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THE 19TH CENTURY INTERNET
THE FASCINATING STORY OF 'INDO-EUROPEAN TELEGRAPH'

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The East India Company introduced Telegraph in India (1851) to establish a firm imperial control over its prized colony. Telegraph served the commercial, administrative and imperial purposes of the Company and practically saved the Company's Govt. during the mutiny of 1857 by quickly transmitting the news of the movements of the mutineers and sending SOS for military reinforcement. After the mutiny, when the administrative control of India passed on from the Company to the Queen's Govt., a pressing need was felt to telegraphically connect England with India. The first attempt was made by 'The Red Sea and India Telegraph Company' to lay submarine cable, which failed. The first successful underwater connection from London to Kolkata via Mumbai was made by the 'Eastern Telegraph Company' of John Pender through the Mediterranean, Red Sea and the Arabian Sea. From Kolkata it further extended to China, Japan and Australia. For laying a direct, dedicated overland telegraphic line between England and India, which is easier to maintain, the British Indian Govt.-owned Indo-European Telegraph Department (IETD), which had already been operating telegraph systems in Persia (Iran) and the Ottoman Empire (Turkey) in the Middle-East, collaborated with the Siemens group of companies (based in London and Berlin), and the 'Indo-European Telegraph Company' (IETC) was formed. IETC's engineer Ernst Werner von Siemens made some important technological innovations that enabled a continuous transmission of messages from London to Kolkata via Prussia (Germany), Russian empire (Poland, Russia, Ukraine and Georgia) and Persia. The line entered India in Karachi and was connected to Kolkata via Agra. It took less than half an hour for a message to reach Kolkata from London. Between 1865 and 1875, a continuous telegraphic network from San Francisco to Melbourne via New York, London, Berlin, Saint Petersburg, Tehran and Kolkata was established. This network can be compared to Roman Roads, first Postal services or today's Internet. Telegraphic communications had important social, economic, political and cultural significance, establishing quick and easy communications between faraway countries. This was, no doubt, the first step towards globalization.

Introduction

The story of Telegraph is the story how a technological change can result in unexpected and far-reaching changes in our society. In today's networked world, we are habituated in sending email and WhatsApp messages to a recipient anywhere on the globe and get back the reply instantaneously or can connect to them through Facebook, Twitter, Instagram, YouTube and a whole lot of Social Media. We can even make Video Calls or Skype Calls to our near and dear ones living on the other side of the globe. During the ongoing pandemic, when long distance or international travel is highly restricted, Video Conferences have become the order of the day. All these are possible due to the world-wide-web of internet. Decades ago, the satellite connections brought

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TV programmes from faraway countries to our drawing rooms. Radio achieved the same about a century ago, using for the first time the wireless technology, first developed by JC Bose in 1890s, and telephone, even earlier, reduced the distance from man to man with the help of electromagnetic signals travelling through metallic cables.

But the Communication Revolution was ushered in by the Electric Telegraph long ago. Electric Telegraph came to Europe and the USA in the first half of the 19th century and the first Telegraph line was laid in India as early as in 1851, from Kolkata (then Capital of British India) to Diamond Harbour, where the ships enter the River Hooghly from the Bay of Bengal on their way to the Kolkata Port. Within years, major cities of India were linked to the Telegraph network, and by 1870 Kolkata was successfully connected to London by a global Telegraph network called the 'Indo European Telegraph', only a few years after Europe had been connected to the USA by Atlantic sub-marine cable. It took less than an hour for sending a Telegraphic message from Kolkata to London and getting back the reply, much faster than 10-12 weeks used to be taken by an official mail to traverse Kolkata-London-Kolkata route by sea and overland. Shortly afterwards, Kolkata was connected to Melbourne and Tokyo. Thus the Telegraph wires created a continuous connectivity along the San Francisco-New York-London-Berlin-Tehran-Kolkata-Melbourne/Tokyo route about 150 years ago. The global Telegraph Network of 1870 was indeed equivalent to today's world-wide-web, and was truly a 19th century Internet; and the history of its creation is fascinating.

Early History of Electric Telegraph

The development of Telegraph was intimately connected to the invention of electricity and electromagnetic induction. The invention of Voltaic cell in 1800 by Alessandro Volta was a key development that made it possible to power electric devices using relatively low voltages and high currents. Development in the science of Electromagnetism by Ørsted, Faraday and Henry accelerated the development of Electric Telegraph. In 1837, William Cooke and Charles Wheatstone developed a telegraph system that employed six wires and actuated five needle pointers attached to five galvanoscopes at the receiver. If currents were sent through the proper wires, the needles could be made to point to specific letters and numbers on their mounting plate. It was further modified to two-needle and single-needle receivers which reduced the complications and were much more efficient.

In 1835, Samuel Morse of the USA devised a system of dots and dashes to represent letters and numbers. Two years later, he was granted a patent of an electromagnetic telegraph. Morse's original transmitter and receiver had inherent difficulties, but his collaboration with Alfred Vail resulted into a simple transmitter with make-and-break key, the refinement of the Morse Code, and the improvement of the mechanical design of the system. In 1844, Morse built a demonstration telegraph line of 60 Kilometers between Washington D.C. and Baltimore (Maryland). Further development of telegraphy resulted in printing telegraph, tele-printer, automatic recording of message, automatic transmission etc. that took place between 1850 and 1900.

The first commercial telegraph system was introduced in the United Kingdom using Cooke & Wheatstone system with single needle. In 1845, Cooke, with the help of financer John Ricardo, formed the 'Electric Telegraph Company', the first such company in the world. In 1851, at a conference in Vienna, the German-Austrian Telegraphic Union, that comprised of Prussia (Germany), Austria and many Central European countries, adopted a modified Morse Code called 'Gerke's Code'. In 1865, at the Paris Conference, 'International Telegraph Union' was formed, and Gerke's Code' was made the International Standard, though the USA continued to use original Morse Code for some more years.

By 1852, many European and North American countries developed their own telegraph lines; the USA completed 37000 kilometre length of Telegraph line followed by the United Kingdom (3500 kilometre), Germany (2300 kilometre), Austria (1600 kilometre), Canada (1400 kilometre) and France (1100 kilometre). At this stage, Telegraph lines were owned and operated entirely by private companies.In 1870, the Telegraph industry was nationalized in the UK and became a part of the British Post Office. In the USA, by 1855, Western Union Telegraph Company was established in New York and in 1861, it completed the first transcontinental telegraph line, connecting San Francisco (on the Pacific Coast) to New York on the East Coast.

Telegraph became very useful for railroad traffic control and Telegraph line was laid along the railway track in the USA by the Western Union Telegraph Company. Telegraph also became very useful for transmitting news. However, initially the Telegraph cost was high and therefore, in the USA, in 1848 the Associated Press (AP) was formed by newspapers to pool Telegraph expenses. Next year in Paris, Paul J Reuters started telegraphic press service (Reuters).

In 1842, William Montgomerie, a Scottish Surgeon, discovered that Gutta-Percha, a resin from the tree

Palaquium gutta, has electrical insulating property. Its effectiveness was successfully tested by Michael Faraday. Shortly, cables insulated with gutta-percha were laid beneath the waters in rivers in the UK and Germany and it was found to be a suitable insulator for underwater Telegraphic cables. By 1850, with the help of submarine cables, two sides of the English Channel were connected from Dover (UK) to Calais (France). The line was further extended to Ireland, Holland and Belgium. The Atlantic Telegraph Company was formed in London in 1856 to undertake the construction of a commercial Telegraph cable across the Atlantic Ocean. By 1866, Europe was connected to the USA across the Atlantic by a sub-marine cable. Thus the first global communication line began to develop.

Telegraph Comes to India

Even in 1850, communication system in India was primitive. Govt. posts were carried by couriers and common people had no access to it. The postal system too was not organized; it varied from state to state, there was no postage stamp (instead the sender had to pay money) and the entire system was fairly inefficient. It was only after the setting up of Telegraph Department, communication system in India became organized.

The East India Company, which was ruling the British Indian Empire at that time, had three-fold interest in installing the telegraph in India: first, to increase the commercial interest of the Company; secondly, to establish a tighter hold on the administration and finally, the furtherance of imperial strategy.

Dr. William Brooke O'Shaughnessy, an Assistant Surgeon of the East India Company and a Professor of Chemistry at Calcutta Medical College, had a long-standing interest in telegraphy. In 1839, he experimented with Electric Telegraphy in Bishop's College campus in Howrah (now a part of IIEST, Shibpur). The total length of the cable was about 17.5 kilometres. In September 1839 issue of 'The Journal of the Asiatic Society of Bengal', O'Shaughnessy published a paper titled '*Memorandum Relative to Experiments with the Communications with Telegraphic Signals by induced Electricity'*.

In 1848, Lord Dalhousie was appointed as the Governor General of India. The Governor General accepted O'Shaughnessy's proposal to telegraphically connect Diamond Harbour with Kolkata in order to provide the Kolkata merchants with swift shipping information. O'Shaughnessy, with the help of a skilled technician of Kolkata, Sheeb Chunder Nandy, who was O'Shaughnessy's assistant when the later was functioning as Assay Master of Kolkata Mint, laid the first Electric Telegraph line from Alipore (Kolkata) to Diamond Harbour (about 48 kilometre length) between 5thNovember, 1850 and 30thNovember, 1851. This was partly underground and partly overhead. The first telegraphic message was sent by Nandy from Diamond Harbour, which was received by O'Shaughnessy at Kolkata in presence of Lord Dalhousie. The line was further extended to Sagar Island at the mouth of the River Hooghly. Further lines, mainly, from Bishnupore to Mayapore (18 kilometres) in the southern part of 24 Parganas district, across the River Hooghly (26 kilometres), and Kukrahati to Khejuri (40 kilometre), in the eastern part of Medinîpur district, were constructed by 1852. O'Shaughnessy described this as "*This line was commenced in October, 1851, and opened to Diamond Harbour in December of that year. In the following May a branch was led to Moyapore. In August and December, it was extended to Kedgeree (Khejuri), 80 miles' distance by the line followed; and in March, 1852, the rivers Hooghly and Huldee (Haldi) were crossed, and the line from Calcutta to the sea opened for official and public correspondence."* (Electric Telegraph in British India: A Manual of Instructions, East India Company publication, London, 1858).

With the successful laying of Telegraph line in India, Dalhousie was impatient to bring India into the modern world. In 1852, he wrote to the Court of Directors[1] of the East India Company in London: *'Everything, all the world over, moves faster now-a-days than it used to do, except the transactions of Indian business. What with the number of functionaries, boards, references, correspondences, and several Governments in India, what with the distance, the reference for further information made from England, the fresh correspondences made from that reference, and*

[1] 'The United (East India) Company was organized into a Court of 24 Directors who worked through committees. They were elected annually by the Court of Proprietors, or shareholders. When the company acquired control of Bengal in 1757, Indian policy was until 1773 influenced by shareholders' meetings, where votes could be bought by the purchase of shares. That arrangement led to government intervention. The Regulating Act (1773) and William Pitt the Younger's India Act (1784) established government control of political policy through a regulatory board responsible to Parliament'.*(from Encyclopaedia Britannica online).*

'Company business was overseen by a central administration in London based around the twenty-four elected members of the Court of Directors and a number of specialized committees of the Court. The directors were answerable to the Company shareholders who met regularly at the General Court of Proprietors'. (*from Margaret Makepeace*)

the consultation of the several authorities in England, the progress of any great public measure, even when all are equally disposed to promote it, is often discouragingly slow'.

In April 1852, O'Shaughnessy visited London at the instance of Dalhousie and successfully obtained the approval of the Court of Directors of the East India Company and necessary funding to construct a 5000-kilometre network of Telegraphic lines linking Kolkata to Agra, Mumbai, Peshawar, Chennai and Dhaka. Construction began in November 1853. O'Shaughnessy again turned to Nandy, who had already become the first Indian to join the Telegraph Department, and by March 1854, O'Shaughnessy and Nandy completed the 1400-kilometre Kolkata-Varanasi-Agra-Mirzapur line. By 1855, Telegraph line connected Kolkata to Delhi and Peshawar, primarily along the Grand Trunk Road. The Delhi line was further connected to Ambala and Attock in Punjab, two important army bases and to Shimla, the summer capital of the empire. Another line from Mumbai was laid to Chennai and Colombo. Mumbai was further connected to Agra, thus to Kolkata in a roundabout way and to the port city of Karachi. The connection between Kolkata and Chennai was delayed and Lord Dalhousie's summer residence on the Nilgiris in the Madras Province remained inaccessible from the capital Kolkata. Nandy later laid underwater cable across the River Padma and linked Dhaka to Kolkata. Dhaka was further linked to Chittagong, Arakan and Rangoon. However, the Telegraph system in India was inherently vulnerable as it was dependent upon single line everywhere without any backup connections and cross-connections. Moreover, many important places of the country were not connected to Kolkata when the 1857 Mutiny struck the Empire. Signal was weak and erratic initially. The construction cost was, however, moderately low at Rs. 21 Lakhs and Telegraphy cost in India was the cheapest in the world. In 1854, the Telegraph act was passed and by 1856, India had 4000 kilometres of Telegraph line and 46 Telegraph offices. In 1854, the Telegraph service was opened to the public and the first telegram was sent from Mumbai to Pune on 27th April, 1854.

The importance of Telegraph was felt not only by the Govt. but also by the public. The Bombay Times and Journal of Commerce (which would become The Times of India), kept a close eye on O'Shaughnessy's work, noting enviously in 1851 that '*our opium merchants would have made no bones of having had a little wire of their own, so that Bombay might have bid against Calcutta at a government sale… and the approach of a ship telegraphed from the lighthouse on Colaba would be known on the instant in the "mercantile capital of Bengal".*' A few years later, the traders of Sind, with their own initiative, helped erect Telegraph lines in the Baluchistan, so that they could expand their trade.

In England, Telegraph mainly served the commercial purpose and that of railways, but in India the situation was different. The huge geographic size of the country posed a significant challenge to the British administrators. Dalhousie's and the East India Company's Court of Directors' decision to invest in an Indian Telegraph system clearly demonstrates the need for efficient administration and imperial control. One can well notice that the Telegraph line was laid from Kolkata to northern, north western and central India to link to the important army bases. Later a line from Kolkata to Ootacumund was also laid so that the Governor General could remain in touch with the capital from his summer residence.

The Telegraph line in India had an important political and military significance apart from its technical and commercial ones. It was the Electric Telegraph (along with Railway) which provided the technical superiority to the British and practically saved the British Indian Empire during the Mutiny of 1857. During the one-year duration of the Mutiny, thousands of official telegrams were exchanged which helped track the mutineers' movements, resolve policy matters, and practically acted as a lightening-speed postal service. On the 11th May, 1857 (a day after the outbreak in Meerut), William Brendish, a signaller boy at the Delhi telegraph office, cabled the Army Commander-in-Chief, then in Shimla, that he had heard rumours in the bazaar about an imminent Mutiny. Commander-in-Chief took it seriously and immediately ordered to disarm the Indian soldiers of the Company posted at Lahore and other places in Punjab. Then, during the Mutiny, particularly in the Northern India, as one army base after another were attacked by the mutineers, the signallers cabled to nearby army bases and train-load of reinforcements arrived quickly. The mutineers did not have this advantage and were ultimately put down. The mutineers uprooted poles in many places, but they were quickly repaired by the Company's engineers and connectivity was restored. Nandy, in the absence of his seniors, was in charge of the Telegraph Department when the disturbances began. He maintained constant link between Kolkata and Mumbai and other places, which were strategically important and helped the Company suppress the mutiny. While O'Shaughnessy was knighted in 1856 and eventually became the first Director General of Telegraph Department in India, Nandy became Assistant Superintendent of Telegraph Department in 1866 and later a Rai Bahadur. In 1883, the Telegraph Department

merged with the Postal Department to become Post & Telegraph Department. The Indian Telegraph Act, 1885 gave Govt. of British India exclusive right to establish and operate telegraphy in India.

The Indo European Telegraph Line

The Mutiny of 1857 resulted in a strong interest among British Govt. in telegraphic communications between Britain and India. However, the idea of connecting England with India through a telegraph line is as old as the science of telegraphy itself. The increasing industrialisation and imperial expansion in the 19th century fuelled the need for faster long-distance communications. But a link between England and India became a strong possibility only after the first Telegraph line was laid in India in 1851.

Figure 1: The Indo European Telegraph Company Line
(From https://new.siemens.com/global/en/company/about/history/stories/indo-european-telegraph-line.html)

The Submarine Lines

The first attempt to link England with India was taken by 'Red Sea and India Telegraph Co.' of London. In 1854, Lionel Gisborne, an engineer, proposed a submarine telegraph line to India. He made arrangements with the Ottoman Government (Turkey) for laying a submarine line between Dardanelles (on the western coast of Turkey) and Alexandria (on the Mediterranean coast of Egypt, on the mouth of the Nile delta). The cable was successfully laid, as far as the Island of Candia, in December 1858, but did not reach Alexandria. The idea was that from Dardanelles it would connect to the European overland lines (already laid) to connect to England. In 1855, Lionel Gisborne's brother Francis again negotiated with the Ottoman and Egyptian governments for completing a line to India. The necessary powers for constructing the line across Egypt, and for establishing stations on the coasts of the Red Sea, were reserved to the company giving it complete control over the line of communication. The 'Red Sea and India Telegraph Company' was formed and Lionel Gisborne was appointed their Engineer. In 1858, capital was raised for a line from Alexandria to India.The cable was laid in 1859 and 1860 from Suez to Aden, and from there to Karachi on the western coast of British India, a distance of more than 5500 kilometres, in six sections. The Suez-Aden line, of 2200 kilometres, worked well for nine months without requiring repairs; the other portions of the line failed within a short time of their submersion (the cables broke in places due to inadequate slack) but the Company was not willing to repair them. The first attempt to connect England to India thus failed quickly.

Another submarine line was tried through the

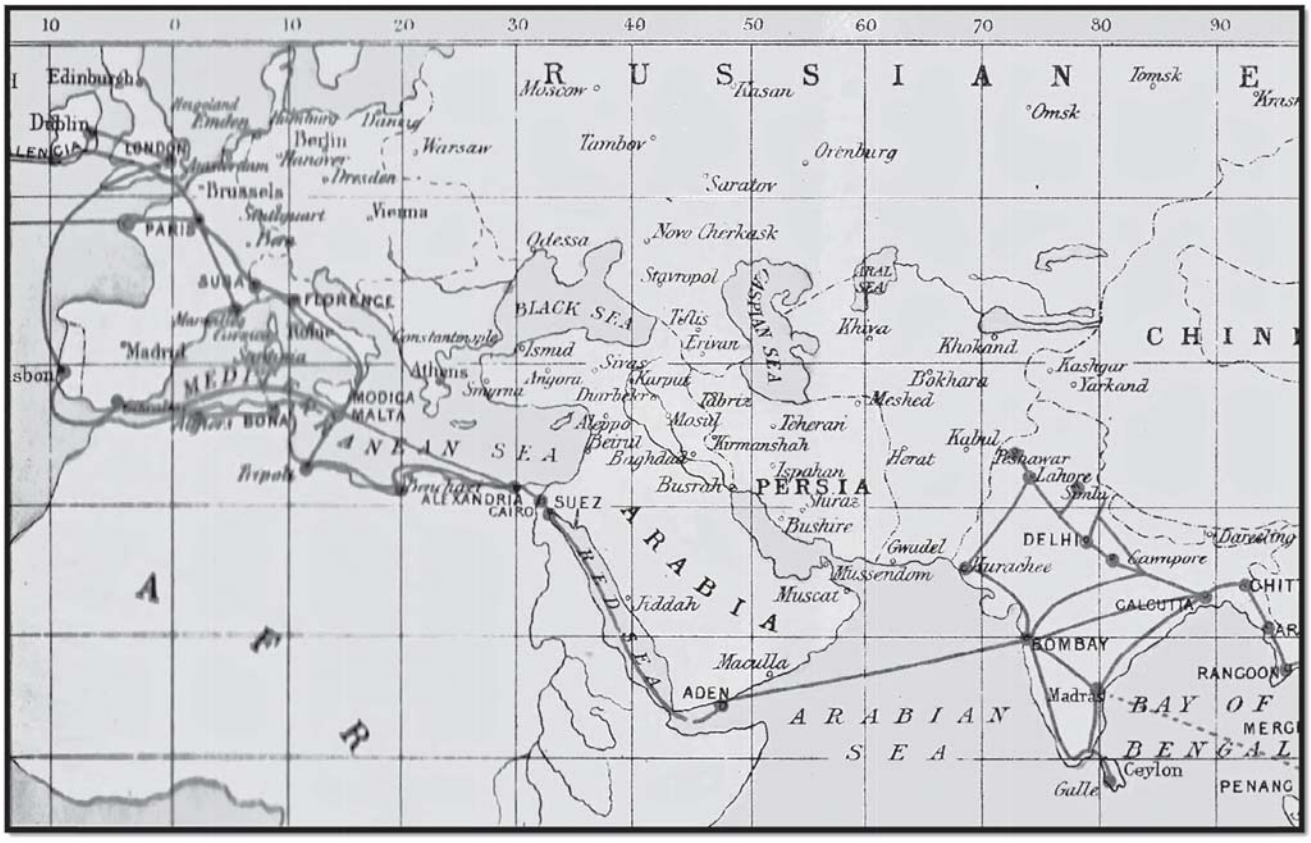

Figure 2: The Submarine Telegraph Connection from England to India by Eastern Telegraph Company (From https://greenwichindustrialhistory.blogspot.com/)

Mediterranean and the Red Sea. Soon after the Telegraph Construction & Maintenance Co (Telcon) had successfully installed transatlantic telegraph cable (1865-66), they approached the British Government with a plan for a cable to India, but did not receive favourable response. In 1868, Telcon's Chairman John Pender resigned and in association with the new Chairman Sir Daniel Gooch, formed three limited liability companies (by acquiring a few existing ones such as the Malta and Alexandria Telegraph or buying the rights of a few others like the Mediterranean Extension Telegraph Company or Levant Telegraph Company) namely, the 'Anglo-Mediterranean Telegraph Company' (1868) to link Italy, Malta and Egypt, the 'British-Indian Submarine Telegraph Company' (1869) to connect Mumbai (and then overland to Kolkata) to Aden and then Suez, and the 'Falmouth, Gibraltar and Malta Telegraph Company' (1869) to complete the line to England via Carcavelos (near Lisbon, Portugal). The landing in England was initially planned at Falmouth (hence the name of the Company), but due to concerns over damage to the cable by ships in the busy port, it was moved to Porthcurno Bay (in South-West England). Pender was the Director of the first company and Chairman of the two others. Both Pender and Gooch invested in this enterprise. These three companies merged with the 'Marseilles, Algiers and Malta Telegraph Company' in 1872 to form the 'Eastern Telegraph Company', the largest telegraphic cable operator of the 19th century.

The fabrication of the cable, laying and commissioning were contracted to Telcon. Telcon had two factories in England: the original Glass, Elliot & Co. factory at Morden Wharf (Pender took over Glass, Eliot & Company's 'The Malta and Alexandria Telegraph'), and the much larger Enderby Wharf site. Between June 1868 and May 1870, the vast majority of the cable was made on these two sites, but to meet the project timescales, some of the manufacture for the Malta to UK system were subcontracted to W T Henley's Telegraph Works at North Woolwich. Telcon used six ships to complete the work: Chiltern, Great Eastern, Hawk, Hibernia, William Cory and Scanderia. Great Eastern was the biggest and was used to lay cables in the Red Sea and Indian Ocean. On 8 June 1870, the final stretch between England and Portugal was completed by Hibernia. John Pender was at Porthcurnow with Sir Samuel Canning, the Chief Engineer of Telcon, to dictate the first test message to be sent over his system to Mumbai. The service from London to Mumbai and Kolkata was opened to the public on 23rd June 1870.

Commercially, the 'Eastern Telegraph Company' was a very successful venture. It controlled over 80% of Telegraphic message market between England and India. Pender further extended his cable to Australia and China by creating or acquiring three companies, namely the British Australian Telegraph Company, the British-Indian Extension Company and the China Submarine Telegraph Company. In 1873 the above companies merged to form the Eastern Extension, Australasia and China Telegraph Company (EEAC).

However, since early 1900s, it started facing stiff competition from wireless companies such as Marconi's 'Wireless Telegraph Company'. In 1928, the 'Eastern Telegraph' decided to use wireless technology too and was renamed as 'Cable & Wireless' which had a subsidiary called the 'Indian Radio and Cable Communications Company' (1932), designed to oversee India's external communications with other countries.

The Overland Connections

By 1860, telecommunication landlines already crossed Europe between France in the West to the Ottoman Empire (now Turkey) in the East. The Ottoman government erected a landline from Constantinople (now Istanbul) through Turkey to Baghdad in Iraq, completed in 1861. It was extended from Baghdad to Khanaqin in October 1864, and from Baghdad to Al-Faw (a port at the outfall of Shatt-al-Arab into the Persian Gulf) in January 1865. Persia (Iran) too planned to develop its own telegraph line. During April and May 1859, about 32 kilometres of wire was laid between Tehran and Karaj. The line was further extended to Tabriz via Soltāniya (the royal summer residence) in July 1860. The line helped the Persian Govt. establish control over faraway provinces. The first message on this line was sent from Zanjān to Tabriz, announcing the divorce of a royal couple.

The crisis during 1857 revolt prompted the British administration to plan for a direct cable link between London and Kolkata. Charles Wood, the Secretary of State for India, began negotiations with Iran's ambassador in London, Mirzā Jaffar Khan, in early 1861 for a telegraph line to stretch from the Ottoman frontier near Khanaqin through Iran to Bandar Ābbās. Meanwhile, in 1861, the government of British India instructed Colonel Patrick Stewart of the Royal Engineers to survey possible telegraph routes from Northern India to the Gulf. In 1862, the Indian government formed the 'Indo-European Telegraph Department' (IETD) under Stewart's command. It was initially an autonomous department, but later came under Post and Telegraph Department of Govt. of India. In February 1863, Britain and Iran entered into an agreement by which IETD would build telegraph line from Khanaqin (on the Ottoman-Persia border, now in Iraq) to Bushehr on the Gulf of Persia through Tehran. The construction began in August of the same year. The IETD established intermediate telegraph stations between Khanaqin and Tehran in Hamadān and Kermanshah. Between Tehran and Bushehr, 13 intermediate stations were built. Lack of railroad and poor roadways delayed the work; nevertheless, the work was completed in 1864 and became fully operational in March 1865.

Parallel to this, by May 1864, Stewart had completed a submarine line from Al-Faw to Karachi, with landing stations at Bushehr and Gwadar (a sea port in Baluchistan on the Arabian Sea; at that time Baluchistan was not a part of British India, but was under the practically independent Khans of Kalat), by recovering the cable left behind by the aborted 'Red Sea and India Telegraph Company'. This line was, however, not commercially successful after the opening of Suez-Mumbai direct line

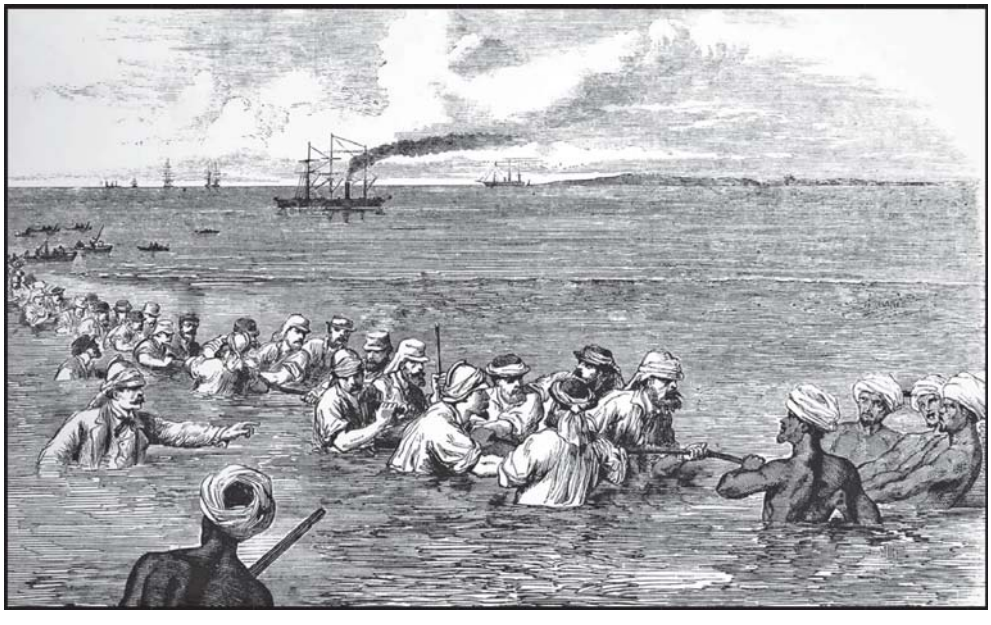

Figure 3: Laying of telegraph cable in the Persian Gulf (From https://atlantic-cable.com/)

constructed by the 'Eastern Telegraph Company'.A further agreement in April 1868 between IETD and Govt. of Persia allowed the IETD to build an overhead line from Bushehr along the Persian coast to Gwadar in Baluchistan which was connected to Karachi to avoid over-reliance on the underwater cables.

The Russian government installed a landline of its own from St. Petersburg to Tehran via Moscow, Tbilisi in Georgia and Jolfa on the Iranian side of the Russian frontier. The network of lines met in 1865, making two routes for telegraphic communication between Britain and India, the northern one through Russia and the southern one through Turkey, Austria and France.

The land lines over Russia and Persia as well as Persia and Turkey were prone to failure. As these countries are non-English speaking and did not use Roman alphabet during that time, the messages had to be translated, transliterated and re-entered again and again at the intermediate stations by local officials and were often inaccurate after re-transmittal. The transmission time taken between London and Kolkata was several days, and was expensive due to the operational involvement of several telegraph administrations.

In 1856, O'Shaughnessy met with England-based engineer Carl Wilhelm Siemens to discuss the feasibility of a direct line between India and Britain. However, work on the scheme by Siemens and his brother Ernst Werner von Siemens of Berlin-based Siemens & Halske was delayed by hostilities between Austria and Prussia. Around 1865, Siemens & Halske (Berlin) and Siemens Brothers (London) reconsidered their plan for a dedicated Indo-European telegraph. In 1867, Werner Siemens proposed an independent double wire landline between London and Tehran, operated by Siemens and carrying only Anglo-Indian communications. It would join the IETD's line at Tehran.

In April 1867, a consortium of these two Siemens companies secured agreements with Prussia, Russia and India for the right to set up direct telegraphic communications between Britain and India, with commitments to start the telegraph service within two years of receiving the concessions. In next year January, they obtained permission of the Shah of Iran to operate telegraph lines in Iran for next 25 years with an additional responsibility to upgrade the existing Iranian line between Tehran and Tabriz.

The 'Indo-European Telegraph Company' (IETC, not to be confused with IETD), formed to construct and operate the new line, was registered on 8th April 1868. The IETC was incorporated under the Companies Act 1862, as a simple joint-stock, limited-liability company with a share capital of £450,000 in seventeen thousand shares of £25 each. The company's head office was in London with Robert Grimston as Chairman. On IETD's behalf Colonel Sir Frederic John Goldsmid, who took over as the head of IETD after the untimely death of Col. Patrick Stewart in 1865, oversaw the work. Stewart and, later on, Goldsmid made extensive travel in the Middle East, Russia and parts of Europe negotiating with officials; Goldsmid recorded this fascinating story in his travelogue '*Telegraph and Travel*' (McMillan, London, 1874).

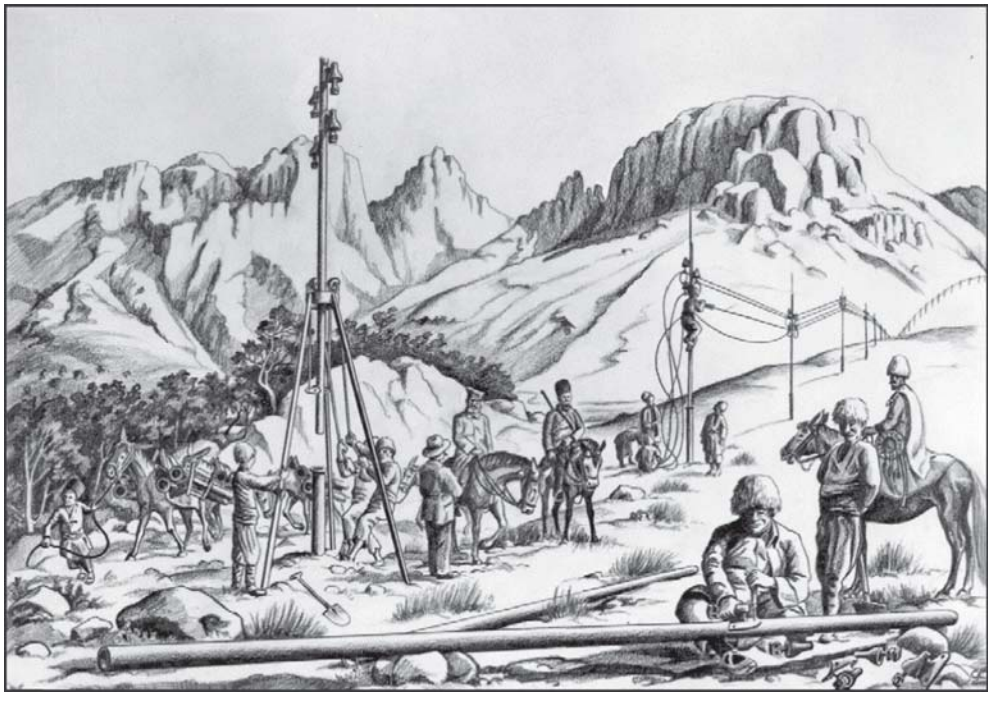

Figure 4: Siemens staff erecting cable posts in the Caucasus

(From https://new.siemens.com/global/en/company/about/history/stories/indo-european-telegraph-line.html)

Siemens & Halske received the construction contract for £ 400,000. While Siemens & Halske (Berlin and St. Petersburg) were responsible for the

construction, Siemens Brothers & Co. in London provided the material and laid the undersea cable through the Black Sea. It was built on three sections (Russian, Caucasian and Persian part) at the same time. 69,000 telegraph posts, partly made of wood and partly of iron (29,000 timber poles in Germany, Poland and Russia, and 40,000 demountable cast iron poles in Georgia and Iran) had to be erected and a pair of wires (6 millimetres in diameter) had to be suspended from iron-capped earthenware insulators, designed and patented by Siemens. The iron poles were still in existence during 1990 in the Caucasus, as reported by Karbelashvili (IJHS, 26.3, 1991, 278-281) as well as in the desert of Persia. A submarine cable was laid between the Crimea and the eastern end of the Black Sea due to the impassable terrain.

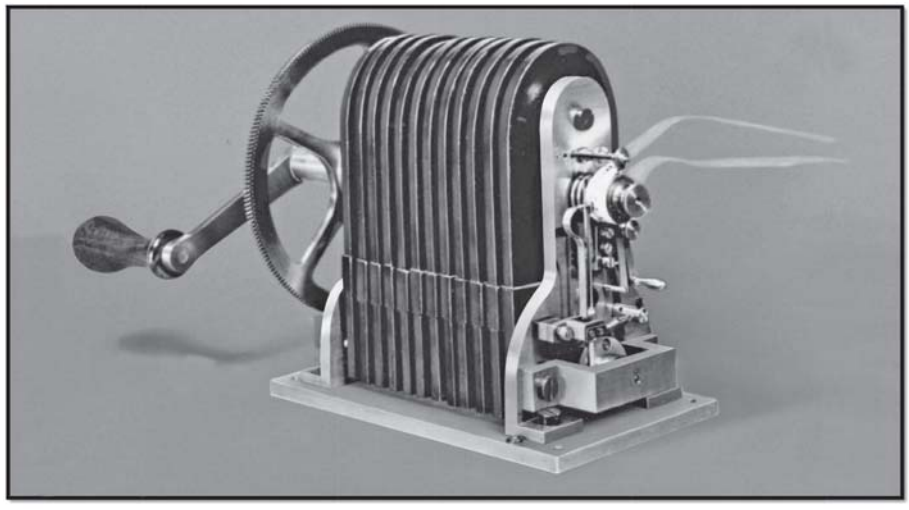

Figure 5: Siemens Punch Tape Telegraph Apparatus

(From https://new.siemens.com/global/en/company/about/history/stories/indo-european-telegraph-line.html)

The 11,100-kilometre route of the Indo-European Telegraph left Britain at Lowestoft, using an existing submarine cable under the North Sea to Emden in Prussia (now Germany) via Hanover State. It continued through a Prussian landline from Emden via Berlin to Thorn (Toruń) at the Polish border (Poland was a part of Russia). Siemens actually constructed a new 4,670 kilometre line between Toruń and Tehran. From Toruń the line passed through Warsaw (in Poland), Vinnitsa and Odessa (both in Ukraine, then a part of Russian Empire). From Odessa, a submarine cable crossed the Strait of Kerch and arrived at Kerch in Crimea. From there, another submarine cable of about 160 kilometre crossed the Black Sea and arrived at the Georgian port city of Poti. From Poti, it further moved through Tbilisi and Jolfa (Georgia) and Tehran, Isfahan and Bushehr (in Iran) by land line. The IETD line from Tehran to Kolkata was upgraded. The line finally traversed from Bushehr to Karachi (British India) by submarine cable and from Karachi to Kolkata via Agra by overland cable. However, on 1st July, 1870,an earthquake destroyed the Black Sea submarine cable. It was replaced with a landline along the newly built coastal road and service resumed in 1871.

While installing the cable, the engineers and staff of Siemens faced several difficulties including rough terrain, hostile climate, extortion by local chiefs and armed dacoits in Iran and what not! All obstacles were however overcome and the project was completed.

Siemens also made some technological innovations to avoid weakening of signals over a long distance due to cable impedance and leakage through poor insulation. They used a punched tape telegraph with a crank inductor as the apparatus. A crank mechanism turned a coil in the field of a permanent magnet and generated the current pulses for transmission. The input speed could be increased through the use of punched tape, which was pulled through a contact device at a constant speed. The line required intermediate relay stations. The weak current pulse was directed to a sensitive electromagnet, the armature of which actuated a contact. This contact closed the circuit of a local battery and gave an amplified pulse to the next station. Five polarised relays were used between London and Tehran, where human operators manually transferred the messages onto the automatic relay line to Kolkata.

On 31st January 1870, the Indo-European Telegraph opened for business, delivering fast and accurate communications. On 12th April 1870, the first message was sent from London to Kolkata, in the presence of Siemens brothers and invited guests. The message took only 28 minutes to arrive and was answered within an hour.

The success of the Indo-European Telegraph line gave Siemens a global recognition and fame.The venture was commercially successful too. IETC's accounts for 1884 showed £98,103 as revenue income and £53,323 as expenses, with a net annual profit of £44,780. From early 1900s, it increasingly used wireless technology. The company continued to function till 1929 and Siemens established itself as a global telecom giant. In 1929, Imperial

and International Communications, a predecessor to Cable and Wireless, acquired the IETC.

From a Reverberating 'Dot' and 'Dash' to a Sad 'Full Stop'

Decades after the opening of the Indo-European Telegraph line, Tagore wrote in his famous poem 'Bhāratatīrtha':

Paścim āji khuliẏāchē dvār, / sēthā hotē sabē ānē upahār,

dibē ār nibē, milābē milibē, / jābē nā phirē,

ē'i Bhāratēr mahāmānabēr sāgaratīrē.

('The West has opened its door today, therefrom people bring the gift (of Western knowledge and culture) and offer them our cultural values; nothing is wasted in this process of cultural exchange and a synthesis and syncretism of the East and the West take place in this great human ocean called Bhārata'-rough translation by Indranil Sanyal).

The Indo-European Telegraph indeed opened the door to the West and made a cultural exchange between the East and the West faster and easier. Lahiri-Choudhury (2010) emphasized upon the importance of telegraph in India as, *'The introduction of a general postal service echoed the growth of bourgeois institutions and ushered in the world we know today. The telegraph system fundamentally changed the way the world was viewed in the nineteenth century. The postal service continues, and, the telegraph system too has transmuted into different forms. The giant communications company Cable and Wireless is living testimony to this in our current Internet and mobile world of communication networks'*. He further terms telegraphy as,'*the single most significant transnational phenomena of the imperial world, and the link between communication, Empire, and social change'*. But the Indo-European Telegraph not only served the imperial purpose only, but also was of great help for commercial and private communication too, as Wenzlhuemer (2013) states, *'During the 1888–9 administrative year, for instance, state messages accounted for only about 2.6 per cent of messages sent via the lines of the Indo-European Telegraph Department(IETD). Press telegrams – including those of The Times of London handled under a special agreement – made up another 2.2 per cent. The remaining (rounded) 95.3 per cent of messages were labelled "Commercial and Private".'*

Telegraph remained the principal mode of long distance communication for about one and half-a-century, though from early 20th century it increasingly depended on wireless technology, but the term 'Cable'(both as noun and as verb) continued to be used. But it started suffering a steady decline after the advent of Internet in the late 20th century. In India, the annual telegraphic communication through BSNL came down from 60 million in 1985 to a mere less than two million in 2013. In that year, BSNL decided to close down the telegraph service due to huge operational loss (the Western Union in the USA had earlier stopped the service in 2006). On July 14, 2013 the last telegram was sent in India.

For more than 160 years, telegraph served the people of India; the dot and dash of the telegraph receiver carried good or often bad news to our households. Nevertheless, it was a part of our life. Telegraph found numerous mentions in literature and became a part of our culture too. Tagore received the news of his Nobel prize award through a Telegram, Raman telegraphically communicated his entire paper on Raman Effect, but Gandhi was the single largest user of Telegraph. Perhaps, the brief nature of Telegraphic message suited a busy personality like Gandhi.

The sweet 'noise' of 'tor*ē*-tokkā' still reverberates in our memory, but now, sadly, there is no more Dot and Dash in the telegraph offices, it is only a sad Full Stop. ❐

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