

Technical standards and political constraints in the first Italian submarine cables network (around 1850-1870)

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Abstract—Submarine cables developed quite early in a backwarded country like Italy after 1850. That was due mostly to the British standardized technology in the field. For some years Italy profited of its unique central position in the Mediterranean sea.

Keywords: *Italian submarine cables, second industrial revolution, communications*

I. INTRODUCTION

In terms of invested capital, financial risk, technological challenge, and public opinion involvement, submarine telegraphy is an extremely important page in the history of the mid 19th century. Taken from the point of view of the economic historian, it appears as 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, constituting a sort of “extension of the diplomatic and military power of the homelands outside their borders”.

The first really international telecommunications network was created thanks to the cables laid in the depths of the sea: submarine cables are fully included as a privileged component in the debate over the original globalization and establishment of a first global economy at the end of the 19th century. The development of submarine cables 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.

There are few more intriguing adventures than the construction of the world submarine telegraphy system: as has been appropriately remarked, the one that most closely approaches it is the laborious conquest of space a century later. The idea of connecting all the continents, making possible within a few hours a contact that a few years previously would have required weeks if not months, seemed incredible even in the eyes of those most sensitive to the progress of technology. It was proof that nature could be subdued by man with intents and purposes that promised to benefit the whole of humanity.

The impact of cables event on the European population most alert to innovation in technical and economic fields was

amazing. Submarine telegraphy, in the eyes of public opinion of the mid 19th century, was a decidedly different matter from land telegraphy which could somehow be understood in its functioning. Viceversa, how it could be possible to have a telegraph cable function immersed in the depths of the sea, was incomprehensible except by projecting the mind into a future filled with unpredictable novelties: “They intend to send a wire to the moon, and they’ll set the Thames on fire very soon”, the poet W.S. Gilbert recited, expressing the feelings of a large part of London society in those days.

II. RULE BRITANNIA

The question of submarine cables bears the permanent mark of the British. The only country to have the required raw materials and first rate engineers readily available was Great Britain, the undisputed ruler of the seas and of mail transportation. Projects and capital came from Britain, and it was the British who stood to gain more than any other nation in this sector, obtaining enormous benefits in all fields from economic to military. The great British Empire was dependent also, to a large extent, on the cable network: in 1900, 72% of the cables laid throughout the world were English property.

The control exercised by Queen Victoria’s subjects was total. All messages exchanged even among other countries with their colonies overseas had invariably to go through Great Britain or through British telegraph stations spread around the world.

All this was not merely a predominant condition to be exploited in case of war emergencies, but it was also an advantage for British firms with regard to international competition. 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.

III. THE CABLE ACROSS THE ENGLISH CHANNEL

The first attempts to lay a submarine cable date from the same period as the circulation of overland telegraphy. In 1841 Charles Wheatstone, one of the recognized fathers of electric telegraphy submitted a plan to the English House of Commons for crossing the English Channel. Also the best known founder of the telegraph system at the time, Samuel Morse, as early as

1845 attempted to lay a cable at the bottom of the port of New York.

Success was achieved in 1851 by the Brett brothers, engineers from Bristol, Jacob (1808-1897) and John Watkins (1805-1863). The first of the two who died long after his brother in unbelievable poverty, had visualized a cable across the English Channel as early as 1845. 1851 was the second try; the previous year it had been thwarted by the accidental interference of a fisherman who had inadvertently cut the cable so that it lasted virtually only about two hours. The very same year of the great rendezvous of the Crystal Palace, the Bretts, at the head of a group of industrialists, succeeded in an accomplishment that seemed beyond the range of technology at the time; this cable, unlike the preceding one, worked for 37 years. It was laid with rudimentary instruments and procedures, by a simple tug boat, the Goliath; it was only later, in the mid seventies, that special cable laying ships were developed for this task.

The following year a second cable, again from Dover to Calais, was laid by the first submarine cable company, the Submarine Telegraphy Company, founded by Thomas Crampton, and in 1853 Belgium was also connected with Great Britain via cable from Middelkerke.

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 were an enthusiastic groundwork for Anglo-America submarine communication, to which the Brett brothers themselves were totally committed. In the end a strong feeling of disappointment prevailed, but what should not be disregarded is the development of a final maturity in the techniques which had been developed thanks to the joint effort of a considerable number of engineers and scientists who were called to a challenge of huge importance.

Hopes were also encouraged by the success in 1855 of the laying of a submarine cable, 356 miles long, from Varna to Balaklava on the occasion of the Crimean war. In that case it was the Newall company, one of the leading cable manufacturers, to follow the operation which yielded 7,500 pounds. Communications had an entirely military purpose: thanks to it London and Paris were able to keep in constant contact with their armies on the battle fields.

IV. TECHNOLOGY AND ECONOMY OF THE CABLES

Installation of the cables required long, hard work. Design and construction were not the only complex stages of a submarine connection, it was in fact also necessary to transport the cables, weighing several tons, and lay them - after adequate testing - on a possibly flat, deep sea floor, submerging them with utmost care by means of pulleys.

The operation required the use of large ships, expressly built for that purpose, and the participation of expert technicians, mainly research chemists, geologists and engineers. The queen of the cable laying ships was the Great Eastern, the largest and most famous of all, originally used for the transportation of immigrants to Australia.

Transmission of electric impulses, subsequently converted into signals, through a cable submerged in deep water was a challenge of a technical and scientific nature highly different from that of overland telegraphy. While the wire of the aerial lines was metal, the conductor of submarine cables had to be encased in special waterproof material, gutta-percha, that would prevent the dispersion of electric power. In order to prevent the cables from suffering damage or, worse still, rupture, they were enclosed in a sheaf of wires, usually up to seven, 1 millimeter in diameter each, in order to make them resistant to blows and tension, but also to shellfish, the anchors of ships, and fishermen who were unintentionally responsible for many failures of submarine telegraphy.

The invention of an effective insulating material was one of the turning points in the history of submarine telegraphy. Where tar and rubber had failed, gutta-percha was successful; it was a plastic material known in Great Britain since 1843, extracted from a tree growing in Singapore, Borneo and Malaya, with the faculty of restraining the electric impulse and then releasing it, insulating the copper wires. Werner von Siemens, the inventor in 1847 of a machine for the application of gutta-percha, provided the necessary turning point; it was the firm created by him that produced the first underground line insulated with gutta-percha, in Berlin in 1848.

Such a financial undertaking, as in the case of the railroads with which it was possible to establish a parallel in many respects, could not be sustained by a single entrepreneur; only large companies were in a position to guarantee a rich availability of capital collected mainly on the British market. The submarine telegraphy sector, potentially more profitable than the overland one, was managed largely by private companies, initially often organized by resourceful engineers, who ordered the construction of cables by the leading firms specializing in the sector: Siemens and Halske, Henley, Newall, Glass and Elliot were the most important in the early period.

The relationship that was developing between the State and private companies came within the sphere of public law, since it was a service. This does not mean that the role played by the public sector is insignificant; on the contrary, the guidelines indicated by the different governments were always crucial also in terms of support to the different initiatives. Great Britain generously subsidized its cable manufacturers, while it was always rather unenthusiastic regarding as intense an involvement in the field of overland telegraphy. Moreover, the unique political, diplomatic and strategic value of submarine cables did not escape anyone, and led in the end to heavy subsidies, which were necessary due to the high cost of the cables themselves and due to the insufficient profitability of the business.

The importance of the international submarine network reflected also on other sectors. From the shipping business which was deeply affected, to an increased awareness of the influence of market conditions on business practices, and the beginning of a modern information system, the innovations brought about by cables laid under water were significant.

Basically there were four main clients of the new submarine telegraph communications : press agencies, the

major ones being Reuters, Wolff and Havas; trading and shipping companies; governments and armed forces; the public in general which was a less important client due to the fact that, for a long time, sending a telegram was very expensive. In short, this new type of telegraphy launched the issue of submarine cables into the big business of the time.

V. THE FIRST ITALIAN LINE

Parallel to the development of expectations regarding the Atlantic cable, telegraphy interests also flowed towards the Mediterranean, where France and Great Britain rivaled one another for the main strategic routes.

Though unable to compete with the other two European powers from both a technological and entrepreneurial standpoint, Italy played a relevant role in the sphere of submarine telegraphy in the years following the laying of the first submarine cable between Dover and Calais in the late seventies. This was possible on account of its geographical position, actually an authentic income situation: being at the center of the Mediterranean, the country happened to be a natural crossroads for telegraph communication which at the time was expanding most successfully. The Italian peninsula with its elongated shape and central position was an ideal landing place for the submarine cables connecting Great Britain and other European countries with the African and Asian colonies. Basically there were two strategic points for which Italy was at the center of a busy chain of initiatives: it was the means of access to northern Africa and at the same time to the East.

The Italian peninsula was a sort of bridge between Europe and Asia, and as such was particularly useful to British strategies of communication with its Indian possessions. In the course of a few years, beginning even before its unification, Italy was able to accumulate a considerable supply of submarine cables, in spite of its unquestionable overall weakness, actually playing a top level strategic role. All this took place also owing to the forethought of its governments which tried to exploit this most inviting opportunity stipulating a number of agreements with the foreign companies in charge of submarine telegraphy.

The original initiative goes back to 1853, when the Paris government, which had made its own laws on the monopoly of overland telegraphy since 1837, decided to support the project for submarine communication with Algeria. The itinerary included crossing Corsica and Sardinia, thus developing a mixed overland and submarine route. The place of arrival was located in the city of Bona.

The leading figure of the episode was again John Watkins Brett, who had expressly founded the "Compagnie du télégraphe électrique sous - marin de la Méditerranée pour la correspondance avec l'Algerie et les Indes". The company's board of directors contained some outstanding names of the European railroad and telegraphy field, especially English and French: Count de Morny, Jean Hastermann, Samuel Laing, William Chaplin, James Carmichael, all happened to hold shares in the two major communications organizations of the time.

The company drew up two separate agreements with the French and the Piedmontese administrations. The text of the contract with the French concerned the construction within two years, laying and subsequent maintenance of the cables, besides operation of the service on the entire line from France to the Algerian colony. The plan envisaged by Brett, however, provided also for extension towards Tunis, Malta and from there towards the East through Egypt; the idea soon fell through for fear that the line might reveal itself unproductive and difficult to build and operate.

With the Turin government, however, the company agreed to carry out also the plan for a cable between the locations of Santa Croce, near the river Magra on the border between Tuscany and Piedmont, and Cap Corse, which was laid in July of 1854. The administration of the Piedmontese House of Savoy, in turn, agreed to connect Genoa with Santa Croce by means of a telegraph line. In exchange for this commitment the Piedmontese government undertook to pay the company 150,000 Lire a year for fifty years, which amounted to a 5% security on capital. Also, against payment of a compensation of 16,000 Lire, the telegraph administration of the House of Savoy took over the control, but not the maintenance, of the Sardinian overland lines which were also completed in 1854 along with the connection of Bonifacio with the Sardinian coast. The fact that the French had granted 4% security on a much lower figure, 4,500,000 Lire, is revealing of the importance given to the issue by the Piedmontese government.

The first Italian cable, finished rapidly considering Italian conditions at the time, was the same as the one connecting Dover to Calais. It consisted no fewer than six conductor wires wrapped in several layers of gutta percha and enclosed in a sheath of tarred hemp, the whole protected by an outer framework of wires arranged in a spiral "so as to resemble a kind of case", wrote Carlo Matteucci, creator of the first Italian telegraph line. Every time it broke down, which happened often, it had to be repaired in Great Britain, which took an enormous amount of time. It had been manufactured by Glass & Elliott, the largest supplier of Mediterranean cables in the second half of the fifties.

The cable presenting the greatest difficulties was the one between Sardinia and Algeria, laid in a very deep stretch of the sea plagued by currents, and probably also too long for the equipment of the time: "Proof had however been obtained – recites a report of English origin - that it was possible to submerge a heavy cable, successfully, to a depth of 1.640 fathoms. It was all important, in enterprises of this kind, to ascertain, with accuracy, the relative speed of the ship and of the paying-out of the cable". The depths of the Mediterranean – the cable between Siracusa and Bengasi went through areas where the sea floor was as deep as 4,200 meters – were an important element in the whole of the submarine telegraph adventure.

At the end of a complicated cycle of negotiations, due also to the delay that had by then been accumulated by the agent, the firm Newall was assigned the job, and in 1857 it completed its task; however, communications never actually worked satisfactorily, and the 256 miles of cable, whose loss cost

70,000 pounds, were finally abandoned at the bottom of the sea.

The failure was probably not caused only by technological problems. During the general meeting of the company in June of 1857, there were a number of attacks on the part of some of the stockholders against the management: doubtful bookkeeping, to say the least, lack of bookkeeping records, misappropriation and fraud seemed to have been normal practice in Brett's company, which explains the disappointing outcome of the second part of the initiative. The deficit against which measures were attempted by issuing new bonds, had been as crucial as the technical difficulties in causing the collapse of the enterprise.

The Piedmontese stockholders in vain consulted their Ministry of Trade, in an attempt to own their investments. Brett was under heavy charges: from "the harm produced by negligence or incapacity of a management that in no way justified the trust that had been placed in it" to "the waste perpetrated up to now" and also to "blameworthy omissions", the analysis was ruthless, but ineffective to practical intents and purposes

The bitter fate of the Sardinia cable weighed heavily on the strategic claims of the Piedmontese government, which was definitely the most enlightened among the pre-unification Italian governments. The defeat, though caused by natural reasons, risked cancelling the advantage of an early start.

The failure brought on a distinct deterioration in relations between the two administrations involved, and the agent Brett, who in 1859 was forced surrender, yielding the leadership of the telegraph company to Claude Ernest Lami de Nozan. Applying the dictates of the agreement, the French government declared the end of the agreement with the company that had been unable to keep to its promise. The Italians instead could not assert the same rights as the French against the company, so they kept up the relationship with it since it was not in default as far as the Italian tract was concerned. Renunciation to the agreement was requested later, in 1864, following the interruption of submarine contact between Liguria and Corsica, which was replaced two years later by a new one; at that point the wording of the contract provided for the Italian government to take possession of the line. A tough court dispute then broke out between the Italian Ministry of Agriculture Industry and Trade and what remained of Brett's company which could not seem to obtain anything except the evident termination of the license.

The French did not give up. Unable to reach Algeria from Sardinia, they were forced to find an alternative course, but it was equally ill-fated. Environmental conditions evidently were not the favorable to laying a submarine cable. Only in 1870 were they able to complete the connection with their North African colony from Port Vendras via Minorca, and from there on the Spanish coast, between Cartagena and Orano in Algeria. The cable was an important acquisition also for Spain, which had laid the first cables in the Mediterranean to reach the Balearic Islands. The Spanish produced their greatest effort in the Atlantic, while they paid much less attention to Mediterranean connections.

VI. BELOW THE OCEAN

During those same years the most sought after objective was connection between the two shores of the Atlantic Ocean. The reunion of the two Anglo-Saxon families, proving their superiority, had its primary expression in the laying of the cable, and at the same time was proof of the very close blood ties between the two people.

So research got under way for preparation of the colossal operation of laying a cable of inconceivable size; and in the meantime investors from both countries started moving. In 1854 a group of U.S. capitalists led by the paper dealer C.W. 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 which in 1856 had been linked to the American continental network. The role played by Field in both endeavors was crucial, to the point that Bright defined him "a man of destiny".

Vital encouragement to attempt the Atlantic undertaking came to Field from Matthew Maury's report to the U.S. navy in which the bottom of the ocean was described "as a plateau, which seems to have been placed there especially for the purpose of holding the wires of the submarine telegraph, and keeping them out of harm's way". Of equal importance was his meeting in England with John Pender (1816-1896), known as the "cable king", the greatest entrepreneur in the field of submarine telegraphy. The next step was the creation in London, in October of the same year, of the Atlantic Telegraph Company, of which Pender became manager, and whose 350 shares at 1,000 pounds each, were underwritten, with considerable reluctance, almost entirely by British capitalists, who were in any case much more inclined to get involved than their American colleagues. Thanks to the good results of the underwriting, production of 4,600 km of cables was completed as early as June 1857. The ships in charge of carrying out the submersion of the wire were supplied by the British and U.S. governments. Both guaranteed financial support for twenty five years for transmission of their official correspondence.

Cable laying was started from the small Irish island of Valentia, August 7, 1857, but five days later, having laid 500 km., the cable, created in only four months, half by Glass and Elliott and half by Newall, broke and disappeared at a depth of 3,600 meters, where it was impossible to retrieve.

The project was put off to the following summer: on June 1858 a second attempt was made, which was equally unsuccessful, as were other subsequent attempts. It was then decided to revise the cable and the machinery for submarine laying. One month later the third attempt was more successful. On July 29th the same ships again started laying the cable, and on August 5th the cable connected Ireland to Newfoundland. Five days later the first messages were dispatched; on the 16th the cable transmitted a message of good wishes from Queen Victoria to President Buchanan, whose reply, sent on the 19th and received 16 hours later, stirred up great enthusiasm, and lyrical paeans rose to the sky: "The seven wonders of the world have passed into oblivion with this miracle of modern science", wrote a periodical of the time, which enumerated the marvels

of the latest scientific achievements. On the U.S. coast the organization of “parades, dinners and speeches” immediately got under way, only to be sorrowfully cancelled.

In September the cable broke in several places, preventing operation; on October 20th, before even opening to the public, the cable became totally silent. At the moment of the final breakdown of the cable, Field “wept like a child”.

In spite of the disaster, the “Punch” proved its full optimism, stating: “It is wrong to imagine that the spark of life is extinct. The most eminent physicians in electricity declare it is only a state of suspended animation that for the moment has taken away the faculty of speech”.

The one to pay for the loss was the person responsible for the electric sector of the company, Edward Orange Wildman Whitehouse (1817-1890), a gifted scientist. He was accused of sufficiently testing the resistance of the cable, and fired by the Atlantic Telegraph Company. He was not spared heavy charges of being a lunatic and a swindler, but most of all – and in greater likelihood – he was accused of having exaggerated with the voltage, which had actually been kept high in an attempt to recuperate the insulation that undue exposure to the air had destroyed. Actually, when the cable was found again many years later, and tests were made on the remains, it was seen that it was probably fated to be damaged anyway, and that Whitehouse’s responsibilities were negligible.

Nor did the other persons in charge of the company receive better treatment: violent criticism was made against President Brett, and Vice President Field, and almost as intense were the charges against the Secretary George Saward. Charles Tilston Bright (1832-1888), chief engineer, had to suffer the disgrace, on the part of the “Scientific American”, of seeing his undertaking defined “a lottery”, rather than an “important scientific, engineering and nautical operation”. Pender, finally, “risked unpopularity by supporting Field in his insistence that the company should try again”.

A total of 732 messages had been sent, and this was sufficient proof that it was possible to communicate at a distance of over 3,000 km without any intermediary station.

An alternative by way of land was investigated to connect the American continent to the European; the itinerary, designed by Perry Collins and explored in 1858 by the initiative of Hiram Sibley of Western Union, wound from San Francisco up through Alaska and Siberia, aiming at the heart of Europe, but was abandoned before its completing.

VII. TOWARDS THE EAST

At the end of the fifties the technology available in the field of submarine telegraphy did not consent construction of long, demanding lines. The equally unfortunate end of the initiative for crossing the Red Sea, which from a financial point of view with a loss of 800,000 pounds and no messages sent was the biggest fiasco, fully confirms this. The resulting frustration scared capitalists away from this field of business and drove the British government to drastically re-evaluate its involvement.

The Indian revolt in 1857 encouraged the English to plan for a cable between Suez and the Red Sea with a view to extending it all the way to Karachi. Conscious of the political and military importance of such communication, the Queen’s government pledged a yearly 4.5% guarantee for five years on the capital of 800,000 pounds, even in the event that the cable would not work, which is what actually happened.

The first concession for a line from Egypt to India through the Red Sea, with an extension to Constantinople was granted in 1858 to the Red Sea and India Company of the brothers Lionel and Francis Gisborne, by the Ottoman and Egyptian governments. Francis (1824-1892) had been planning this line for years, after acquiring experience with the early Canadian lines and having worked on the first submarine cable in North America. In the meantime the Brett brothers entered the competition founding the European and Indian Junction Telegraph Company, with the objective of connecting the Mediterranean with the Persian Gulf through the valley of the Euphrates, a project that was soon discouraged by the denial opposed by the Ottoman Empire, which decided to complete the telegraph line to the Persian Gulf on its own.

The Gisbornes assigned the job of laying the Red Sea cable to the Newall company, which carried out the operation between May 1859 and February 1860. The line did not work, and the reason was hastily identified to be the high temperature of the waters crossed; the cable was also much lighter than the earlier ones, and rust and worms soon had the better of it. It was a huge disaster for the English, to be blamed also on political and organizational reasons – an “extraordinarily lovely case of bureaucratic ineptitude” – as well as of technological incompetence.

VIII. THE MEDITERRANEAN CHALLENGE

The Red Sea scheme implied the crossing of the Mediterranean which in the late fifties had not yet been achieved. The English counted entirely on Malta as the foundation of the Mediterranean strategy and the basic means of access to reach Suez more conveniently. Connecting with the small Mediterranean island which was the British outpost towards the East, meant not depending on any country and therefore establishing a connection entirely under its own control.

For this reason as of 1859 the English had supported the creation of a cable between Sicily and Malta, followed by others in subsequent years; according to their reckoning it was better, at least in that period, to cut through the Italian peninsula lengthwise and get as close as possible to Malta, rather than pointing on Gibraltar, as was done later, and having then to deal with a long, difficult marine crossing. Also the alternative of an overland line through Turkish territories caused doubts due to the low reliability inspired by the Ottoman Empire. From Malta it was then necessary to reach Egypt: the Malta and Alexandria Telegraph company in 1861 finally succeeded in achieving this crucial connection, which from Alexandria then branched off in one direction towards Suez and in another towards Algeria and Tunisia.

Therefore Italy came to find itself as the main crossroads of the flow of British correspondence to and from the Asian and

African colonies, and until the time when the English reached Malta independently from the west, it had the somewhat arrogant dream of becoming the hub of telegraph communications for Britain with the East. The Telegraph Construction and Maintenance company (Telcon), the product of the merger decided by Pender in 1864 between Glass & Elliott and Gutta Percha, did not hesitate in preferring the construction and operation of a long overland line from Modica to Susa, laying as many as four cables in the Strait between 1867 and 1868, when it was replaced by the Anglo – Mediterranean company. The agreement drawn up with the Italian government was highly favorable to it, and it was also free from any commitment regarding maintenance of the line. The idea essentially retraced the one for the railroads known as the Indian Mail, changing the point of arrival from Brindisi to Modica. The Italian government was to get the income from the fares traveling on the line, receiving a significant economic benefit, and the English could count on the safety of the connection.

However, it was necessary to cross the Straits. The first cable to Sicily had been laid January 25, 1858, and had not held out more than nine months. Altogether nineteen cables broke down in those years due to the strong currents in the Straits, requiring special reinforcement of the cable armor. The question was solved when finally in 1863 the general supervisor of the Italian telegraph administration, Salvatori, had a cable laid which in fact offered more than twenty years' resistance on a slightly longer but less wearing course from Bagnara in Calabria to Torre di Faro in Sicily. The cables then multiplied: more were laid between Pozzallo and Torre di Faro in 1884, 1886 and 1889. In that same period communications were also started with the Eolie islands via the Milazzo – Lipari cable in 1881, and the Lipari – Salina in 1882.

Connection between the two major islands was not less of a problem. In 1863 the first cable between Sicily and Sardinia was laid, prompted by Glass & Elliott, but the stretch of sea was as rough as the Straits and communication was extremely difficult. The cable broke down immediately, and the company, due to the unfortunate agreement made by the Italian administration, was exempted from repairing it. The difficulties were overwhelming to such a point that Sardinia remained telegraphically isolated for almost two years, and in 1868 the plan for connecting the two islands was finally abandoned. Then the Italian government was compelled to make do with a new connection with Corsica and between it and Sardinia. It was only in 1875 that a direct connection was achieved between Sardinia and Orbetello without going through Corsica, and it was the longest: 118 nautical miles.

Italy, ultimately, was the leading player in a further initiative which confirmed its relative vitality, in consideration of its overall backwardness. In 1859 the administration of the Kingdom of the Due Sicilie completed a stretch of submarine telegraph which from the beginning revealed itself of major economic and strategic importance, between Otranto in Puglia and Valona in Turkish Albania. Two years later, after the Italian unification, a second cable constructed by the Henley company connected Otranto to Corfu.

Seemingly the agreement made with the Ottomans was a drawback for the Neapolitan state. The latter actually undertook the transportation, submersion, laying and opening up of the cable, remaining the only responsible party in case of a breakdown or inadequate performance. The Neapolitan government would therefore have to deal with the maintenance and possible repairs to the submarine cable. The Turkish administration was thus free from any responsibility except that of continuing the overland telegraph line from Valona in three directions, toward the territories of the Austro-Hungarian empire, towards Constantinople and from there towards Persia, and to the telegraph network of the Russian territories. In this way, by means of the Adriatic cable, the Kingdom of the Due Sicilie could connect with distant capitals such as Vienna and St. Petersburg, avoiding transit through the Papal States.

Actually the Bourbons, and later the Italian government, benefited widely from this agreement, thanks also to the fact that the cable, laid along a flat and relatively calm sea bed, worked without too many problems, and even earned large profits. Through that line, in fact, passed the main dispatches directed towards the East, whether towards Russia or towards Persia and the British Indies. Even though part of the route was made by post, generally speaking this cable made possible the first telegraph connection between Europe and the East. For this reason in 1864 the Italian telegraph administration made a new agreement forcing the Sublime Porta to complete connections between Constantinople and the Persian Gulf, where the telegraph line would be connected to Bassora by the submarine cable which reached Karachi, and from there to Bombay. The advantages were obvious and continued until the line to Malta went into effect. Up to that time the Italians were able to forward dispatches originating from Northern Europe and directed to the East on the Adriatic line, taking advantage also of the fact that international agreements on the subject indicated the requirement of using the least expensive means for each telegram, and going through Otranto was actually the cheapest alternative.

IX. THE ATLANTIC CABLE OF 1866

The two failures suffered in 1858 in the Atlantic and Red Sea was an inevitable setback for the entrepreneurs involved in the sector. In spite of the disappointment, the Atlantic Telegraph Company prepared to lay another cable, providing for a capital increase which was underwritten in spite of the huge risks that the undertaking obviously entailed. In fact the English government guaranteed 8% interest on the new issue for twenty five years from installation; 4% interest was guaranteed to the first-time issued securities. It was also necessary, however, to support the viability of the project; so the British government nominated a committee – The Joint Committee of Privy Council for Trade - jointly with the Atlantic Telegraph Company, made up of renowned scientists, who worked from December 1859 to September 1860 on the project, and expressed a favorable opinion. In April 1861 the committee made its results public in a particularly substantial publication, *The Blue Book*; these results were on the whole reassuring in relation to the estimated profitability of the investment, and the technical feasibility of the Atlantic project.

Government aid did not end here: a British Navy Ship, the *Porcupine*, again sounded the ocean between Ireland and Newfoundland in order to supply more exact data. The most visible result of these forms of support, besides creating technical progress, was to arouse confidence in the investors. In spite of the disastrous financial precedents, early in 1864 the necessary capital had been collected and the price of the shares shot up. It was calculated that, once communications had been established, one year of operation would be sufficient to recuperate the invested capital.

The period following the 1858 disaster was characterized by an intense phase of research and preparations, particularly in the sector of electrical studies, which led to the final maturing of submarine telegraphy. In actual fact this level remained as the standard until the 1920s. A number of leading figures contributed to the technological progress needed to win the Atlantic challenge. From Fleeming Jenkin (1833-1885) teaching in Edinburgh, to Willoughby Smith (1828-1891), to William Thompson, Lord Kelvin (1824-1907), a professor of natural philosophy at the University of Glasgow when he was only twenty one, who developed in a significant way the theory of the transmission of signs, the role of scientists in this situation was absolutely crucial. As confirmation of the enormous progress made, it should be kept in mind that out of 56 cables laid until 1860, 46% had failed, while 17 of the 18 cables laid between 1861 and 1866 performed brilliantly.

The 1866 expedition, finally made possible also by the end of the American Civil War, was prepared with the utmost care. The *Times* sent, on the *Great Eastern* – the 22,500 ton ship selected for the undertaking, as the largest cable layer in existence at the time and the only one with the capacity to carry 4,500 tons of cable – a journalist, W.H. Russell, former correspondent from Crimea at the time of the war, whose articles thrilled readers. It was a complete success; two cables, immediately opened to business with a transmission capacity of 5-6 words per minute, connected Hearts Content, Newfoundland with Valentia Island, Ireland, both territories belonging to Great Britain. In 1869 a new cable was added to the existing ones.

X. IN INDIA

As they were unable to cross the Red Sea, the English had to be satisfied with conveying their messages to India by land. In 1865 the Suez telegraph line was finally linked to the Turkish network and reached Bassora and Karachi, thus completing the connection from London to their major colony. There was long diplomatic, as well as technical, groundwork, requiring practically the entire first half of the sixties. Particularly laborious were the long negotiations with the different governments, many of them politically unstable, whose land the line went through. This made the government in London uneasy, since it would have preferred a submarine line totally under its control, and it did not appreciate having to measure itself with the demand of using local personnel, many of whom often did not even speak English.

The first submarine connection between London and Bombay, uninterrupted except for the Suez-Alexandria stretch which was still overland, was inaugurated in 1870 by the

Falmouth, Gibraltar and Malta Telegraph Company. The long cable, from Great Britain to Gibraltar, Malta to Suez and from there to Bombay, represented, after the Atlantic cable, the second greatest telegraph system in the world. It was the “first link in an intended ‘all red’ system, that is a cable network which linked all the parts of the Empire without ever touching foreign soil”, a matter of major importance to the London government. That same year another long overland line connected Great Britain to Teheran through Germany and Southern Russia.

In the following years other cables were added to the first one, and others still were made to continue on their way from Bombay to the Far East, Australia, South Africa and Latin America.

XI. THE TURNING POINT

Once the first cable to the United States had been successfully laid, Great Britain transferred all its attention towards the Mediterranean in order to take possession of the essential strategic route towards India. Nationalization of overland telegraphy in 1868 released a considerable amount of capital which was for the most part diverted towards submarine telegraphy.

At that point the English drive was such as to subdue the fragile central quality Italy had established up to then. The Italian golden moment therefore failed, more or less, from that time; the Mediterranean became the center of economic and political interests that a country as young and powerless as Italy was not in a position to hold up with its own strength.

When at the end of the sixties the United Kingdom, relying on an unquestionable supremacy in this field, connected Malta to Gibraltar and the latter to England, the Italian peninsula, and with it all of continental Europe, was left out from the flow of English correspondence to and from the colonies.

When the Falmouth, Gibraltar and Malta telegraph company, founded in 1869, laid a cable from Porthcurno, in Southern England, to Lisbon, Gibraltar, Malta and finally Egypt, for a total of 2,281 miles, everything was all set for Great Britain. In this way it avoided potentially risky crossings, such as the Italy, preferring a securely loyal country such as Portugal, a good friend of the English, and also interested in an international connection. In 1873 another cable reached Carcavelos in Portugal from Porthcurno; then in the eighties other cables were laid to Malta and Egypt.

The French were also moving with increasing vigor in the Mediterranean area. The cable laid by the Marseilles, Algiers and Malta Telegraph Company of England in 1870 from Marseilles to Algiers was obviously not satisfactory, so they prepared to lay new ones in 1871, 1879 and 1880, and also others to Tangier in 1887, to Orano in 1892 and Tunis in 1893.

The situation changed further in 1872, when Pender merged four large cable companies - the Anglo-Mediterranean, the Falmouth, the Marseilles, Algiers and Malta, and the British Indian – founding the Eastern Telegraph, which thus became the leading business enterprise in the Mediterranean. The creation of Eastern Telegraph confirmed the ultimate change in

attitude of the English regarding the Southern European area. In the course of twenty years Eastern Telegraph, with a capital of 3.8 million pounds, and whose dividends in the period from 1873 to 1901 never fell below 6.75%, acquired 45.5% of the world's submarine cables.

In the Mediterranean sphere power relations had been restored, and Italy had to put away the hopes it had nurtured in the early years of its existence. The short-lived period of glory, however, contributed to a growth of the sector that was most significant in the course of events.

XII. THE ADRIATIC

Since the time of the first cable between Puglia and Turkish Albania, the activity of submarine cable laying had been ceaseless also on the eastern side. Between 1870 and 1898 fewer than 80 cables were laid in the eastern Mediterranean.

The main route, in its shortest stretch which was later continued as far as Egypt, was followed by other itineraries creating a vast network of cables linking the Adriatic shores of Italy to those of Greece and its islands.

The Austrian government in 1882 also gave its consent for a submarine cable between Trieste, Ragusa and Corfu to Malta; the concession was the privilege of the Erlanger firm in Paris, which later gave it up to Eastern Telegraph.

XIII. A PLANET OF CABLES

Beginning in the seventies, an actual competition for cables got under way, involving the whole world. The final consolidation of technology and financial strengthening of the sector made it possible for the submarine network to include all the continents; on the eve of World War I telegraphy was an operating structure, a teeming system of communications crisis crossing the oceans, which had changed the way of doing politics, business and information transfers.

Thanks to Pender's unrestrained activism, creating the Eastern Extension Australasian and China Telegraph Company, the cables reached the Far East and Australia: in 1870 Singapore was connected, three years later Honk Kong, the first message from Port Darwin arrived in London on November 16, 1871, and from Adelaide June 23, 1872, in October 1872 the line for the Australian continent was officially opened. In 1879 the Eastern and South African Telegraph Company laid a cable at the Cape of Good Hope; in the same period it also laid cables in Latin America. In 1902 the cable connecting Vancouver to Auckland and Brisbane closed the circle of Pan-British submarine cables around the world, which really was an imperial operation.

The English were increasingly the masters of the submarine cable system, but the other countries were doing their best to keep up with British power from a point of view of growing colonial rivalry. Soon after the accomplishment of the 1866 cable, the French were planning an independent connection with the U.S. It is a fact that in spite of French and German progress, in 1914 the English maintained a clear superiority in this field, as in that of shipping; and even compared to the dawning American power, the gap continued to be evident: at

the end of the century English cables exceeded American cables four times in terms of nautical miles.

There was also a clear preference for private operation: out of a total of 516,000 km. of submarine cables, 94,000 were state owned and of these one third were in the hands of the British Empire. Out of 422,000 km. of submarine cables belonging to private companies, 250,000 were the property of companies registered in London.

As it had been at the beginning, the field of cables was not a perfect example of free competition. The cables used mainly for business purposes usually did not benefit from subsidies, while those of some political and strategic importance were financially supported, whether they belonged to the State or to private companies. In this latter instance the companies were expected to give precedence to official messages announced by the "clear the line" signal. The fact that the strategic cables guaranteed subsidies to the companies or even a monopoly situation, was highly criticized by the companies that did not enjoy any benefits, and by anyone advocating an open market and competition in telegraph communication. The company that was most protected by the government was the Eastern Telegraph Company, due to the fact that the majority of the strategic lines belonged to it. At the end of the century it was even expected that its ships would be placed under the command of the English Admiralty.

REFERENCES

- [1] DANIEL R. HEADRICK, *The invisible weapon. Telecommunications and international politics, 1851-1945*, New York-London, Oxford University Press, 1991
- [2] *Flussi invisibili. Le telecomunicazioni fra Ottocento e Novecento*, volume monografico di "Memoria e ricerca", a cura di Andrea Giuntini, 2000, 5
- [3] GILLIAN COOKSON, *The cable. The wire that changed the world*, Stroud, Tempus, 2003
- [4] *Sul filo della comunicazione. La telegrafia nell'Ottocento fra economia, politica e tecnologia*, a cura di Andrea Giuntini, Prato, Istituto di studi storici postali, 2004
- [5] SIMONE FARI, *Una penisola in comunicazione. Il servizio telegrafico italiano dall'Unità alla Grande guerra*, Bari, Cacucci, 2008
- [6] ANDREA GIUNTINI, *Le meraviglie del mondo. Il sistema internazionale delle comunicazioni nell'Ottocento*, Prato, Istituto di Studi Storici Postali, 2011