

# STORIA ECONOMICA

*ANNO XVI (2013) - n. 2*



**Edizioni Scientifiche Italiane**



## SOMMARIO

ANNO XVI (2013) - n. 2

### ECONOMICS AND POLITICS IN SUBMARINE TELEGRAPH CABLES (XIX<sup>TH</sup> AND XX<sup>TH</sup> CENTURIES).

A GLOBAL PERSPECTIVE BETWEEN HISTORY,  
HERITAGE AND PRESERVATION

edited by Andrea Giuntini and Ana Paula Silva

- Some introductory words* by Andrea Giuntini and Ana Paula Silva p. 235
- ANDREA GIUNTINI  
*Submarine telegraphy as a global emerging technology in the second half  
of the nineteenth century (1851-1902)* » 239
- DONARD DE COGAN - DOMINIC DE COGAN  
*A history of the Anglo American Telegraph Company as seen through  
its litigation* » 267
- ÁNGEL CALVO  
*Imperial dreams and national awakenings: Spain and the world telegraph  
system, 1859-1930* » 287
- ANA PAULA SILVA - MÁRIO EURICO LISBOA - ANTÓNIO MANUEL MAR-  
TINS NAIA  
*Locality in the Global World: facts and reflections on the Lusitanian land.  
Examples of the heritage of submarine cables* » 321
- MAURO COSTA DA SILVA - ILDEU DE CASTRO MOREIRA  
*The deployment of submarine cable on the brazilian coast and the  
development of brazilian landlines* » 353
- SIMONE FARI - GABRIELE BALBI - GIUSEPPE RICHERI  
*The Bureaucratisation of the Telegraph Union* » 377

SOMMARIO

STORIOGRAFIA

- L. DE MATTEO, *Il "ritardo" del Mezzogiorno dai Borbone a oggi. Un recente volume, i rituali politico-cultural-mediatici del nostro tempo, la storiografia economica* » 395

## SUBMARINE TELEGRAPHY AS A GLOBAL EMERGING TECHNOLOGY IN THE SECOND HALF OF THE NINETEENTH CENTURY (1851-1902)

### *The underwater revolution*

The idea of connecting all continents, and making contact between them within a few hours, seemed incredible for a long time. Submarine telegraphy, in the view of public opinion in the mid-nineteenth century, was a decidedly different matter from land telegraphy. It was part of one of the most intriguing technological revolutions in the second half of the century.

In terms of imperial power, invested capital, financial risk, technological challenge, and public opinion involvement, submarine telegraphy is an extremely important page in the entire book of contemporary economic history<sup>1</sup>. Taken from the point of view of the economic historian, it is one of the events most typically belonging to the second industrial revolution: as a winning combination of science and technology on the one hand, and of entrepreneurial initiative on the other, it fully reflects the leadership of the Western world at the time of imperialism. The first international telecommunications network, created thanks to submarine cables, was one of the privileged components in the debate over the establishment of the «first global economy» at the end of the nineteenth century<sup>2</sup>.

<sup>1</sup> W. SMITH, *The rise and extension of submarine telegraphy*, London 1891; S.A. GARNHAM-R.L. HADFIELD, *The submarine cable*, London 1934; B.S. FINN, *Submarine Telegraphy. The Grand Victorian Technology*, London 1973; C. BRIGHT, *Submarine telegraphs: their history, construction and working*, New York 1974; R.M. BLACK, *The history of electric wires and cables*, London 1983; T. STANDAGE, *The Victorian Internet*, New York 1998; K. BEAUCHAMP, *History of telegraphy*, Herts 2001, pp. 134-180; D. EDGERTON, *The shock of the old. Technology and global history since 1900*, London 2006.

<sup>2</sup> C. FUMIAN, *Verso una società planetaria. Alle origini della globalizzazione contemporanea (1870-1914)*, Roma 2003; C. TORP, *L'economia mondiale prima della*

*Rule Britannia*

The field of submarine cables bears the permanent mark of the British. The only country to have the required raw materials and the best engineers was Great Britain, the undisputed ruler of the seas and of mail transportation. Technological projects and capital came from Britain, and it was the British who stood to gain more than any other nation in this sector via enormous benefits in all fields, from economic to military: in 1900, 72% of the cables laid throughout the world were British property. The cables formed one of the pillars of the great British Empire's prominent power. All messages exchanged, even between other countries and their colonies overseas, invariably had to go through Great Britain, or through British telegraph stations spread around the world, such as Gibraltar, Cape Town and Singapore. Examples such as the conflict of Fashoda and the Boer War demonstrated how the ability to intercept and censor messages by the British could turn the tide of international political crises. Neither before nor after this period had a single country exercised such excessive power over the circulation of business and strategic information on a worldwide scale<sup>3</sup>.

This was not merely a predominant condition to be exploited in case of war emergencies; it was also an advantage for British firms with regard to international competition. Such a financial undertaking could not be sustained by a single entrepreneur; only large companies were in a position to guarantee a rich availability of capital, which was mainly collected on the British market. The submarine telegraphy sector was managed largely by private companies, which ordered the construction of cables by the leading firms specializing in the sector. British submarine telegraphy companies were the most powerful in this sector. Once the necessary technology had been established, no one else was able to invest capital, and the submarine telegraphy companies were a springboard for continued privileges in the industry. Where that was not granted, they did not lack the means to obtain it, arousing understandable resentment and opposition in the competition. Understanding the sector's overall scope, the British

*Grande guerra. La prima ondata della globalizzazione economica*, «Novecento. Per una Storia del Tempo Presente», 14-15 (2006), pp. 251-277; D. OLSTEIN, *Le molteplici origini della globalizzazione. Un dibattito storiografico*, «Contemporanea», 5 (2006), pp. 403-422.

<sup>3</sup> B. MARSDEN-C. SMITH, *Engineering empires. A cultural history of technology in nineteenth-century Britain*, Basingstoke-New York 2005.

government intervened on several occasions, contrary to their liberal vocation. Great Britain generously subsidized its cable manufacturers. The imperial, political, diplomatic and strategic value of submarine cables in the time of imperialism did not escape anyone. To neglect the role played by the State would be misleading. Submarine telegraphy, in fact, was by no means a free market, but rather a field in which the intervention of the state prevailed, as noticed by an outstanding specialist of this sector: «Telegraph traffic can with good reason be included among the group of monopolies that were opposed to liberalism»<sup>4</sup>.

### *A technological challenge*

Installation of the cables entailed extensive, difficult work. Design and construction were not the only complex stages of submarine connection; it was in fact also necessary to transport the cables, which weighed several tons, and lay them on a deep sea floor, which had to be as flat as possible, by submerging them with the utmost care by means of pulleys. The operation required the participation of expert technicians, who were mainly research chemists, geologists and engineers. The transmission of electric impulses, which were subsequently converted into signals, through a cable submerged in deep water, represented an enormous challenge that was of a technical and scientific nature. While the wire in the aerial lines was metal, the conductor for the submarine cables had to be encased in special waterproof material, called gutta-percha (a plastic extracted from a tree that grows in the far-east), to prevent the dispersion of electric power by restraining the electric impulse and then releasing it, thereby insulating the copper wires. The invention of an effective insulating material was one of the turning points in the history of submarine telegraphy. Furthermore, in order to prevent the cables from suffering damage or, worse still, rupture, they were enclosed in a sheaf of wires in order to make them resistant to blows and tension, but also to shellfish, the anchors of ships, and fishermen.

<sup>4</sup> J. AHVENAINEN, *Telegraphs, trade and policy. The role of international telegraphs in the years 1870-1914*, in *The emergence of a world economy 1500-1914*, edited by W. Fischer, M. McInnis and J. Schneider, II, 1850-1914, Wiesbaden 1986, p. 513.

*First submarine experiences*

The first (improvised) attempt to lay an underwater telegraph cable goes back to 1839. The experiment, based on a technology that was inevitably still immature, was attempted by Brooke O'Shaughnessy (1809-1889), superintendent of the electric telegraph for the Indian colony, under the river Hooghly in Calcutta, at the delta of the Ganges. In 1842, the founder of the best-known telegraph system at the time, Samuel Morse, laid a submarine cable in the waters of New York harbor. In 1846, even the inventor of the revolver, Samuel Colt, jointly with George Robinson, tried to lay a telegraph submarine cable between Manhattan and Brooklyn, and between Long Island and Coney Island<sup>5</sup>.

In the beginning, submarine telegraphy was conceived as being complementarity relative to land telegraphy. The system was thus designed to include the combined use of landlines and submarine cables, with the landlines hanging over limited distances. The idea of a cable across the Channel was in line with this kind of project. The first project was presented in 1840 by Charles Wheatstone (1802-1875)<sup>6</sup>, one of the fathers of electric telegraphy; four years later he implemented some promising experiments in submarine telegraphy in Swansea Bay. However, his excellent intuition was not supported by the level of technology.

Success was achieved in 1851 – the same year of the great exhibition at Crystal Palace in London – by the Brett brothers, Jacob (1808-1897) and John Watkins (1805-1863). The two engineers from Bristol led a group of industrialists, founding a company called the *General Oceanic and Subterranean Electric Printing Telegraph*, that, on the second try, laid a cable between Southerland and Cap Gris-Nez. This cable worked for 37 years, despite being laid using rudimentary instruments and procedures. The cable was designed by the two brothers: 25 nautical miles long, insulated with gutta-percha, and covered with four copper wires coated with iron.

The satisfactory crossing of the Channel convinced the leaders in this sector to envisage a cable across the ocean aimed at the American continent. Enthusiasm was such that the difficulties of the undertaking were greatly underestimated. The following years formed the groundwork

<sup>5</sup> C.G. HEARN, *Circuits in the sea. The men, the ships, and the Atlantic cable*, Westport-London 2004, p. 8.

<sup>6</sup> B. BOWERS, *Sir Charles Wheatstone FRS 1802-1875*, London 2001.



for an astonishing Anglo-American submarine communication, to which the Brett brothers themselves were totally committed.

Between 1850 and 1870, the submarine telegraphy lived his technological apprenticeship that led to the final maturity of the sector. The go-ahead was given from the government side, as the British government was extremely concerned with intensifying telegraph connections, especially in the direction of its colonial empire. The year after opening the first cable, a second cable was laid between Dover and Calais by the *Submarine Telegraphy*, founded by Thomas Crampton, a railway engineer. Also involved was another important technician, Charles Wollaston, who ordered from *Küper* company a much more robust and resistant, and 30 times heavier, wire compared to that used by the Brett brothers. In 1852, another cable connected Britain with Ireland, between Portpatrick and Donaghadee, but the cable was later lost. Following this, in 1853 Belgium also established a telegraph communication, from Middelkerke to Ramsgate<sup>7</sup>. In the same year, the *Electric and International Telegraph Company* benefited from the exclusive use of undersea telegraph links with the Netherlands. Other communications were established in the following years: the longest one, at 350 miles, linked Britain with Denmark, which was connected in 1854 on one side with Sweden, through a cable between Copenhagen and Flensburg, and on the other side with Hamburg. In the same period, a cable was placed between the Italian coast and Corsica; it was a segment of the long telegraph connection that the French were establishing with northern Africa<sup>8</sup>. In 1855, a cable crossed the Sound, joining Denmark and Sweden, which was also connected with Norway. Five years later the cable was extended to Haaparanta; this meant being able to unite Denmark and Russia through the Gulf of Botnia<sup>9</sup>. Before 1857, in which the first attempt was made to lay an Atlantic cable, the total length of submarine cables was 1,400 miles.

<sup>7</sup> B. VAN DER HERTEN-P. VERHOEST, *The Belgian contribution to the creation of the 19<sup>th</sup> century international communication networks*, in *European Networks. The Development of a Transnational System of Transport and Communications*, edited by A. Carreras, A. Giuntini and M. Merger, Florence 1995, pp. 334-346.

<sup>8</sup> A. GIUNTINI, *Il potere dei cavi. Le telecomunicazioni sottomarine nel Mediterraneo*, in *Sul filo della comunicazione. La telegrafia nell'Ottocento fra economia, politica e tecnologia*, a cura di A. Giuntini, Prato 2004, pp. 59-81; *Id.*, *Gli esordi della telegrafia sottomarina in Italia*, in *Studi in ricordo di Tommaso Fanfani*, a cura di M. Berti, A. Bianchi, G. Conti, D. Manetti, M. Merger and V. Pinchera, Pisa 2013, I, pp. 403-411.

<sup>9</sup> P. THESTRUP-H.C. JOHANSEN, *Denmark as a nodal point in the international telegraph network in the 1870s*, in *European Networks*, pp. 84-95.

Some of these cables functioned for long periods, while others were short-lived due to damage from anchors and the processes of corrosion of the iron outer wire. Overall, between 1854 and 1869, 37 cables were activated around the world.

### *First military use: the Crimean War*

The Crimean War provided an opportunity for another submarine test, which was decisively aided by the western European states, both in terms of technology transfer and funding. The war, which began in July 1854, formed an occasion on which to introduce the telegraph in a large part of the Balcanic area<sup>10</sup>. The British company Newall installed a cable designed by Charles Liddell (1813-1894). Submarine cables were projected to bring together the two banks of the Ottoman capital, Scutari on the Asiatic side, and Pera on the European; and Constantinople with the port of Varna on the Black Sea. French troops drew the telegraph line from Varna through Shumen to Ruse, and from there across the Danube, from Giurgiu up to Bucharest. Starting in the spring of 1855 from the capital of the Ottoman Empire, it was possible to communicate by telegraph with western European capitals, passing through the northeastern Bulgarian cities and across the Danube. With the aim of satisfying the needs of the western allies' military commands on the front of Crimea – at the siege of Sevastopol – a 640 km submarine line was implanted in August 1855 between Varna and Balaklava. Thanks to this, London and Paris were able to keep in constant contact with their armies on the battlefields.

### *The Atlantic*

The main goal of linking Britain with the new world using a forward-looking economic calculation and commercial perspective, while at the same time extending the imperial and political control, remained. For wiser businessmen who were capable of understanding the potentialities of a great country still in the making, the north

<sup>10</sup> A. Kostov, *Le prime telecomunicazioni nella periferia europea. Il telegrafo nei Balcani fino alla Prima guerra mondiale*, in *Flussi invisibili. Le telecomunicazioni fra Ottocento e Novecento*, a cura di A. Giuntini, «Memoria e Ricerca», 11 (2000), pp. 67-78.

Atlantic route was considered one of the most profitable<sup>11</sup>. Research concerning the connection between the two shores of the Atlantic Ocean got under way in preparation of the colossal operation of laying a cable of inconceivable size; in the meantime, investors from both countries began to get involved. In 1854, a group of American capitalists, led by the paper dealer Cyrus Field (1819-1892), founded the *New York, Newfoundland and London Telegraph Company*, with the specific purpose of connecting the two worlds at their closest point, between Ireland and Newfoundland. Between the end of 1855 and the beginning of 1856, the cable between Newfoundland and New York came into operation, but it was very expensive and economically unprofitable. Hunting for lenders, in the same year, Field went back to London to make a decisive alliance with Brett, and in the October promoted the formation of the new *London and Atlantic Telegraph Company*. Capital of £ 350,000 was almost entirely subscribed by British investors. Field also secured the commitment of both governments, British and American, to grant subsidies to the company for 25 years in return for priority use of the submarine line. Government support, the perfect communion of purposes and separation of investments promised generous profits. But technology was still insufficient and scientists and technicians, in these years, made enormous efforts to improve it and adapt to the need of an Atlantic communication. Morse also joined the group, after Field contacted him to get a technical opinion on the project; Morse would later work with two British engineers already active in the field of telegraphy, Charles Tilston Bright (1832-1888) and Edward Orange Wildman Whitehouse (1817-1890), in providing the Atlantic cable. Thus, submarine telegraphy began to function as a coagulant to big business; however, the driving force of young American capitalism, even in this area, should not be underestimated. The first American capitalists, for whom the transformations of the economy of their country was happening in front of their eyes, began to understand how the telegraph could function as a stimulus for the integration of economic and entrepreneurial activities of traders, bankers, insurance brokers and those engaged in shipping activities<sup>12</sup>. In England, Field

<sup>11</sup> V.T. COATES-B. FINN, *A retrospective technology assessment: submarine telegraphy. The transatlantic cables of 1866*, San Francisco 1979; G. COOKSON, *The cable. The wire that changed the world*, Stroud 2003.

<sup>12</sup> M. BLONDHEIM, *News over the wires. The telegraph and the flow of public information in America, 1844-1897*, Cambridge-London 1994; R. JOHN, *Network nation. Inventing American telecommunications*, Cambridge (MA) and London 2010.

met John Pender (1811-1896)<sup>13</sup>, the greatest entrepreneur – the «cable king» – in the field of submarine telegraphy, and owner of 50,000 miles of submarine cables spread all over the world. Pender became manager of the new company in 1856. He built the famous “red line” of communications, a system of cables that spanned the globe, though landing only in the territories of the British Crown. In 1864, Pender was architect of the merger between the cable company *Glass and Elliot and Gutta Percha*, the world leader in the field of cable insulation. In the same year, he constituted the *Indian Rubber, Gutta Percha and Telegraph Works*. The result of the merger was the birth, in 1864, of *Telegraph Construction and Maintenance (Telcon)*, the largest and most powerful cable manufacturing enterprise in the world, of which Pender was first chairman. Thanks to his monopolistic approach, the harmful fragmentation of international telegraphy into many small companies was avoided. In 1892, *Eastern Telegraph*, with its many subsidiaries, held 45.5% of the global wires<sup>14</sup>.

Due to the good results obtained from the financial underwriting, the production of 4,600 km of cables – partly by *Glass and Elliot* and partly by *Newall* – was completed as early as June 1857. As there was no single ship capable of carrying 2,500 tons of cable, it was necessary to divide it across two large ships, which would move simultaneously along the two coasts. The ships in charge of carrying out the submersion of the wire were supplied by the British and US governments. Cable-laying was started by the steamship *Niagara* – the biggest of the American navy vessels – from the small Irish island of Valentia, on August 7, 1857; however, five days later, the wire broke and disappeared at a depth of 3,600 fathoms, where it was impossible to find. This failure cost the company £ 100,000. However, Field did not lose heart or give up; he managed to find other subscribers, though not without difficulty, and to convince the existing ones that the loss was just a mishap, and that the project would work. The equipment was improved, including the necessary machinery for laying the cable,

<sup>13</sup> K.C. BAGLEHOLE, *A century of service. A brief history of Cable and Wireless Ltd. 1868-1968*, London 1969; H. BARTY-KING, *Girdle round the Earth. The story of Cable and Wireless and its predecessors to mark the group's jubilee 1929-1979*, London 1979, pp. 3-7; ID., *John Pender (1816-1896)*, «Dictionary of Business Biography», edited by D.J. Jeremy, 4, London 1985, pp. 609-614.

<sup>14</sup> D. DE COGAN, *Innovazione tecnologica e stagnazione finanziaria (lo sviluppo della telegrafia internazionale tra il 1866 e il 1900: una prospettiva britannica)*, in *Flussi invisibili*, pp. 25-43.

and the conductivity of the cable itself thanks to the new Thomson marine galvanometer mirror<sup>15</sup>.

The project was put off to the following summer. On June 10, 1858, a second attempt was made, which was equally unsuccessful. It was then decided to revise the consistency of the cable, as well as the machinery for submarine laying. One month later, the third attempt was more successful and the first messages along the line were ready to be dispatched, provoking an irrepressible enthusiasm. Five days later, the first messages were transmitted; these crossed the Atlantic in 30 hours. On August 16, the cable passed a goodwill message of 99 words from Queen Victoria directly to President Buchanan, who replied three days later; in 16 hours, his message reached Europe. However, at the beginning of September, before being opened to the public, the cable broke in several places and became totally silent. The person held responsible for paying for the loss was the one in charge of the electric sector of the company, Edward Orange Wildman Whitehouse, a gifted scientist, who was accused of having exaggerated the voltage. A total of 732 messages had been sent.

### *High hopes*

The fact that 732 messages had been transmitted served as sufficient proof that it was possible to communicate over a distance of 3,000 km without any intermediary station, despite the obvious immaturity of the adopted technology. Many considered the failure as a mere mishap, according to the traditional positivist perspective of time in the field of technological confidence. The loss for the shareholders of the company was considerable, amounting to £ 500,000. The main culprit was considered to be the high voltage recommended by Whitehouse, who, after paying the costs, was replaced by William Thomson, the greatest British scholar in the field of electricity at that time. Of the two, the first witnessed the propensity of the English of the first industrial revolution to the emphasis of the pragmatic dimension, while the second was completely turned towards a scientific view, according to the canons that the second industrial revolution was imposing<sup>16</sup>. Beyond the value of the technicians engaged in the great

<sup>15</sup> G. COOKSON-C.A. HEMPSTEAD, *A Victorian Scientist and Engineer: Fleeming Jenkin and the birth of electrical engineering*, London 2000, pp. 55-56.

<sup>16</sup> Hunt defines him as a «baconian experimentator» (B.J. HUNT, *Scientists, engineers*

adventure, almost all of whom were British and undoubtedly very prepared, it must be stressed that this was probably the most ambitious infrastructure project ever conceived in history and, at the same time, the one that triggered the highest number of experiments. The quite reasonable fear was that a signal that was so far away would fail to arrive, or would be weak and slow.

*A new intervention from the State*

The failure prompted the British government to change its attitude, especially in the wake of the Indian revolt, which showed very clearly the need for rapid telegraphic communication with the main British colony. At the end of the 1850s turned into the generic favor the involvement of very different thickness, which pushed the leaders of British policy towards the granting of generous financial aids to cable companies, as it did not escape the political, diplomatic and military irreplaceable worthy role, that the submarine cables played. While remaining in the private sector, submarine telegraphy enjoyed a level of interest that was unusual in light of the traditional British nineteenth century *laissez faire* attitude. In fact, the British government, followed by others in Europe, assured subsidies to private companies, which were struggling to maintain profitability given the costs involved in producing and laying the cables and managing the lines. In addition, private companies obtained a monopoly in the market, which clashed with the liberal vocation of the country. Moreover, when the first cables were laid, there was no regulation at either the national or international level. The warranty on the investment of £ 800,000 on the Red Sea cable initiative from Suez to Aden, which then failed, represented a real turning point. In 1859, jointly with the *Atlantic Telegraph*, the company protagonist of the story of the Atlantic cable, the British government instituted a joint commission – the *Joint Committee of the Privy Council for Trade* – that was tasked with investigating the technical causes of the failures suffered. The Commission, led by Douglas Galton, met 22 times within a period of almost a year, rallied the best technicians in the field of submarine

*and Wildman Whitehouse: measurement and credibility in early cable telegraphy*, «The British Journal for the History of Science», 29 (1996), p. 157). See also I.R. MORUS, *Telegraphy and the technology of display. The electricians and Samuel Morse*, «History of Technology», 13 (1991), pp. 20-40.

telegraphy, and presented a favorable conclusion on the technical feasibility of an Atlantic communication project. The Commission's decisions were defined as «the most valuable collection of facts, warnings, and evidence ever compiled concerning submarine cables»<sup>17</sup>. In April 1861, the results were made public in a huge publication, the *Blue Book*, which suggested that success may be achieved in the space of a few years and reassured investors, who were anxious about the fate of their capital. For the first time, the *Blue Book* introduced as a mandatory matching criteria to the quality of the materials and tools used, away from the cables, and electrical and signaling standards were scientifically established. The Commission noted that experiments had been made too quickly, without the necessary controls in place, but, in terms of implementation, the cable had been well built: «The failures were – Finn wrote – consequences of the overexuberance of promoters, who had little knowledge of the technology and were more interested in getting the job done than in doing it well»<sup>18</sup>. The panel of experts also wanted a test ride to be carried out using the ship *Great Eastern*, which in June 1860 had covered the distance from Southampton to the American coast in 11 days at an average speed of over 11 knots, thereby passing the test and gaining, in substance, the right to lay the cable. The members of the Commission sent a positive stimulus to investors, highlighting the fact that the necessary techniques had been developed, both for the installation and for the transmission, so that it was profitable to try again. In fact, developments after the failure were less depressing than feared. Field had already been back on the market since June 1859, with his usual enthusiasm with respect to raising £ 600,000, which was successfully achieved. The British government then also decided to guarantee the interest of 8% on the new issue, for 25 years from the installation of the cable, and an interest rate of 4% was granted on the titles of the first issue. The success was such that the value of the shares skyrocketed; however, in the meantime, an event occurred that looked likely to increase the preparation time needed for the next attempt: the American Civil War complicated the issue, postponing the solution for better times.

<sup>17</sup> D.R. WINSECK-R.M. PIKE, *Communication and empire. Media, markets and globalization, 1860-1930*, Durham-London 2007, p. 23.

<sup>18</sup> B. FINN, *Submarine telegraphy: a study in technical stagnation*, in *Communications under the seas. The evolving cable networks and its implications*, edited by B. Finn and D. Yang, Cambridge-London 2009, p. 14.



*Continental alternatives*

The outcome of the Atlantic cable initiative in 1858 persuaded many experts in telegraphy to think about alternative routes by which to connect the American continent with Europe, which include a mixed mode and thus exploited the land route. All these projects were aborted, but the challenge that lay in the two opposing views represented an undeniable factor of competition, which stimulated studies and trials.

Around the mid-1850s an American colonel, Tallifero Shaffner, drew a telegraph path through the North Atlantic, which went from Denmark to Norway, and through Scotland, the Far Öer Islands, Iceland and Greenland. Cable manufacturers believed that this was achievable, and Lincoln himself, in the middle of the Civil War, gave his agreement for the project to go ahead. Wheatstone was consulted and his judgment was favorable, but the problems presented by the project were more numerous than the advantages; for example, the ice that gripped many seasons during the year in the regions concerned, and the risks associated with the inability to ensure constant monitoring and maintenance of the landlines. The idea was retrieved from the danish financier and banker G.F. Tietgen, who was also the owner of Privatbanken and founder of *Great Northern*, one of the most prominent telegraph companies in the world<sup>19</sup>. The great merit of Tietgen's idea was that the telegraph line would link up Russia and Great Britain via Denmark, favoring the emergence of Russian power in the field of telegraphy, which was considered a challenge to British rivals, especially in the big Asian Game. Between 1868 and 1871, the Danish entrepreneur laid cables up to Hong Kong via Japan, thereby establishing a significant presence for *Great Northern* in an area that was considered strategic. Another direction followed, in order to reach the American

<sup>19</sup> K. JACOBSEN, *The Great Northern Telegraph Company: a Danish company in the service of globalisation since 1869*, in *Between national histories and global history*, edited by S. Tønnesson, J. Koponen, N. Steensgaard and T. Svensson, Helsingfors 1997, pp. 179-196; ID., *In struggle for control over the Far Eastern Telegraphs. The Great Northern Telegraph Company and Japan 1870-1943*, in *Transnational companies (19<sup>th</sup>-20<sup>th</sup> centuries)*, edited by H. Bonin, C. Bouneau, L. Cailluet, A. Fernandez and S. Marzagalli, Paris 2002, pp. 331-346; ID., *The Great Northern Telegraph Company and the British empire 1869-1945*, in *Britain and Denmark: political, economic and cultural relations in the 19<sup>th</sup> and 20<sup>th</sup> centuries*, edited by J. Sevaldsen, B. Bjørke and C. Bjørn, Copenaghen 2003, pp. 199-230; ID., *Small nation, submarine telegraphy and international politics: the Great Northern Telegraph Company, 1869-1940*, in *Communications under the seas*, pp. 115-157.



continent, was that of Siberia, which Russia was paying great attention to both in its efforts towards internal colonization, and in relation to its competition with Great Britain<sup>20</sup>.

The first landline between Europe and Siberia was completed in 1861, between Kasan and Tjumen; this was extended to Omsk the following year, and then to Irkutsk on Baikal Lake in 1863. In 1865, negotiations were initiated for a line that reached from Beijing to Kiachta, however this was ultimately rejected by the Chinese government. A line to the United States through Siberia was designed in 1858 by American major Perry McDonough Collins<sup>21</sup>. The line started from San Francisco and reached Alaska, which at the time belonged to Russia, passing beneath the Bering Sea and arriving in Siberia. Strategically, it constituted a step of great importance for Russia because it offered the possibility of peaceful, political and economic expansion. The Civil War imposed a delay on the project until 1865, when the concession passed the sum of \$ 100,000 into the hands of *Western Union* with the approval of the Russian government, which, in the same year, initiated the construction of the Siberian line. In 1866, the Russian line and the line from British Columbia were finally approaching completion, but in the meantime the success of the Atlantic cable annihilated all efforts, and so the Russians decided to abandon the Bering Sea line.

### *Towards India*

The other favored axis by the British Crown for submarine telegraph communication was the East, and particularly the Indian subcontinent. The first projects date back to the 1850s, and substantially repeated the two directions studied and implemented for the mail: the overland route to Egypt and the path to the Middle East. The father of the Indian telegraph network was the governor James Andrew Ramsay, Marquis of Dalhousie, who was involved in several electrical studies and experiments<sup>22</sup>. The first stretch of the Indian electric telegraph

<sup>20</sup> J. AHVENAINEN, *The Far Eastern Telegraphs: The History of Telegraphic Communications between the Far East, Europe and America before the First World War*, Helsinki 1981.

<sup>21</sup> AHVENAINEN, *Telegraphs, trade and policy*, p. 511.

<sup>22</sup> M. GORMAN, *Sir William O'Shaughnessy, Lord Dalhousie, and the Establishment of the Telegraph System in India*, «Technology and Culture», 4 (1971), pp. 581-601.

was opened in the Bengali capital in 1851. In 1857, at the time of the Sepoys mutiny, which was repressed thanks to the telegraph landline system, the extension of telegraph line was already remarkable at 7,200 km. The Indian telegraph system was directed and owned by the State, while the lines between India and Europe were financed by private companies with government support.

The good performance offered by the telegraph on the Indian subcontinent gave the final push to the British to plan a cable between Suez and Aden in the Red Sea, with the intention of proceeding to Karachi. The first grant from the Ottoman and Egyptian governments for a line from Egypt to India through the Red Sea, with an extension to Constantinople via the Euphrates valley, in 1858, was in favor of the Red Sea and India Telegraph Company, which was owned by the Gisborne brothers, Lionel and Francis Newton. The two entrepreneurs entrusted the *Newall* company to lay the Red Sea cable; it executed the operation between May 1859 and February 1860. The initiative got some support from the Foreign Office and the East India Company, as well as the Turkish government. Despite the support it received, however, the Gisborne brothers were unable to raise the necessary capital, especially in the face of skepticism generated by the parallel failure in the Atlantic. The line did not work, and the reason for this was summarily identified as relating to the high temperature of the water. The event was deemed a disaster for the British, to be attributed also to political and organizational reasons – an «extraordinary lovely case of bureaucratic ineptitude»<sup>23</sup> – as well as technological ones.

### *The Euphrates telegraph*

The Euphrates route represented to the eyes of many an affordable alternative by which to link Britain with India by telegraph, without the risks arising from using a long submarine cable. In June 1856, the *European and Indian Junction Telegraph Company* – whose shareholders included the Brett brothers – began a project to connect the Mediterranean with the Persian Gulf. However, the project, driven by a British company, was initially opposed by the Ottoman Empire, which decided to carry out installation of the telegraph line itself. The project consisted of a railway line, and finally a submarine cable to

<sup>23</sup> J.W. CELL, *British colonial administration in the mid-19th century: the policy-making process*, New Haven and London 1970, p. 233.

Karachi. The negotiations between the Ottoman and the British governments began in January 1857; the pivotal role in the operation was played by the British ambassador in Istanbul, Stratford de Redcliffe. For a few months, things seemed to be going well for the *European and Indian Junction Company*. By the summer the concession was apparently granted, but because of French pressures (since France was engaged in building the Suez Canal), the Turks preferred to impose a suspension, putting in a request, which was subsequently accepted, that the telegraph line should pass through the capital, Constantinople. But the Turks were still unsatisfied; conscious of their strategic location between West and East, they pretended to directly check the telegraph line, removing all power from the hands of the British. The telegraph was a national item and a resource to be fully exploited in economic terms during the time of a very relevant cultural and technological modernization process<sup>24</sup>.

Unable to cross the Red Sea, the English had to be satisfied with conveying their messages to India by land until 1864, when a submarine cable finally connected Karachi to the Persian Gulf, where the telegraph line was linked with the Turkish land telegraph network and beyond, via the European one. A few months before, a land cable had connected Russia to Tehran. The operation involved lengthy diplomatic negotiations, which lasted practically the whole first half of the 1860s. In particular, such long negotiations with various governments was exhausting, especially with the Persian government, whose territories, which were politically unstable, were crossed by the line<sup>25</sup>. This made the British government, which would have preferred a fast and entirely controlled submarine line<sup>26</sup>, restless and unsatisfied. Overall, while improving the general level of communications, the service was never entirely satisfactory, with slow communications, numerous technical problems and too-high tariffs; however, the connection between London and its main colony was finally concluded. The first submarine, uninterrupted and efficient connection between London and Bombay, except for the Suez-Alexandria stretch, was inaugurated in 1870 by the *Falmouth, Gibraltar and Malta Telegraph Company*, which was formed in 1869. The long cable from Britain to Gibraltar, Malta to

<sup>24</sup> Y. BEKTAS, *The Sultan's Messenger. Cultural Constructions of Ottoman Telegraphy, 1847-1880*, «Technology and Culture», 4 (2000), pp. 669-696.

<sup>25</sup> WINSECK-PIKE, *Communication and empire*, pp. 31-34.

<sup>26</sup> C.P. HARRIS, *The Persian Gulf submarine telegraph of 1864*, «The Geographical Journal», 135 (1969), pp. 169-190.

Suez, and thence to Bombay, was, after the Atlantic cable, the second longest submarine telegraph line in the world. It was the «first link in an intended ‘all red’ system, that is a cable network which linked all parts of the Empire without ever touching foreign soil»<sup>27</sup>. In 1870 two cables joined Lisbon to Britain and Gibraltar<sup>28</sup>. In the same year, another long landline connected Britain with Tehran through southern Germany and Russia, thanks to the work of Charles Siemens and Julius Reuter, who formed the *Indo-European Telegraph Company*. With the new line, the travel time of a message from London to Karachi came down to eight and a half hours, though tariffs did not diminish significantly. Paul Julius Reuter, once the line was completed, opened an office of his own press agency in Bombay. Despite the great efforts expressed, the connection with India remained unsatisfactory in terms of traffic revenues until the end of the century.

### *Spain looks at Latin America*

Almost all the major European countries threw themselves into the great adventure of submarine telegraphy, while searching for an independent national way. That Spain looked to Latin America is not that strange: in February 1857, Horatio J. Perry, then secretary of the American embassy in Madrid, with the support of the powerful groups of Field, the Brett brothers, Bright and Morse, prepared a project for a cable between Cuba and Florida, which was to be opened only ten years later. He planned to connect this cable with the Anglo-American one that was under construction<sup>29</sup>. The North Atlantic project penalized Spain, which remained cut off from the main projects between Great

<sup>27</sup> P.M. KENNEDY, *Imperial cable communications and strategy, 1870-1914*, «English Historical Review», 341 (1971), p. 731.

<sup>28</sup> A.P. SILVA-M.P. DIOGO, *From host to hostage. Portugal, Britain, and the Atlantic Telegraph Networks*, in *Networking Europe. Transnational infrastructures and the shaping of Europe, 1850-2000*, edited by E. van der Vleuten and A. Kaijser, Sagamore Beach 2006, pp. 51-69.

<sup>29</sup> M. ARCARONS, *Empresa privada y condicionantes políticos en las comunicaciones telegráficas intercontinentales españolas 1855-1895*, in *Las Comunicaciones entre Europa y America, 1550-1993, I Congreso internacional de comunicaciones*, Madrid 1995, pp. 151-164; ID., *L'Espagne et les liaisons télégraphiques transatlantiques. Une approche chronologique (1858-1898)*, in *Les réseaux européens transnationaux, XIXe-XXe siècles: quels enjeux?*, edité par A. Carreras, A. Giuntini et M. Merger, Nantes 1995, pp. 161-184; ID., *La Spagna e i collegamenti telegrafici transatlantici (1858-1898)*, in *Flussi invisibili*, pp. 45-66.

Britain and America. In addition, a general plan for submarine telegraphy could not be established, «since Spain lacked money, personnel and knowledge as well as adequate equipment»<sup>30</sup>. Spain also paid the cost of the failure of the cable installed in the Gibraltar Strait to connect the country with its territories in North Africa. Most successful was the laying of a cable to the Balearic Islands in 1860, and to the Canary Islands in 1879<sup>31</sup>. In more or less the same period, in a rising competition, even captain Matthew Maury (1806-1873), chief of the Naval Observatory in Washington, who was well known for his oceanographic studies and supported by a bank of Barcelona and a series of Cuban merchants, conceived a similar project. The Spanish government was quite prudent, even in terms of its relations with the United States, and rejected all grant requests for installation of the connection. The failure of the Atlantic cable did not dampen the enthusiasm of Perry, who in December 1858 applied again with a new proposal for a connection between Cadiz and Cuba with a South Atlantic line, which was to stretch through the Canary Islands, Cape Verde, and the Brazilian island of Fernando de Noronha, before reaching the Brazilian coast, where it would go back to Guyana, Puerto Rico and Cuba, and from there to New York. Exactly as in the Portuguese case, the Spanish promoters wanted to exploit the Atlantic islands to make bridgeheads to reach the new continent. If the project had proceeded, the South-Atlantic cable would have replaced the North-Atlantic one, forcing all messages to America to pass through Cuba. Difficulties in raising money provoked the loss of the promise of a grant, which in January 1864 declined, even for the English hostility and competition. In the meantime a new competitor emerged, confirming the existence of a very stimulating market. In 1863, Arturo Marcoartú, a Spanish engineer and member of the Institution of Engineers in London, was planning a cable from the Cabo San Vicente, in Portugal, to Madeira, the Canary Islands, Cape Blanc – on the coast of Mauritania – the islands of Cape Verde, Penedo and Fernando de Noronha, before arriving at Cape San Roque, on the Brazilian coast, where the line would have continued to Cuba and up to the

<sup>30</sup> Á. CALVO, *Business and Geopolitics in the International Transfer of Technology: Spanish Submarine Cables, 1849-1930*, «History of Technology», 27 (2006), p. 80. See also his *Los inicios de las telecomunicaciones en España: el telégrafo*, «Revista de Historia Económica», 3 (2001), pp. 613-635.

<sup>31</sup> Á. CALVO, *Los cables submarinos: una rama emergente de la ingeniería civil en el siglo XIX*, «Quaderns d'Historia de l'Enginyeria», V (2002-2003), pp. 261-263.

United States. The third to appear, in 1862, was the piedmontese engineer Pier Alberto Balestrini, who was also in search of a concession for the contended telegraph line in the South Atlantic in a moment of technological difficulty for the Anglo-American cable. France organized the first international conference on submarine cables to settle the question of the line between the Iberian peninsula and Latin America. Involved countries convened in Paris in June 1863. This was the first attempt to regulate a market that did not recognize shared rules, but still moved according to autonomous impulses promoted by groups and individuals. Four European countries – Spain, Portugal, France and Denmark – and two Latin American countries – Brazil and Haiti – attended to the conference. No hospitality was extended to Britain or the United States, since the submarine cable networks in both countries were owned by private companies. Eventually, in May 1864, an agreement was signed that established the direction of the line and neutrality in the case of war. The Spanish government placed its trust in Marcoartú, who was granted a temporary concession for a telegraph cable from Cuba, Puerto Rico, the island of Saint Thomas in the US, and the Virgin Islands, to the coast through Panama. In 1866, Marcoartú founded the *West Indian and American Telegraph Company* with capital of one million pounds. Carelessness and inconclusiveness were still prevailing, however, and Spain needed both capital and technology. The various failures in the South Atlantic confirmed that, even in the 1860s, it was almost nonsensical to plan to lay a submarine cable without the aid of the British.

### *In the Mediterranean Sea*

The project to lay a cable through the Red Sea and India required the British to cross the Mediterranean, in the middle of which they focused in Malta, which belonged to the Crown, as the crucial bridgehead by which to reach Suez and beyond to the East. Connecting to the small Mediterranean island did not require dependence on anyone, and thus the British established a connection entirely under their own control. Before the submarine link via Portugal was established, the cheapest and most adequate alternative consisted of crossing the entire Italian peninsula from north to south, thereby reaching the tip of Sicily and thence to Malta. Hence the unexpected Italian centrality in the context of UK projects grew, and in fact lasted a few years. When, in 1869, the *Falmouth, Gibraltar and Malta*

*Telegraph Company* laid a cable from Porthcurno, the most western point of the British Islands, to Lisbon, Gibraltar, Malta, and finally Egypt, at a total of 2,281 miles, the game for Great Britain was over. In this way, the British power did not have to pass through potentially risky countries, such as Italy, with preference instead falling to Portugal, which represented a good friend and controlled country. Although unable to compete with the two major European powers, both in terms of technology and enterprises, Italy, thanks to its geographical position at the center of the Mediterranean, played a primary role in submarine telegraphy, roughly, from 1851 to 1870. From Malta, in 1861 the *Malta and Alexandria Telegraph*, which was the dealership arm of *Telegraph Construction and Maintenance*, was finally able to realize the crucial connection to Alexandria. Dispatches were sent from Egypt to Algeria and Tunisia on the one hand, and to Suez on the other, and then carried by sea to Bombay.

Even the French had tried to gear up in time to address the issue of submarine telegraphy. Since 1850, the emperor had appointed an expert that was dedicated to new technologies; this expert was Jacques Babinet, a pupil of Ampère. In the years prior to 1866 – by which time the submarine cables network amounted to 320 km – France was not able to keep up with the UK, collecting a higher number of failures than successes<sup>32</sup>. It was unlucky that the cable between Sardinia and Algeria which the French placed in the very depths of the sea at a point tormented by the currents. However, the French did not give up, due to the central importance of the political and military need to communicate with their Mediterranean colony: «[the] Government's urge – wrote Headrick – to communicate raced ahead of the capabilities of the new technology»<sup>33</sup>. Thus, the French decided to lay a third cable, made by *Glass and Elliot*. The first attempt was made at the Bay of Salpêtrière near Toulon, where a cable factory had also been established, to Algiers; the second went from Port Vendres to Algiers via Minorca, and then connected to the Spanish network – but both failed. The French were thus forced to seek an alternative route: a landline in Spain, which reached Cartagena in 1864, getting there via

<sup>32</sup> P. BATA, *Les sociétés concessionnaires de liaisons de télégraphie sous-marine au XIX<sup>e</sup> siècle*, in *L'État et les télécommunications en France et à l'étranger 1837-1987*, sous la direction de C. Bertho-Lavenir, Genève 1991, pp. 115-146; R. SALVADOR-G. FOUCHARD-Y. ROLLAND-A.P. LECLERC, *Du Morse à l'Internet. 150 ans de télécommunications par câbles sous-marins*, La Seyne-sur-Mer 2006, p. 29.

<sup>33</sup> HEADRICK, *The Invisible Weapon*, p. 16.



Port Vendres and Minorca, to Oran. In the following years, communications with North Africa were further intensified: a cable to Tangier was laid in 1887, and during the Moroccan war one more cable was laid between Tarifa and Ceuta and between Melilla and Almeria; finally, two more cables reached Oran in 1892 and Tunis in 1893. All lines were politically relevant, though not in terms of financial results because of the low revenues.

Spain tried to regain lost ground in the Atlantic race, and increased its cable network within the Mediterranean and to Great Britain. In 1872, the *India Rubber Gutta-Percha and Telegraph Works Company* immersed a cable between Bilbao and Britain; the same company also took care of the connection between Bilbao and Barcelona, in order to expand its influence towards the Mediterranean.

Submarine telegraphy also developed in the Adriatic Sea. The first communication in 1859 between Otranto and Vlora, in Turkish Albania, was built by the Bourbon government, whose plan was to install a connection with Constantinople and, from there, with Vienna and St Petersburg. However, the agreement signed with Turkey was apparently a disadvantage for the Neapolitan State, which was in charge of transporting, installing and operating the cable, where it remained solely responsible in case of failure or malfunction. The Bourbon government, therefore, had to take care of the maintenance and repair, where needed, of the submarine cable. Turkey was committed to continuing the telegraph landline from Vlora in three directions: the territories of the Austro-Hungarian Empire, Constantinople, and from there to Persia and the Russian telegraph network. The cable worked well, probably thanks to a flat and relatively quiet seabed, and brought to the Bourbon administration, and then to the Italian one, robust profits for the high number of dispatches. In the wake of the positive results obtained, in 1861 one more cable was laid by *Henley Company* between Corfu and Otranto. The eastern route guaranteed good income, and in 1864 the Italian telegraph administration signed a new agreement with Turkey to double the Otranto-Vlora cable with an obligation for Turkey to complete the links between Constantinople and the Persian Gulf, where the telegraph line would be connected to Basra, with the submarine cable going to Kurrachee and thence to Bombay. Between 1870 and 1898, in the eastern Mediterranean at least 80 cables were laid, creating a dense mesh. In 1882, the Austrian Government gave its approval to a submarine cable between Trieste, Ragusa (today Dubrovnik) and Corfu up to Malta; the concession was the prerogative of the French house Érlanger, which then sold it to the *Eastern Company*.



*Finally, the Atlantic cable*

In the years between the failure of the cable in 1858 and the attempt of 1864, the new submarine technology significantly progressed, together with the enthusiasm of private entrepreneurs and the confidence of governments. The hope of high profits did not appear without any reason. After years of careful preparation, in 1862 the *Atlantic Telegraph Company* was ready to start, with support from the British and American governments and private investors. The new cable contained three times more copper than the previous one, and one and a half times more gutta-percha. Despite this, the new attempt, which was made in summer 1865, also failed: while the cable was being hoisted to be repaired, it broke and could not be rescued. However, this did not discourage Field and his colleagues; on the contrary, it ultimately demonstrated that laying the cable in the Atlantic ocean was possible based upon the technology adopted. To start over, £ 600,000 were needed; these funds were again collected from the main British commercial and industrial centers, as well as through the intervention of a banker, J.S. Morgan. Following the revitalization and recapitalization, it was decided that a new company would be created: the *Anglo-American Telegraph Company*. The 1866 expedition was prepared with much care in terms of technology and organization, and, last but not least, was established after the end of the American Civil War. On 27 July 1866, the Great Eastern was successful in laying the cable. Communication between Europe and America – or, more precisely, between Valentia island in Ireland and Hearts Content in Newfoundland (notably both British possessions) – was finally established. The cable was the result of two years of experimentation by Charles Bright and Latimer Clark; it was able to transmit twice the number of words per minute than those transmitted by the cable of 1858.

A new era was started: among the 56 cables laid up to 1860, 46% had failed, while 17 out of the 18 cables laid in the years between 1861 and 1866 worked brilliantly. In 1914, at the eve of World War I, the total number cables laid in the North Atlantic was 17.

*Expansion of the market after 1866*

After the success of the Atlantic cable in 1866, telegraphy seemed to open up very inviting horizons. The speed of communication was amazing: at the end of the century telegrams between the London

and the New York stock exchanges took three minutes to cross the ocean, reached Bombay in 35 minutes, Hong Kong in 80 minutes, and Sydney in 100 minutes<sup>34</sup>. Telegraphy definitely turned into one of the major business of the century. If, from the technological viewpoint, the years of preparation for the laying of the Atlantic cable in 1866 represented the richest of innovations, the next epoch was characterized more by the effervescence of the market and the stagnation of technology. Those looking for a profitable investment spotted the right target in the cable companies. New cable companies of various sizes, and belonging to a wider range of countries, quickly joined the existing groups, creating intense conflicts that frequently resulted in mergers and acquisitions, but also in struggles for the occupation of a potentially promising area. French, German, American, Austrian, Russian, and Danish companies threw themselves into the underwater challenge with maximum effort, hunting the «British hare». Relevant agreements were settled, such as the *Submarine Cables' Trust*, which came to hold a high number of the shares of telegraph companies in circulation. Both for the cartel agreements and for the results of the market competition, especially on the busiest lines, submarine telegraphy tariffs fell, causing a significant increase in the use of the open submarine lines. Great Britain, while remaining by far the most hegemonic power on a global scale, suffered increasing competition from the major world powers, which, in the aftermath of 1866, increased the country's involvement in the sector. In 1887, 70% of the cables running into the seas of the world belonged to British companies; five years later, out of a total of 247,000 kilometers of submarine lines, 66% belonged to British companies, or countries that were part of the British empire; in 1908, the proportion had fallen to 56%. Great Britain was aware, from roughly the last decade of the century, of the importance of direct control over the lines, or the so-called «all-red» system, and thus incremented their own involvement from a purely imperialist perspective. In addition, heavy governmental subsidies appeared for the highly strategic lines; in return, the British government maintained the right of immediate use at any time, and used the warning «clear the line», whenever sudden urgent political or military needs arose. Within a few years, the hegemonic plan was completed and the dominance of Britain was overwhelming.

<sup>34</sup> HEADRICK, *The tentacles of progress*, p. 130.

### *The Atlantic competition*

The laying of the cable in 1866 marked the beginning of a fierce competition over the Atlantic, which was facilitated more and more by the consolidation of technology, and by wider testing adopted by the specialized companies. At the beginning of the 1880s, five lines crossed the Atlantic: three new cables laid by *Anglo-American*, from Valentia to Hearts Content, and another installed by Siemens brothers for the *Direct United States Telegraph Company*, which became fully operational in 1873, before being partially purchased from *Anglo-American*. The fifth cable was French.

A particular page was written by the French, who were still in search of the first Atlantic independent connection from the British<sup>35</sup>. The Atlantic expedition, which started on June 21, 1869, from Fort Minou, ten miles away from Brest, represented a failed attempt to defeat the British monopoly on the route between Europe and America. This was funded by Reuter – a great user of Euro-American communications who was thus looking for a less expensive alternative – and Emile d'Érlanger, a Swiss banker who worked in Frankfurt. The two businessmen were duly supported by the French government, even though much of the capital was paid by British investors. Thus, despite the fact that appeared as a French company, in fact, the *Société du Cable Transatlantique Française*, then absorbed by *Anglo-American*, had a British profile: it was recorded in London and from there came the money necessary for its operations. Furthermore, the company shared the same directors as *Anglo-American*: James Anderson, who was also director of *Eastern*, and Daniel Gooch, who was also president of the *Great Eastern Steamship*, which owned the cable-laying ship, the *Great Eastern*, which laid the longest Atlantic cable in the world to date, at 5,169 km from Brest to Saint Pierre and Miquelon, a French island in the south of Newfoundland, and thence to Duxbury, a town located 40 km south of Boston. The line was opened to the public on August 5, 1869, and cost £ 1.2 million<sup>36</sup>. An additional wire was immersed in Brest and Saint-Pierre in 1879 on the initiative of the

<sup>35</sup> P. GRISET, *Entreprise, Technologie et Souveraineté: les Télécommunications Transatlantiques de la France*, Paris 1996, p. 65; G. COOKSON, *The French Atlantic cable of 1869: settled technology and unsettled relationships*, «Engineering Science and Education Journal», 8 (1999), pp. 135-141; Id., «Ruinous competition».

<sup>36</sup> P. GRISET, *Je t'aime, moi non plus: the development of Atlantic submarine cables and the complexity of the French-American dialogue, 1870-1960*, in *Communications under the seas*, pp. 159-182.

Frenchman Pouyer Quertier, frontman of the *Compagnie Française du Télégraphe de Paris à New York*, with a capital of 42 million francs and a handsome subsidy from the transalpine government, but this wire was subsequently bought by the *Commercial Cable Company*.

An alternative direction to reach the United States was constituted by the Azores. The protagonist of the initiative was the *India Rubber Gutta-Percha and Telegraph Works* – a testament to the growing influence of emerging countries in the field of submarine telegraphy. Following a series of convulsive and contradictory phases, the realization of the cable took a long time, and it was finally laid between 1890 and 1893. Between 1897 and 1900, the cable, which stretched from the Portuguese islands, came to reach the United States, thanks to the intervention of the German company *Felten and Guilleaum*.

### *The birth of Eastern Telegraph*

In the early 1870s, the event of greatest interest in the context of cable companies was the merger, conducted by Pender in 1872, of four companies – *Anglo-Mediterranean*; *Falmouth*; *Marseilles, Algiers and Malta*; and *British Indian* – which together gave rise to *Eastern Telegraph*. This new company became the largest in the Mediterranean, and sanctioned the new British strategy in that sea. *Eastern Telegraph* was also the undisputed master of Balkan submarine telegraphy; practically all states in that area entrusted exclusive rights in submarine communications to it. The most developed countries in the field were Turkey and Greece, in which *Eastern Telegraph* had entirely created its cable networks. In 1897, in the Ottoman Empire 638 km of submarine cables operated. In addition, the *Black Telegraph Company*, which supervised the laying of a submarine cable between Odessa and Constantinople, belonged to *Eastern Telegraph*. The influence of Pender's newly formed company was enough for it to expand to owning 45.5% of submarine cables in the world, and geographically surpass the initial Mediterranean context. In 1869, Pender formed the *China Submarine Company* with the intention of running a cable from Singapore to Hong Kong and Shanghai, and then *British Australian Telegraph* to install a cable from Singapore to Port Darwin; both were laid in 1871. The first message from Port Darwin arrived in London on November 16, 1871, and from Adelaide on 23 June, 1872. In 1873, Pender's companies operating in the Far East and Oceania merged with *British India Extension* and created *Eastern Extension Australasia*

and *China. Eastern Telegraph* was also the most generously subsidized, raising, more than once, vibrant protests from other less favored companies that were not included in the benevolence of the British government. Moreover, Pender was running the most strategic lines in political and military terms, and just for this he deserved a special respectful treatment.

### *The conquest of the East*

The question of telegraphy was addressed in China at the beginning of the 1870s, with the decision to draw up a sort of code of regulations to govern the field of communications<sup>37</sup>. After the Opium Wars, the commercial interest with regard to China increased, hence its transformation into a target for large international telegraph-cable companies. In addition, positive attention to innovative telegraph projects began to arise from the rest of the business community in Hong Kong and Shanghai.

The other significant country in the Far East that was opening up to concept of the telegraph was Japan. From 1869 to 1875, the country established 6,912 km of lines. The role of the *Great Northern*, which laid the line between Shanghai and Hong Kong, was of great importance in the process of modernization of the Eastern-area telegraph<sup>38</sup>.

### *The Latin-American side*

Once Spain opened its doors to Atlantic cable traffic, it was not long before the South American market, which had been very active since its new states came into being between 1850 and 1870, began looking for a way to access to the new global communications context. The Atlantic turning point in 1866 opened the door to myriad projects related to the southern part of the American continent. Many telegraph initiatives were presented by local promoters, often on an improvisation basis, who then were inexorably forced to turn to Britain when the

<sup>37</sup> E. BAARK, *Lightning wires. The telegraph and China's technological modernization, 1860-1890*, Westport-London 1997.

<sup>38</sup> D. YANG, *Submarine cables and the two Japanese empires*, in *Communications under the seas*, pp. 227-254.

time came to collect funds and access technology<sup>39</sup>. The Uruguayan government moved, between the end of the 1860s and the beginning of the following decade, for a cable to Brazil and Europe through the West Indies using the *Montevidean and Brazilian Telegraph Company*, together with the *Argentinian River Plate Telegraph Company*. In 1871, the Uruguayan brothers Pedro and Andrés Lamas obtained a concession for a line from Rio to Buenos Aires, which was then sold to the *Compañia Telegraphica Platinum Brazileira*; this was later absorbed by *Western and Brazilian*, one of the largest companies in South America in Pender's orbit. Unlike what was happening in Europe, contracts concluded with South American companies were not always clear, and this gave rise to multiple interpretations. The market was dynamic and immature from the end of the 1860s; though transmitting signals was of strong interest, the country was not always able to translate initiatives into coherent and stable projects, except with the decisive intervention of the great British companies. *European and South American Telegraph*, and *Submarine Telegraph*, became the protagonists of the cable between North America and the French West Indies in 1871. Around roughly the same period, a more concrete initiative took place thanks to James Scrymser, a former American officer and founder of the *International Ocean Telegraph* in 1866, with the aim of laying cables in the Caribbean<sup>40</sup>. Two other companies were supported by funds coming from the UK: *West India and Panama Telegraph and Cuba Submarine Telegraph*; these were active in the same Caribbean area for communications with Europe. The other strong subject in the Central American context was the *Great Western Telegraph Company*, which was founded in 1872 with the purpose of enabling communications between Great Britain and Bermuda, from which two branches would have departed, one bound for New York and the other for South America. In the same year, a cable was laid between San Juan in Puerto Rico and Kingston by *West India and Panama Telegraph*, which was founded in 1869 and owned 15 cables in the Antilles. In the early 1890s, *West India and Panama Telegraph* had collected the various branches operating in the Caribbean. This

<sup>39</sup> J. AHVENAINEN, *The European cable companies in South America before the first world war*, Helsinki 2004.

<sup>40</sup> J.A. BRITTON-J. AHVENAINEN, *Showdown in South America: James Scrymser, John Pender and United States-British cable competition*, «Business History Review», 1 (2004), pp. 1-27.

was the most powerful company in the area<sup>41</sup>. Where Perry and Marcoartú faced insurmountable problems, *Brazilian Submarine Telegraph* succeeded. In 1874, Pender's company extended the first cable from Lisbon to Cape Verde and Madeira to Pernambuco, and continued to hold control over it for nearly 20 years, until 1891. From the Brazilian destination, the cable from Portugal was connected with that managed by *Western and Brazilian*, also owned by Pender, which linked the delta of the Amazon river with the Brazilian coast up to the Uruguay border, and from there with Chile and Buenos Aires. This was the main line between Europe and South America. In 1892, *South American Cable* laid a cable between Cadiz and Senegal, and beyond, to Pernambuco.

Submarine telegraphy in the Pacific later expanded. In 1884 the US company *Central and South America* established a stable connection via a cable that descended from the Mexican west coast via Panama to Lima, where it connected to another cable owned by *West Coast of America*, thus bringing dispatches up to Santiago. The Latin-American cable network route was becoming more and more dense with the arrival of the new century. Another long line was opened at the beginning of the twentieth century by *British Western Telegraph* from Madeira to Buenos Aires via Ascension Island. In 1914, there were three links between South America and North America: two through Panama and another across the Caribbean. There were also five cables running between South America and Europe: three British, one French and one German. On all of these lines the number of telegrams was not particularly high; indeed, traffic languished for a long time because of too-high tariffs.

“*The nerves of Empire*”<sup>42</sup>

The progression of the submarine cable network was explosive: the 1,100 miles in operation in 1864 became more than 20,000 in 1870, 86,000 in 1880, and well over 200,000 at the turn of the century. In 1902, thanks to the opening of the telegraph line between Vancouver in British Columbia and Auckland in New Zealand, laid by the *Pacific*

<sup>41</sup> J. AHVENAINEN, *The history of the Caribbean telegraphs before the First World War*, Helsinki 1996.

<sup>42</sup> G. PEEL, *The empire and the century: a series of essays on imperial problems and possibilities*, London 1905.



*Cable Company*, the planet could be said to be fully wired. The game had a winner: the British had gained the advantage, inflicting on their pursuers unbridgeable gaps, despite entry into the market of powerful German, American and French companies. A large part of the network was owned by private companies: in 1913, only 18% of the 516,000 km of cables in the seas and oceans belonged to public.

Even the Victorian empire can be said to have been held together largely thanks to having the most steadfast submarine telegraph network in the world. Large enterprises, including those obtained by virtue of frequent mergers, gave stability to the sector. The increase in traffic was overwhelming: at the dawn of the new century, in 1902, 90 million telegraph messages were sent from Britain – i.e. 2.2 telegrams for every inhabitant of the country, while this figure was 0.9 per person for the US. Significant reductions in the cost of telegraph transmissions changed the market in the period 1876-1914. The submarine telegraph network, at the end of the century, was the connective tissue of the world, and one of the most substantial products of the industrial revolution.

ANDREA GIUNTINI

*Università di Modena e Reggio Emilia*