewels, of two mermaids holding a shield above the Latin, 'Sub Mariubique', was also used on the Naval Telegraph Cable Service label badges, again demonstrating the close relationship between the British establishment and the Cable industry, as well as possibly underlining the origins of this desire for exclusivity.<sup>117</sup> Their work was important to the Empire and furthermore required specific technical skills and faced unique dangers and challenges through working in remote locations, at sea or in colonial outposts.



Fig. 12. Jug made to celebrate the 1858 Atlantic Cable, © NMM

The maritime affiliation of the submarine cables had always been present, but during the nineteenth century had become stronger and a more intrinsic part of the cable identity. Throughout the early depictions of the submarine telegraph cable maritime mythology had featured heavily, due to the many uncertain aspects of the ventures, including the fact that little was known about the bottom of the sea, and the invisible transfer of knowledge through the cable. The link to maritime commemoration is, unsurprisingly, best demonstrated

<sup>115</sup> IET website <http://www.theiet.org/about/libarc/archives/research/guides-iet.cfm> (31 August 2011 10:20).

<sup>116</sup> *The Freemason* 17 June 1893 BE910FRE pp.316-17.

<sup>117</sup> Founder's jewel for Telegraph Cable Lodge, No. 2470, 1893.

through the collection held at the National Maritime Museum, and particularly through the collection of ceramics and medals related to the Atlantic cables.<sup>118</sup> Due to the collecting objectives of the Museum these items may have been singled out for collection relating to objects the Museum already holds, for example a Samuel Plimsoll ‘Sailor’s Friend’ jug made in 1879 to commemorate Plimsoll’s role of the passing of the Merchant Shipping Act in 1876 which included several new safety measures for ships to follow including the Plimsoll line.<sup>119</sup> There is also an 1887 jug depicting two yachts, the *Thistle* and the *Volunteer*, which were, respectively, the British and American contenders for the 1887 America’s Cup, *Volunteer* won.<sup>120</sup> In terms of medals, there were medals created, in 1778, to commemorate the discovery of Hawaii by Capt. James Cook,<sup>121</sup> as well as a medal from 1877 commemorating Maritime and Piscatorial Exhibition.<sup>122</sup> As Chris Caple points out, this could be evidence of object bias, the result of the ‘unusual’ and ‘valuable’ objects surviving, paired with a collecting objective of the National Maritime Museum to collect from a naval or nautical perspective, could give an ‘inaccurate’ and ‘incomplete’ record of the material culture associated with the cable, emphasising a maritime link.<sup>123</sup> However the importance of the maritime affiliation to the submarine telegraph is underlined by its presence at the Royal Naval Exhibition in Chelsea, London. The largest submarine cable companies were represented, Siemens Bros had a kiosk, and the Telegraph Construction and Maintenance Company had a stall, as did the Indian Rubber, Gutta Percha & Telegraph Works co., Ltd. Models of cable ships featured heavily, sections of cable were exhibited including those ‘recovered after several years submersion, with marine growth attached’.<sup>124</sup> It’s worth noting that at this exhibition were galleries devoted to people like Rear-Admiral Sir John Franklin, the lost Arctic explorer, which contained ‘the interesting and pathetic relics of the several Artic expeditions’; and Admiral Nelson containing ‘the most interesting and valuable collection of Art treasures and Relics ever brought together’, underlining the strong

<sup>118</sup> NMM objects no. AAA5203, ZBA4385, ZBA4383, MEC228, & MEC1293.

<sup>119</sup> NMM object no. ZBA4386 <http://collections.nmm.ac.uk/collections/objects/383670.html> (17 August 2011 12:20).

<sup>120</sup> NMM object no. ZBA2290 <http://collections.nmm.ac.uk/collections/objects/248444.html> (17 August 2011 12:20).

<sup>121</sup> NMM object no. MEC2117 <http://collections.nmm.ac.uk/collections/objects/39557.html> (17 August 2011 12:20).

<sup>122</sup> NMM object no. MEC2873 <http://collections.nmm.ac.uk/collections/objects/40313.html> (17 August 2011 12:20).

<sup>123</sup> C. Caple, *Objects: Reluctant witnesses to the past*, (Oxon, 2008), p. 19.

<sup>124</sup> *Royal Naval Exhibition, 1891, Official Catalogue & Guide*, (London, 1891) p. 410 :

<http://www.archive.org/details/officialcatalogu00royarich> (11 August 2011 14:00).

connection between maritime collective memory and the creation of relics.<sup>125</sup> I would argue that partly due to this shared maritime identity that over time these sections of submarine telegraph cable began to assume a relic-like identity, but by the 1890s they were still considered more of a curiosity than a relic.



Fig. 10. Section of Anglo-French Cable, © NMM

The establishment of the cable's identity as a relic was a slow process, and the product of the cable becoming invisible to a wider public and the cablemen community becoming increasingly narrow. This transition is seen in the National Maritime Museum's collection of cable sections from private collections. Looking at these collections as the 'extended self',<sup>126</sup> we can see that through the collecting of the submarine cable specimens a person's identity as being one of the 'cablemen' becomes reaffirmed. Excluding the twenty or so cable sections that originated from the Royal Artillery Museum, the majority of single cable sections held by the Museum originate from individuals or relatives of those who have worked in the industry, and more often than not the cable is not the only item donated to the museum. Several sections of cable came from Sir Henry Clifford's collection, a Chief Engineer at the Telegraph Construction and Maintenance Company, which also included paintings and manuscripts,<sup>127</sup> a couple of sections came from R. H. Barter the skipper of the cableship the *Norseman* owned by Western Telegraph Co & stationed at

<sup>125</sup> Royal Naval Exhibition, 1891, Official Catalogue & Guide, (London, 1891) p. xv:

<http://www.archive.org/details/officialcatalog00royarich> (11 August 2011 14:00).

<sup>126</sup> Pearce, *Museums, Objects and Collections*, pp. 55-57.

<sup>127</sup> National Maritime Museum objects AAB0109, AAB0110, AAB0111, AAB0112, AAB0113, AAB0114 & AAB0115 for documentation see X88/046.

Pernambuco, in Brazil, for repair of faulty Atlantic & other submarine cables.<sup>128</sup> Similarly another couple of sections came from the collection of Captain Harry Manning, master of the *Kangaroo*, and it was received with his sea chest and a photograph of cableship *Kangaroo*.<sup>129</sup> Other sections of cable arrived as part of collections of relics; this included a section of Atlantic cable that came with other relics collected by Admiral Foote.<sup>130</sup> Another section of Atlantic cable came as one of the relics collected by a man described as a 'traveller' and whose other relics included a telescope made by Charles Tulley, a swordfish snout, an excursion ticket for the *Princess Alice* with a piece of wood from the wreck, and two stereoscope cards of the *Great Eastern*. Finally a section of the 1851 Anglo-French cable had belonged to a former seafarer turned customs officer, it came to the Museum with one of his writing boxes and papers belonging to his children who also went to work at sea, the piece was reportedly bought at Deal, Kent, where they were being sold for a shilling each.<sup>131</sup> Though these sections of cable are not defined as relics in the traditional sense, they clearly don't hold religious significance and are not the remains of people; they are remains of the communication system, previously part of the submarine telegraph network that was powered by electricity. Furthermore, though some sections were commodities at some stage in their lifetime, their presence within a private collection results in their value being projected by the owner, a value that depends on the life history of the object, they are more important and relic like because they have been 'recovered' or were part of a famous cable like the Atlantic cable.<sup>132</sup>

Moreover this identity has been reinforced through the acquisition of the sections by the National Maritime Museum and the act of commemoration is replicated through their being categorised as relics. With a few individual exceptions the lack of a public exhibition or display of the sections,<sup>133</sup> has prevented a reinterpretation of the objects, and they remain grouped together in stores. This segregation of the objects simulates their existence in private collections away from public display; in addition the cataloguing

<sup>128</sup> National Maritime Museum object no. AAB0117, AAB0118, AAB0119, & AAB0120, for documentation see X85/009.

<sup>129</sup> National Maritime Museum object no. AAB0123, for documentation see X82/009.

<sup>130</sup> National Maritime Museum object no. AAB0156, for documentation see NMM2024/4/49.

<sup>131</sup> National Maritime Museum object no. AAB0121, for documentation see X83/058.

<sup>132</sup> Appadurai, 'Introduction', p.23.

<sup>133</sup> NMM Object AAB0108 was featured in an 'Engineers' exhibition in the Neptune Hall gallery in the 1980s, and NMM object ZBA2294 was displayed within staff corridors in the East Wing. NMM objects AA0116, AAB0137 and BHC4252 have been previously been loaned to museums in Paris and Malta.

classification of the objects as 'relic' has replicated the veneration of the objects to relic status. Similar to the NMM the Science Museum has sections of cables that originate from the private collections of those who worked in the industry, but in contrast, both the Science Museum and Porthcurno Telegraph Museum have displayed their sections of cable in special exhibitions as well as permanent displays. The Science Museum's special exhibitions have included an exhibition celebrating the centenary of the first submarine telegraph cable in 1950 and another exhibition in partnership with the Smithsonian Institute in 1973.<sup>134</sup> The permanent exhibitions include the Science Museum's 'Making the Modern World' gallery which forms a timeline of inventions and scientific progress, and Porthcurno's South Tunnel, which has a case that displays the development of technology focusing on submarine cables from the early cables up to modern fibre optic cables. These displays work to reinforce the identity of achievement as well as experiment showing the development and accomplishments of the cable. However their presence within a museum, and alongside modern technology, also reinforces the identity of relic; the section of cable is a failed section of cable, it is no longer performing the activity it was made for and instead is venerated as a symbol of a past achievement and experiment.

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<sup>134</sup> Appendix 1: Temporary (Special) Exhibitions, 1912-1983, Morris, ed., *Science for the Nation*, pp. 317-323.

## Conclusion

After the achievement of the 1866 Atlantic cable along with the government enquiry of 1860, submarine telegraph cables were seen as an established technology and began to disappear from the public realm. Though, as popular interest waned, the cable communities, that had started to emerge from origins of the technology, started to grow. As they became more closely associated with the cable they looked for outlets of this new shared identity, the workforce of the industry used journals like the *Zodiac* and exhibitions to establish a heritage and associated identity. Alternatively the higher levels of society built on the established celebration rituals and gift giving by looking for exclusive networks to maintain their cable identity, possibly a symptom of the growing size of the commercial cable celebrations and broadening of professional societies. It is clear that, regardless of their social standing, the work of a cableman was considered, by the cablemen themselves, to be exceptional and with a rich heritage worth preserving. A heritage established through the popular depictions of experiment and achievement, and a connection with this was verified through the private collections of cable sections. It is this act of collecting that created the identity of a relic, an identity now replicated in collecting procedures and display (or absence of display) in museums.

Tracing the trajectory of the material culture created in the celebration and commemoration of the submarine telegraph cable, and analysing the objects' changing context and perceived value, has illustrated the transitions of the submarine telegraph's identity. The contrasting acts of exchange impose varying levels of interpretation and significance on the objects. The survival and circulation of objects created as commodities has helped sustain a memory of the most celebrated acts of experiment and achievement in the history of the submarine telegraph cable, the Atlantic Cable. However the addition of personalised objects, along with objects personally redirected from their original purpose, such as 'recovered' cable, also allowed private veneration of maritime achievements and experiment.

The invention of the internet may have helped to bring the submarine telegraph cables back into the realm of popular history, but we are still coming to terms with the legacy of these feats of engineering and science.

Few people realise that today 95% of our international communication is still through cables under the oceans and seas, though today fibre optic cables are obviously used; these are the successors of the first submarine telegraph cables.<sup>135</sup> Just as electricity and the telegraph cables created an invisible transfer of knowledge, this knowledge and technology of the cables too became invisible, partly the result of the decline in the industry and the decline of the Empire it was championed to sustain. In this sense the sections of cable, collected by cablemen, were not only representative of their own identity but of a declined power. These sections of cable are signs of a failed cable, which can only exist as a former part of a network of power and communication related to the decline of an Empire and the receding of a previously celebrated industry. The historiography of the submarine telegraph cable has emphasised the cables significance in imperial and scientific histories, and this role was clearly important to the cablemen working in the industry, but the current historiography has neglected to investigate the relationship between the cablemen and the cable, failing to underline the significance of creating cable relics. As a relic these objects encapsulate the cable's transition from experiment, achievement, that include a failure, but also their persistence in a collective memory cultivated and maintained by these silent cable communities.

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<sup>135</sup> M. Sechrist, 'Cyberspace in Deep Water: Protecting the Arteries of the Internet', in *Harvard Kennedy School Review*, vol 10 (2009-2010)

## Bibliography

### Archives and Primary Sources

#### National Maritime Museum

Please see the Appendix for a list of the objects studied, below is a list of the documents within the Museum's internal archive which records the acquisition of the respective objects.

X82/009	documents on object AA0123
X83/058	documents on object AAB0121
X85/009	documents on objects AAB0117 – AAB0120
X87/009	documents on object AAA5203
X88/046	documents on object AAB0109
X95/023	documents on objects ZBA0001 & BHC4252
X2002/005	documents on object ZBA2294
NMM8/1785	documents on object AAB0154
NMM8/2388	documents on object AAB0152
NMM8/5013	documents for object AAB0770
NMM2024/4/49	documents on AAB0156

#### Porthcurno Telegraph Museum

Below is a list of the objects and documents studied in the Porthcurno Telegraph Museum's archive, the items proceeded by 'DOC' are documents, of which some are printed; items proceeded by 'PHO' are photographs; the others are objects. These are currently being catalogued and so dates within the catalogue number may correspond to the date re-catalogued.

C290	SUBMARINE TELEGRAPH CABLE. DISPLAY CASE manufactured by J Sax in London containing provision for 45 cable samples made by Glass Elliot & Co. These represent 32 different contracts
2000PK009	CABLE SAMPLE, Watch-chain decoration made of 1858 cable section

1998-53	Framed photographs of exhibition in St John's Hall Feb 13 1879
2010PK001	Piece of Atlantic Telegraph Cable from Tiffany & Co., brass ring around the cable reads "Atlantic Telegraph Cable Guaranteed By Tiffany & Co. Broadway - New York - 1858"
DOC//34	J.N. Header, 'The Atlantic Cable', from <i>The Philosophical Magazine</i> , (Jan 1859)
DOC/BISTC/6/2	'Souvenir of the Banquet on the 25th Anniversary of Establishing a Submarine Cable with the Far East'
DOC//10/48/	Bacon's Chart of the Atlantic Telegraph
DOC/PCB/6/2	Visitor Book to International Exhibition, 1924
DOC/PCB/6/1	Visitor Book to International Exhibition, 1911
DOC//10/34	List of Atlantic Cable Collection
DOC//10/71/	Atlantic Telegraph Cable Pendant
DOC/EXC/9/1	Catalogue of Open-Air Fete
DOC/ECSTC/1/1	Dover to Calais cable agreement in French
DOC/EEACTC/6/5/1	Souvenir of the Banquet and Evening Fete
DOC/BISTC/6/2	'Souvenir of the Inaugural Fete in Commemoration of the Opening Direct Submarine Telegraph with India at Mr Penders'
DOC//10/18/Box 1865	<i>The Zodiac: The Cableman's Paper</i>
DOC//8/9	Palace of Engineering for British Empire Exhibition
PHO///10/4/1	Souvenir of Atlantic Telegraph
PHO///1026	Ladies Saloon on the <i>Great Eastern</i>
PHO/521	Cable Sample presented to Prince Philip
PHO///1000	Trophy to J. Pender
PHO///4001	Invitation to view <i>great Eastern</i> 1866

PHO/ATC/10123      Cable laying equipment on *Great Eastern*

PHO//1020      On Deck of the *Great Eastern*

PHO//1022      The *Great Eastern* as a floating exhibition

### **Science Museum**

Below is a list of the objects studied in the Science Museum's collection, the first number corresponds to the year the object was acquired with the following number detailing the nth object collected that year. The Science Museum keeps documentation related to objects in files that follow the numbering of the objects.

1862-148      Specimens of submarine telegraph cables 1851-62 from J. W Brett.

1892-78      Specimen of Henry Crampton's Dover and Calais telegraph cable, laid in 1851

1913-230      Specimen of first submarine cable laid between Dover and Calais, 1850

1919-350      Glazed case containing specimens of Atlantic submarine cables

1926-637      Three-foot length of the 1865 transatlantic telegraph cable

1950-230      Short length of the Cross-Channel submarine telegraph cable laid on 28th August  
1850

1958-192      Small specimen of the 1857 Atlantic telegraph cable

1958-197      Specimen of 1858 Atlantic telegraph cable

1964-85      Specimen of 1850 submarine telegraph cable

1970-57      Eight samples of Siemens telegraphic submarine cables

1970-69      Presentation case of submarine cable samples, France and North Sea to Morocco,  
1915

1970-71      Case of seven Atlantic submarine cable samples

1974-443      Sample of 1858 Atlantic submarine cable with certificate of authenticity by Cyrus W.  
Field

1975-189      Sample of 1857/8 Atlantic telegraph cable

1978-333	Submarine cable samples: Dover/Calais, 1851; Cape Hay, Newfoundland - Asupee Bay, Cape Breton, 1856
1981-560	15 Samples of submarine telegraph cable in presentation box
1985-1871	Mounted sample of 1858 Atlantic telegraph cable. Recovered 1906.
1985-1875	Submarine telegraph cable (laid 1873, recovered 1906) encrusted with marine growth
1994-151	Sample of the 1865/66 Transatlantic Telegraph Cable laid by the <i>Great Eastern</i> and recovered in the 1960s by C.S. "Lady Denison Pender". (Initially described by the donor as unarmoured cable, due to the total elimination of the armouring by corrosion)
2000-578	Cable 'tree', decorative souvenir of the 1858 Transatlantic submarine telegraph cable.

#### The Freemasons Museum & Archive

BE 166 (2470) HOO	Hooker, A, "Telegraph Cable Lodge, No. 2470: 1893-1993"
BE 910 FRE	<i>The Freemason</i> , 17 <sup>th</sup> June 1893 pages 316-7 report on the Consecration (formal opening) of Telegraph Cable Lodge, No. 3470
BE 166 (1793) BRA	Braden and Wilnegale "Sir Charles Bright Lodge, No. 1793: centenary souvenir, 1879-1979"
BE 910 FRE	<i>The Freemason</i> 1 <sup>st</sup> March 1879 pages 93-94 for Consecration report
Petition papers for Lodge No. 1793	
Petition papers for Lodge No. 2470	
There are two Founder's jewels and two Past Master's jewels for this lodge in the Museum collection	

#### Government and other contemporary printed sources

*Daily News*

*Illustrated London News*

*The Leeds Mercury*

*The Times*

*The Illustrated Magazine of Art*, Vol 3 (1854)

Briggs, *The Story of the Telegraph*, (New York, 1858)

*Post Office London Directory 1858*

Hansard Lords 19 July 1859 vol 155 cc5-11

1860 [2744] *Report of the joint committee appointed by the Lords of the Committee of Privy Council for Trade and the Atlantic Telegraph Company to inquire into the construction of submarine telegraph cables; together with the minutes of evidence and appendix*

*The International Exhibition of 1862. The Illustrated Catalogue of the Industrial Department*, Vol 2 (1862)

Sabine, R., *Reports on the Paris Universal Exhibition 1867*, Vol 4 (1867)

*Philadelphia International Exhibition, 1876: Official Catalogue of the British Section, part 1*, (1876)

*Newcastle Upon Tyne Exhibition: Royal Jubilee Year 1887: Royal Mining Engineering and Industrial Exhibition, Official Catalogue*, (Newcastle Upon Tyne, 1887)

Lee Bapty, S., ed., *Official Catalogue, International Exhibition of Electrical Engineering, General Inventions and Industries*, (1890)

*Royal Naval Exhibition, 1891, Official Catalogue & Guide*, (London, 1891)

*Survey of London*: volume 38: South Kensington Museums Area (1975), pp. 220-227. URL:

<http://www.british-history.ac.uk/report.aspx?compid=47529>

**Secondary Sources:****Books**

Anderson, B., *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, (London, 1991)

Appadurai, A., ed., *The Social Life of things: Commodities in Cultural Perspective* (Cambridge, 2007)

Bennett, J., Brain, R., Bycroft, K., Schaffer, S., Otto Sibum, H., & Staley, R., *Empires of Physics: A Guide to the Exhibition* (Cambridge, 1993)

Brain, R., *Going to the Fair: Readings in the Culture of Nineteenth-Century Exhibitions*, (Cambridge, 1993)

Boyer, P., & Wertsch, J., ed., *Memory in Mind and Culture*, (New York, 2009)

Caple, C., *Objects: Reluctant witnesses to the past*, (Oxon, 2008)

Coates, V. T., & Finn, B., *A Retrospective Technology Assessment: Submarine Telegraphy. The Transatlantic Cable of 1866*, (California, 1979)

Cookson, G., *The Cable: The Wire that Changed the World* (Wiltshire, 2003)

Dekker, E., *Globes at Greenwich: A Catalogue of the Globes and Armillary Spheres in the National Maritime Museum, Greenwich*, (Oxford, 1999)

Finn, B. S., *Submarine Telegraphy: The Grand Victorian Technology* (Margate, 1973)

Finn, B., & Yang, D., ed., *Communications under the Seas: The Evolving Cable Network and Its Implications*, (Massachusetts, 2009)

Greenhalgh, P., *Ephemeral Vistas: The Expositions Universelles, Great Exhibitions and World Fairs, 1851-1939* (Manchester, 1988)

Gregory, J., & Miller, S., *Science in Public: Communications, Culture and Credibility*, (New York, 1998)

Halbwachs, M., *On Collective Memory*, (Chicago, 1992)

Harvie, C., *A Floating Commonwealth: Politics, Culture and Technology on Britain's Atlantic Coast 1860-1930*, (Norfolk, 2008)

Headrick, D. R., *The Tools of Empire: Technology European Imperialism in the Nineteenth Century* (New York, 1981)

Headrick, D. R., *The Invisible Weapon: Telecommunications and International Politics 1851-1945* (New York, 1991)

Henson, L., Cantor, G., Dawson, G., Noakes, R., Shuttleworth, S., Topham, J. R., ed., *Culture and Science in the Nineteenth Century Media*, (Cornwall, 2004)

Lightman B., ed., *Victorian Science in Context* (Chicago, 1997)

Joyce, P., *The Rule of Freedom: Liberalism and the Modern City*, (New York, 2003)

Klingender, F. D., *Art and the Industrial Revolution*, (New York, 1968)

Kriegel, L., *Grand Designs: Labour, Empire and the Museum in Victorian Culture* (Durham, 2007)

Lavery, B., & Stephens, S., *Ship Models: Their Purpose and Development from 1650 to the Present* (London, 1995)

Marsden, B., & Smith, C., *Engineering Empires: A Cultural history of Technology in Nineteenth-Century Britain*, (Chippenham & Eastbourne, 2005)

Menke, R., *Telegraphic Realism: Victorian Fiction and Other Information Systems* (Stanford, 2008)

Morris, P., ed., *Science for the Nation; Perspectives on the History of the Science Museum*, (Chippenham and Eastbourne, 2010)

Pearce, S. M., ed., *Interpreting Objects and Collections* (London, 1994)

Pearce, S. M., *Museums, Objects and Collections*, (Baldock, 1992)

Standage, T., *The Victorian Internet* (New York, 2007)

Steele Gordon, J., *A Thread Across the Ocean: The Heroic Story of the Transatlantic Cable* (Bath, 2002)

Young, P., *Globalization and the Great Exhibition: The Victorian New World Order* (Chippenham and Eastbourne, 2009)

**Articles:**

Bektaş, Y., 'The Sultan's Messenger: Cultural Constructions of Ottoman Telegraphy, 1847-1880' in *Technology and Culture*, vol. 41 (2000)

Butcher, W., Hidden Treasures: The Manuscripts of "Twenty Thousand Leagues", in *Science Fiction Studies*, vol. 32, (2005)

Cookson, G., 'Submarine Cables: Novelty and Innovation, 1850-1870', in *Trans Newcomen Society*, vol. 76 (2006)

Forgan, S., 'Festivals of Science and the Two Cultures: Science, Design and Display in the Festival of Britain, 1951', in *The British Journal for the History of Science*, vol. 31 (1998)

Kennedy, P. M., 'Imperial Cable Communications and Strategy, 1870-1914' in *The English Historical Review*, vol. 86 (Oct. 1971)

Kubicek, R., 'British Expansion, Empire, and Technological Change', in A. Porter ed., *The Oxford History of the British Empire: The Nineteen Century*, Vol. 3 (Oxford, 1999)

Malecki, E. J., & Wei, H., 'A Wired World: The Evolving Geography of Submarine Cables and the Shift to Asia' in *Annals of the Association of American Geographers* vol. 99 (2009)

Midley, C., 'Transoceanic Commemoration and Connections between Bengali Brahmos and British and American Unitarians' from *The Historical Journal*, 54, (2011)

Phillips, C., 'Tiffany's Early Transatlantic Style', in *Journal of Antique Metalware Society*, No. 14 (June 2006)

Picker, J. M., 'Atlantic cable', in *Victorian Review* 34, (2008)

Rhys Morus, I., 'The Nervous System of Britain': Space, Time and the Electric Telegraph in the Victorian Age' in *The British Journal for the History of Science*, vo. 33 (2000)

Sechrist, M., 'Cyberspace in Deep Water: Protesting the Arteries of the Internet', in *Harvard Kennedy School Review*, vol 10 (2009-2010)

White, G., 'The Croll Testimonial' in *Friends of the Clockmakers' Museum Newsletter*, Issue 4, Autumn 2009.

**Websites**

<http://atlantic-cable.com/> (26 July 2011 7:41)

<http://www.victorianweb.org> (31 August 2011 13:00)

<http://www.nmm.ac.uk/about/history/national-maritime-museum/history-of-the-national-maritime-museum> (23 August 2011 15:25)

<http://www.porthcurno.org.uk/page.php?id=1> (23 August 2011 15:25)

<http://www.oxforddnb.com> (28 June 2011 11.30am)

<http://www.airgale.com.au/frank/d6.htm> (16 August 2011 14:50)

<http://www.ebay.co.uk/> (16 August 2011 17:00)

<http://www.porthcurno.org.uk/nerve-centre/empire> (31 August 2011 13:00)

<http://www.theiet.org/about/libarc/archives/research/guides-iet.cfm> (31 August 2011 10:20)