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Between the Ends of a Wire – Electricity, Instantaneity and the World of Telegraphy

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With the advent of electromagnetic telegraphy in the 1830s, a notion emerging from the history of the science of electricity diffused into popular knowledge: the instantaneous transmission of electric action. Ever since Stephen Gray, more of an amateur than what nowadays would be called a scientist, explored the possibility of electric transmissions through long copper wires in 1730, the speed of electricity was an object of interest and of several investigations. This knowledge fosters to the rise of telegraphy a century later and defines the epistemological foundations of the new medium. Experiments with electric transmission during this period revealed that electricity apparently had no speed. It was impossible to measure any temporal difference between the events at the two ends of an electrically charged wire. The notion of instantaneity, which was quickly introduced to explain the strange occurrences, implied that electricity was present at both ends of the wire at the same instant – instantaneous, immediate.

Contemporaries of the nineteenth century experiencing the advent of telegraphic transmissions over distances as long as oceans described the new medium as timeless and without speed. My article follows some of the traces of such transmissions. First, I describe the early experiments conducted by Gray. In the second part, I concentrate on one specific case: Samuel Morse's reference to Charles Wheatstone's experiments on the velocity of electricity. In the third part, I want to highlight some of the consequences of instantaneity for what may be called 'cultural techniques of synchronisation'.[1] The historical context of the notion of instantaneity was the foundations of physics and of philosophy, because for Newtonian physics and Aristotelian logics nothing can act where it is not or be at two places at the same time. But this seems to be the case with the electric *actio in distans* of Gray's transmissions or telegraphic communications.[2] Thus, throughout the eighteenth and nineteenth century and even up to the present day of smart, ubiquitous or mobile media, debates about transmission, communication and their technical time

[1] I borrow this term from Kassung /Macho, *Kulturtechniken der Synchronisation.*
[2] Cf. Hesse, *Forces and Fields.*

are related to fundamental, but historically grounded questions. By investigating their impacts on the establishment of the electromagnetic telegraph, I intend to explore what may be called a 'phantasmatic dimension of technical media'.[3] Consequently, scientific truths and mere curiosities have to be treated on the same level.[4]

My goal is to emphasize what Jacques Derrida calls a „coherence in contradiction"[5]: that electricity can be coherently described as instantaneous *and* having speed, as immediate *and* mediate. In the historical discourses I want to explore, these notions can stand shoulder to shoulder without contradiction. This coherence, I want to argue borrowing from Derrida, „expresses the force of a desire"[6], which accompanies the history of media and communication. Methodically, the discussion of a 'coherence in contradiction' should not aim at any solution, as a desire cannot be true or false. It is part of the history of media and in the case of the electric telegraph, it exerts a distinct productivity in the formation of global communication networks.

In telegraphy, much depends on the difference between slow speed and no speed. This difference may seem small, but it means everything to physics and to media. If something has speed, it cannot be instantaneous. For the discourses I wish to investigate, electricity seems to be instantaneous and have no speed, but for the sake of physics, it must exhibit speed. When it has speed, it takes time and is delayed. If it is delayed, there is a gap or an abyss between both ends of the transmission. This abyss is disguised or negated by instantaneity, while it is necessary for communication, media and their materialities.[7] Communication needs at least two communicators and an in-between. There must be a difference between the communicators. They must be two to become one and there must be a third: the medium.

Part 1 – Stephen Gray and the Ends of a Wire

To investigate the properties of the force called electricity that was almost unknown at the time, Stephen Gray hung a wire from one end of a garden in the south of England to the other. On a warm summer day in 1730, as he reported in the *Philosophical Transactions of the Royal Society*, electricity was transmitted over a distance for the first time. There was a distance of 666 and later 886 feet between the two ends and there was a distance between cause and effect, which nonetheless seemed to happen at the same time. Gray called this connection a „line of communication."[8] He had no idea about cables and did not know anything about induction,

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[3] In a similar vein this has been explored in Marvin, *When old technologies where new* and Morus, 'The nervous system of Britain'.
[4] Cf. Bloor, *Knowledge and the social imaginary*.
[5] Derrida, Structure, Sign and Play, p. 279.
[6] Ibid.
[7] Gumbrecht/Pfeiffer, *Materialities of Communication*.
[8] Gray, A Letter to Cromwell Mortimer, p. 27. See also Heilbron, *Electricity in the 17th and 18th Centuries*.

isolation or charges. In the sciences of his time, physical transmissions were named 'communication', a term often used by Isaac Newton. It did not mean to send a message to someone else, but to transmit an action to another place, for example between bodies, stars or the ends of a wire. Gray touched his end with a charged tube of glass. At the same instant, with „no perceivable difference,"[9] the electric action was carried to the other end, resulting in the dance of some pieces of brass gold located under the wire. Gray's friend Granvile Wheler, priest and owner of the estate, shouted that something had happened, while Gray was still at the other end of the garden. As both were not able to recognize any temporal difference between the electric occurrences at both ends of the wire, even as the wire was arranged in a circle in following experiments, they were described as instantaneous, as happening at the same time, as having no difference and no mediation.

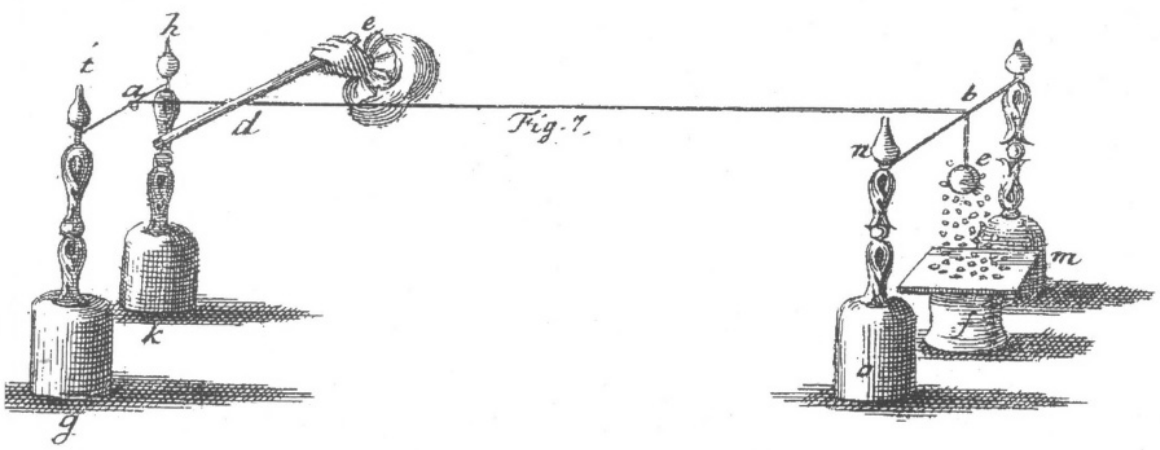

Abbildung 1: Doppelmayr, Johann Gabriel (1744): *Neu-entdeckte Phaemomena von bewundernswürdigen Würckungen der Natur*. Nürnberg, Fleischmann. Tafel II.

After Gray, William Watson, Louis Guillaume Le Monnier and Charles Dufay continued these experiments until the 1750s.[10] As no useful application of electricity was in sight, the investigations soon ended. The experimenters' senses were too slow to see what was happening in the interval between the two events, and their instruments did not provide enough exactness to account for any difference. But even when exact measuring instruments were available a century later, electricity was, as I will show, thought to be instantaneous.

Besides the technical aspects of transmission, there is a paradox at hand here. If there is a distance and a communication in the physical sense, that means, if there are two separate

[9] Gray, A Letter to Cromwell Mortimer, p. 28.

[10] Watson, A Continuation of a Paper concerning Electricity; Le Monnier, Recherches sur la communication de l'électricité; Dufay, *Versuche und Abhandlungen von der Electricität der Körper*.

elements communicating and trying to bridge the abyss in-between and to cross an empty space like the garden between Gray and Wheler, then there is a mediating transmission between separate elements.[11] And if there is mediation, then there is a contradiction to the notion of instantaneity which results in what may be called phantasms of immediacy. These phantasms, up to today and all the time during the great days of telegraphy in the long nineteenth century, were important to balance the imaginative economy of communication, its relation of here and there or local and global. These were not simply false conceptions of electric transmission that would soon be refuted. The notions were important to deal with the transformations of a new medium and new forms of communication. As a transversal phenomenon, these phantasms occupied several fields from the physical sciences to literature and from engineering to marketing. On the one hand, they show the uncertainty related to each new medium offering formerly unknown forms of connection between people or places and leading to new conceptions of space, time, presence and absence. On the other hand, these phantasms articulate an oscillation historically connected to media upheavals: the oscillation between immediacy and mediation.[12]

However, all electricians of the time, whether physicists or engineers, knew very well that nothing could move with an instantaneous speed because action at a distance is impossible – even though this was a complicated issue for the Newtonian physics of that time and still is for Quantum mechanics. The premise that nothing can act where it is not, at least if there is no medium, dates back to antiquity. Aristotle announced that every cause needs to be in contact with and have proximity to its effect.[13] This contact was disconnected with actions at a distance such as gravitation, magnetism or electricity. The theoretical framework of physical sciences had to be reorganized repeatedly to manage these interruptions of causality and of the nexus of time and space. If there is a causal relation of two separate bodies, then a medium must communicate between them, even if it is immediate, that means, if it is at two places at the same time. This constellation is the matrix for the media of physics: for ethers, vacua and „most subtle spirits"[14]. When unknown causalities had to be described, they were introduced as supposed connections of unconnected elements in space in the form of specific actions at a distance. Electricity quickly became part of this group of "argumentative resources".[15] Electric immediacy, as it was discursively established, acts as a medium, though it contradicts mediation. In both the discourses of physicists and in public debates 'argumentative resources' provided possible ways to

[11] Peters, *Speaking into the Air* and Chang, *Deconstructing Communication*.
[12] In a similar direction, Jay David Bolter and Richard Grusin have described immediacy and transparency for media interfaces, while I intend to expand on media history. Cf. Bolter/Grusin, *Remediation* and Sprenger, *Medien des Immediaten*.
[13] Cf. Aristotle, *Physics*, 267a.
[14] Newton, *Mathematical Principles of Natural Philosophy*, p. 574.
[15] Cf. Cantor, The Theological Significance of Ethers, p. 152.

domesticate the new medium of telegraphy and to deal with the uncertainty it introduced. The common denominator of most arguments in this debate was a desire to solve the paradox of the absent presence or present absence an *actio in distans* brought with it. It is still present in the history of global communication networks, their economies and politics.[16]

When dealing with techniques or apparatuses and producing objects like telegraphs in all their different forms, scientists and engineers pondered the immediacy of electricity and what it would offer to humankind. As the commercial success of the telegraph was enabled to some extent by the notion of instantaneity, this idea gained a wider influence in the public sphere too.[17] It can be found in poems, newspaper articles, manuals, patent applications and religious manifestos. Without the idea that this new medium created a form of presence at another place but at the same time, telegraphic communication may not have been asserted so successfully, though it never became a mass medium and served rather specific interests and needs of economy, press and politics. Instantaneity provided economic benefits as well as metaphysical forms of connection. A new conception of communication and of community could emerge: a worldwide connection of all people in a sometimes mediumistic realm of electricity, which was eligible for spiritism.[18] This destiny is obvious in a popular song which served as the motto of the contemporary magazine *The Telegrapher*: "Intellect hath conquered time".[19] By conquering time intellect erased it. Electricity could be everywhere at once and resulted in essentialistic ideas of a worldwide community, anticipating what would later be called a *global village* by Marshall McLuhan, who implicitly relied on these discourses.[20]

The new relation of the local and the global introduced by the telegraph and subsequently applied by the telegraphic networks all around the globe emerged from the new meaning of time and space. Time and space were supposed to be transcended in no time and from anywhere. In an article dating back to 1857, a member of the American Telegraph Company, launched in 1855 to operate the terrestrial lines connecting to a possible transatlantic telegraph cable, described this 'telepresence'. This term was used by media theorists in the 1990s with regard to the internet, as a means to be present at a distant place. Similar constellations can be found in 1857: „We publish the following novel and interesting account of a meeting of the employees of the American Telegraph Company on the 3d instant at – what place? That is the question – at no place, or at all places where there were Telegraph offices, within the circuit of seven hundred miles. A large

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[16] Cf. Tomlinson, *The Culture of Speed. The Coming of Immediacy*. For example, the sociological concept of ‚time-space-convergence' still functions this way in the works of Manuel Castells, Anthony Giddens or Paul Virilio.
[17] See also Martin Doll's article in this book.
[18] Cf. Asendorf, *Batteries of life*.
[19] Anonymous, The Electric Telegraph, quoted in: Shaffner, *Shaffner's Telegraphy Companion*, p. 26.
[20] Cf. McLuhan, *Understanding Media*.

room, that – seven hundred miles in diameter – for a meeting to convene […]. The members together in spirit – in communication, and yet in body seven hundred miles apart!"[21] In this sense, the place of presence is everywhere, connected by cables and immediate electricity. Such phrases were repeated throughout the subsequent history of telecommunications.[22] When two or more places are connected in such a way, the space in between is nothing more than a time to bridge. Electricity allowed telegraphers to build this bridge, even though it took time, relays were used at every station and every message had to be decoded in time. The 'annihilation of time and space', a popular phrase in the nineteenth century, lead to conceptions of a global worldwide unity.[23] These ideas influenced, as I want to show in the final part of my article, the political conceptions of community and shaped the identity of those belonging to the community.

This long and winding history had a starting point in a garden. When Gray for the first time communicated an electric action through a wire, but without any message or code, a space was established between the two ends of the garden and the two communicators. Through the expansion of a global communication network by means of wired and wireless telegraphy, this space would later become the global space of electric media. Even though there were many scientific developments to come and failures to overcome, the physical structure of communication and its phantasmatic dimension was still the same when Samuel Morse sent his first telegram from Washington to Baltimore in 1844.

Part 2 - Samuel Morse, Charles Wheatstone, Telegraphy and Time

Morse, who can be regarded as the founding father of telegraphy at least in economic respects, also knew very well that electricity had a speed and was not immediate, as British physicist Charles Wheatstone had shown. In 1834 Wheatstone, who later became a competitor together with William Cooke, tried to measure the actual speed of electricity. The results were quite ambiguous and their interpretation widely misunderstood, but nonetheless it was obvious that electricity had a speed.[24] Yet, both Wheatstone and Morse relied upon the gift of instantaneity when talking about the practical uses and the impact of the telegraph on society.

For his experiments, Wheatstone installed a revolving mirror and observed the light of electric sparks in this mirror. By comparing the sparks at different positions in a circuit seen through the mirror and with the help of the number of revolutions of the mirror, he wanted to calculate the

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[21] „Telegraphic Meeting", Tiffany's Montly, 3, 1857, p. 142, quoted in: Sconce, *Haunted Media*, p. 21.

[22] Cf. Müller-Pohl, „By Atlantic Telegraph".

[23] The idea of an 'annihilation of space and time' is not only part of the history of global media, but also of media theory, because it deals with the paradox of how something can be where it is not – one of the main aspects of the rephrasing of the term medium in the nineteenth century. This discourse of near and far and speed is also part of the Hegelian, teleological legacy of media theory (Cf. McLuhan, *Understanding Media.*; Virilio, *Speed and politics*).

[24] Wheatstone, An Account of some Experiments. See also Bowers, *Sir Charles Wheatstone Frs 1802-1875*.

velocity of electricity. As Wheatstone's experimental system is extremely sophisticated, I cannot go into deeper detail in this context.[25] Strictly speaking, Wheatstone mistook the light of electric sparks with the speed of electricity. Furthermore, he only stated that his instruments were able to measure a speed of 288,000 miles per second, but never said that this was the actual speed of electricity. Many publications attributed this velocity to electricity, as did Morse. Wheatstone himself never refuted this incorrect interpretation of his experiments. In his paper, he even talked about the „instantaneousness of the light of electricity"[26] and reflected on the possibility of telegraphic transmissions.

In his biography, Morse announced that as soon as he had heard about the possibilities of electromagnetism around 1830, he had said: „If the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted instantaneously by electricity."[27] Both Morse and Wheatstone built on the benefits of instantaneity while building telegraphs and experimenting with electricity, knowing that media and physics cannot be immediate. Referring to Wheatstone's experiments Morse wrote that: „no time is consumed that is necessary to write the intelligence to be conveyed, and to convert the words into the telegraphic numbers. The numbers are then transmitted nearly instantaneous, (or if I have been rightly informed in regard to some recent experiments in the velocity of electricity, two hundred thousand miles a second) to any distance, where the numbers are immediately recognized, and reconverted into the words of intelligence."[28]

Many histories of telegraphy hinge on Morse's apparatus and his famous code, which became a worldwide standard by 1865.[29] Even though his actual importance for economic and technological developments can be questioned, Morse is important for my perspective. He extensively wrote about the impacts of the telegraph and reflected on the opportunities of the new medium in contrast to established means of communication. The fact that Morse's method gained such an enormous influence against other competitors – also against Wheatstone's inventions since the 1840s – is equally due to an aggressive patent policy, a narrative deeply embedded in North American culture and a reliable, elementary technical procedure, regarding both the used instruments and coding.[30] Of course, even before the telegraph was established,

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[25] For further explanation see Sprenger, *Medien des Immediaten*, pp. 288.

[26] Wheatstone, An Account of some Experiments, p. 591.

[27] Morse, *His Letters and Journals, p.* 6.

[28] Morse, Memorandum to the ‚Secretary of the Treasury', 27. September 1837, quoted in: Aschoff, *Geschichte der Nachrichtentechnik*, p. 192.

[29] Cf. Czitrom, *Media and the American Mind*; Morus, Telegraphy and the Technology of Display; Silverman, *Lightning Man*.

[30] „The steed called Lightning, say the Fates/Was tamed in the United States/'Twas Franklin's hand that caught the horse/'twas harnessed by Professor Morse" (cf. Czitrom, *Media and the American Mind*, p. 14.)

there were technical and semiotic ways to transmit signs and words and to translate them into signals. Morse's apparatus made it a mass business for the first time. By coding long and short electric impulses and the pauses between them, Morse's system separated communication and transport.[31] But above all, electromagnetic force, which was discovered by Hans-Christian Oersted in 1820, resonated with a new order of knowledge.[32] Morse's telegraph connected the electromagnetic tact and the tact of coding. He optimized the channel's rate of transmission with an effective method of coding. In both cases, electromagnetism and telegraphy, tact means time, because the dots and dashes follow each other and cannot be simultaneous. Against all this knowledge, the notion of immediacy prevailed among physicists and engineers when they pondered about the cultural or epistemological impact of the telegraph. In regard to Morse, I want to show that the electromagnetic transmission of the telegraph and its instantaneity are so profoundly intertwined that transmission could be described as instantaneous against all better knowledge, or even had to be described this way due to the imaginative economy of a new medium.

Let me briefly sum up the historical background. At the end of the 1820s, the academic painter Samuel Finlay Breese Morse visited the art galleries of Europe to find examples for his historical paintings. He became acquainted with the optical telegraph, whose revolutionary effects were the subject of an exhibition at the Louvre. Some years before, Morse had spent his time on the unsolved problems of electricity and done a few experiments. So he was no stranger to this field and even had some friends working on electricity when he perceived the potentials of this force. On his homeward journey from Europe, as he repeatedly remembered later, he had enough time to ponder about this strange discovery: even on the fastest transport medium of the time, a steamer named Sully, the crossing of the ocean took two weeks. At sea, no message could be faster than the messenger who carried it. At that time, no transatlantic communication media was faster than marine transport. During the long evenings on board, the conversations circled around the fashionable topic of electricity.[33] At the time, every newspaper reported on the rapid succession of new discoveries and inventions. Hence, it was possible to refer to electricity a common knowledge, a knowledge which was bewildered by phantasms.

Until 1835, when Morse was appointed Professor of the Literature of Art and Design at University College in New York, he found no time to work out his ideas and to convert from arts to engineering. At the time Wheatstone's experiments became known, he was in the first exploratory stages of his invention and the technical outline was still in an open process of

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[31] This transformation has most prominently been described by Carey, *Technology and Ideology*.
[32] Oersted, *On Electro-magnetism*. See also Caneva, *Ampère, the Etherians, and the Oersted Connection*.
[33] Cf. Morse, *His Letters and Journals*, p. 19.

development. It took him almost 15 years from the first small experiments shortly after his voyage to successful fund-raising and the introduction of his system in 1846, followed by wealth and fame.[34] During these years, Wheatstone and Cooke introduced their telegraph in Great Britain and Morse was forced to stage himself as the first inventor of telegraphy by mythologizing the events on board the Sully.

Morse's telegraph can be understood as a combination of different regimes of time. A media archaeological perspective offers the tools to describe the technical characteristics as solutions to temporal differences on several levels.[35] Together with Alfred Vail, Morse developed an apparatus composed of two operators, the transmitter or the Morse key, which changed letters to code, the sender, the writing apparatus and of course the cable. They replaced the group of small batteries formerly used with one huge battery with high voltage to intensify the signal. The first receiver consisted of a pen attached to an electromagnet. Paper was pulled across this pen, which moved depending on the movement of the electromagnet and wrote down a zigzag line. The signal inscribed itself, because it consisted of electric impulses that could be made visible by inscription. Electricity did not transmit any substance of matter, but rather conveyed forces and signals arriving in time. The telegraph operator simply had to take the paper and decode the message manually. Electricity was the invisible hand of this writing. The telegraph only became operational in November 1837, after incorporating the work of Joseph Henry on the use of relays.[36] 'Local circuits' were needed to move the pen because when applying such long lines, the electromagnetic force was not sufficient.

[34] Cf. Pichler, *Die Einführung der Morse-Telegraphie*.
[35] Cf. Huhtamo/Parikka, *Media Archaeology*.
[36] Henry, *On the Application of the Galvanic Multiplier to Electro-Magnetic Apparatus*.

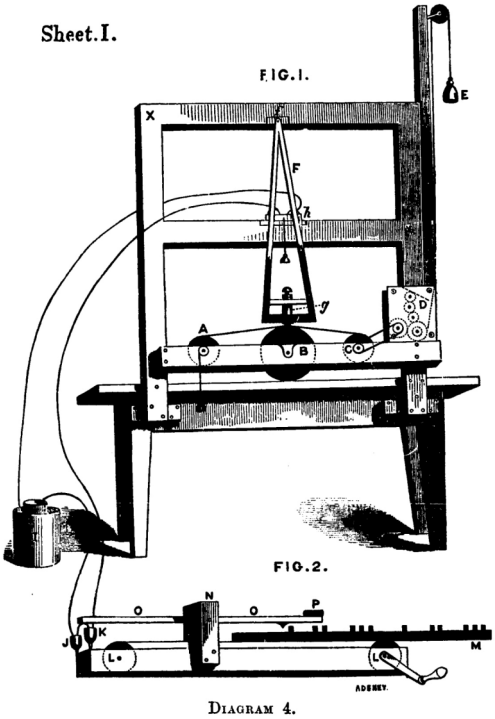

Abbildung 2: Morse, Samuel. Modern Telegraphy: Some Errors of Dates and Events and of Statement in the History of Telegraphy. Paris: Chaix, 1867. S. 20.

Thus, the telegraph can be described as a manifestation of time-critical synchronizations.[37] Similar to the embossed printing that Louis Braille presented in Paris in 1829 during Morse's visit, his apparatus operated with an element of code and its absence. The signal was short or long, separated by brief interruptions for a continuous sign or long breaks for the distinction between signs. There was writing and non-writing: functions or manipulations of time. Transmission was serial, as discrete signals were sent in rapid succession. The signs were interrupted by breaks. Points, lines, usually three after another, and the spaces in between were recorded, though the technical devices changed rapidly. The discrete code of dots and dashes created a tact, because it transformed the continuity of time into a sequence of signals. Each sequence of signals generated tact and tact is a sequence in time, because for the machine signals were only readable in sequence.[38] A perfect, instantaneous signal would switch from one state into the other immediately and write a rectangular line instead of a curve. In practice, things were not quite as easy. The writing apparatus produced irregular curves and jags because in reality, every transmission needs time and signals are never equally strong. For telegraphers, signals were hard to distinguish from each other and from noise, and these problems became more and more urgent with the first attempts of long-distance-transmission.[39] For physicists it became obvious

[37] See Hirt/Volmar, *Kanalarbeit.*
[38] Cf. Kittler, *Real Time Analysis – Time Axis Manipulation.*
[39] Hunt, Michael Faraday, *Cable Telegraphy and the Rise of Field Theory.*

that the problems were the result of a delay in the cable – a delay that, like in Wheatstone's experiments, undermined all instantaneity.

By implementing electromagnetism, Morse was able to conjoin transmission and storage to a powerful media network. The introduction of automatic writing put an end to the laborious writing by hand and furthermore offered a more economic operation of emergent global telegraphy. The inscriptions of the telegraph, its ability to translate movements into signs and to store their temporal order, diffused in many directions: for example Hermann von Helmholtz' physiological determination of the velocity of nerve conduction in 1850 – of a similar importance as Wheatstone's experiments – was conducted with telegraphic equipment and presented using telegraphic metaphors.[40] Almost every physiologist of that time used telegraphic apparatuses to translate movement into inscription by recording their duration. As John Durham Peters has shown, the Morse telegraph constitutes a historical intersection of ‚tele' media such as the telescope, telepathy or later television and ‚graphic' media such as photography, phonography or seismography.[41] Telegraphic action at a distance is inscription at a distance, and this was applied for different purposes of time-critical recording. With the Morse telegraph, numerous 'discourse networks' (*Aufschreibesysteme*) were conceivable because it became possible to record signals of all kinds: muscle movements, blood pressure or earthquakes.[42] The new medium allowed the translation of numerous flows, moves and waves into data by transcribing and storing them in a temporal order.

Nonetheless, the innate time of the electromagnetic telegraph was occupied by phantasms from electric research. For the practical uses of communication, instantaneity may have been negligible. The signals could be transmitted only one by one. For each telegrapher, it was obvious that his message took time and that even an instantaneous transmission had to be decoded. The sender had to feed signs one by one and the recipient had to decode them one by one. Telegraphy was technically considered clocked economy of time. Any electrical or electromagnetic transmission is a series of differences, a succession of changes. Since it has to be decoded, the time of transmission is shorter than the time of receipt, and thus it is framed by practical margins. The speed of electricity is not the same as the speed of the signal. A signal has to be on-time (*rechtzeitig*) instead of real-time (*echtzeitig*) to assure successful communication.[43] In-time means that transmission has to conform to a given interval of time, a duration in which it has to arrive. These time-critical synchronizations form the technical basis of all telegraphs. But still, the

[40] Cf. Lenoir, *Helmholtz and the Materialities of Communication*.
[41] Cf. Peters, *Technology and Ideology*; Rieger, *Schall und Rauch*.
[42] Cf. Kittler, *Discourse networks*.
[43] For these terms see Rohrhuber, *Das Rechtzeitige*.

interventions of the telegraph in society's self-descriptions were marked by instantaneity. That does not simply mean that instantaneity, as it was articulated in writings on telegraphy, and its ability to reach distant places, relatives or stock exchanges were merely a dream or a reverie, as Gaston Bachelard called such poetic imaginaries.[44] It also means that the twentieth century's term *global village* and all the ideas of a worldwide connection and community were and still are related to an idea of immediacy. It is historically grounded in the discourses of electric research. Their knowledge had to cross these phantasms.

In 1843, the US Senate decided to fund a 40-mile telegraph line from Washington to Baltimore for $30,000. The two cities were connected and their new relation of 'distant proximity' provided what appeared as a spiritual unity. The protagonists of the events foresaw a brighter future of 'global connectivity'. According to Morse, it was no longer „visionary to suppose that it would not be long ere the whole surface of this country would be channeled for those nerves which are to diffuse, with the speed of thought, a knowledge of all that is occurring throughout the land."[45]

On March 21st 1844, after a few teething troubles, the first and for a long time very successful electromagnetic telegraph line started service. The first message ever sent said 'What hath God wrought', a quote from the Bible. (Book of Numbers, 23-23).[46] God's words, carefully chosen by Morse, were sent back to Washington to confirm the success of transmission. In this sense, telegraphy verified itself as a Will of God. Morse initially charged one cent for the transfer of four letters. The revenue from the first days was one cent. The first commercial message significantly asked '4', which means 'what time is it?' and the response from Baltimore said '1'. The impact of telegraphy was documented by the fact that it synchronized time between two places. Baltimore said '1' when it was one o'clock and this message reached Washington when it was one o'clock and not when it was past one o'clock, provided their clocks were synchronized. As the interest declined after a few days, another offer was made: for half a cent, the customers could carry their name to the other end of the cable, and for a full cent, they even got it back. A few years later, a similar epistemological confusion took place in England: „We have heard of things being done ‚in less than no time', and always looked on the phrase as a figure of speech signifying great dispatch. The paradox seems, however, to have been actually realised in the case of Wheatstone's Great Western Telegraph, a message having been sent in the year 1845, and received in the year 1844." On New Year's Eve, just one second after midnight, the station supervisor at Paddington Station sent a message to his brother in Slough. But in Slough, another time was used. The answer came

[44] Cf. Bachelard, *On Poetic Imagination and Reverie.*
[45] Morse, *His Letters and Journals*, p. 85.
[46] Cf. Morse, *His Letters and Journals*, p. 187; see also Siegert, *Von der Unmöglichkeit, Mediengeschichte zu schreiben.*

directly, „suggesting that the wish was premature, as the New Year had not yet arrived at Slough."[47]

These examples of the curiosities and epistemological irregularities of temporal difference and instantaneous transmission give an impression of the new medium's potential to transform common conceptions of time between instantaneity, synchronization and mediation. In this respect, the telegraph transformed local times by embedding both the phantasms of instantaneity and the delay of transmission. The use of local times became inevitably obsolete, because times had to be synchronized for the railway. The railway demanded a temporal uniformity, finally leading to the establishment of worldwide standard time by Sandford Fleming.[48] The nineteenth century is famous for its technologies of synchronization which allowed to keep technical media, different time schemes and cultural practices in balance to achieve simultaneity. As James Beniger has shown in detail in *The Control Revolution*, the impacts of these developments shaped global interactions.[49] Different forms of synchronization helped to deal with the complexity of working processes: the timetables of the railway, the production of energy in steam engines, photography or telegraphy. From Greek 'synchronos', together and time, synchronization means to produce simultaneity and to adjust differences. There should be no place for instantaneity in this technical world. Another far-reaching and exemplary case comes from astronomy. In 1854, the observatories in Brussels and Greenwich were connected telegraphically for astronomical research.[50] This research aimed at accuracy to the nearest second in order to determine the degrees of longitude of the two cities. More than 3000 signals were interchanged to synchronize clocks. A master clock was used to coordinate several slave clocks. The transmission took approximately 0.1 second to cover 270 miles. This delay was factored in by simply letting the slave clocks run ahead by 0.1 second. For an exact measurement, the signal would have had to be at two places at the same time. Consequently, a metaphysical immediacy was part of this synchronization: „The immediate result of such a connexion [sic] of different Observatories is the power of bringing into combination the astronomical observations made at different Observatories as if they were made at one."[51] The time of observation was subtracted from the time of transmission to achieve synchronicity. Synchronization was needed where simultaneity was impossible but essential. As Peter Galison has shown, a similar epistemological problem led

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[47] Anonymous, Time and the Electric Telegraph, 1845a, p. 416. There are several instances for this quote: Anonymous, Facts connected with the Telegraph; and Anonymous, Time and the Electric Telegraph, 1845b. This newspaper article spread from England to the US and to New Zealand in a month by use of the telegraph. At that time it was common to publish articles in different newspaper. Thanks to Roland Wenzelhuemer/Heidelberg for this note.

[48] Blaise, *Time lord*.

[49] Cf. Beniger, *The Control Revolution*.

[50] Schmidgen, *Telegraphie, Zeit und Lärm*.

[51] Times, *The Year-Book of Facts*, p. 206.

Albert Einstein to the formulation of the theory of relativity, which finally excluded all instantaneity from the fields of physics.[52]

After several days of successful telegraphing through Morse's first line, cheques were validated and rumors of deceased relatives in the neighboring city were clarified. News was sent from New York and appraised in Baltimore with much curiosity. But still, the Senate refused to buy Morse's patent for the required $100,000. Instead, Morse redeemed the line from the state. He made a better deal: in 1854, there were 36,972 miles of telegraph lines across America and Morse was the head of a cartel.

After some years, the newly founded Telegraph Company recognized that the telegraph operators could read and write in code as code. They could even think in code. The Morse Code could be used like any alphabet if the operator had the necessary feeling for tact. Time had become money for the new medium. The circuit could be closed without any intermediate step, while the receiving apparatus could remain automatic because the telegraph operator was not able to write faster than the arrival of signals. Experienced receiving operators left this work to their ears and translated the clicking sounds of the apparatus into plain language without looking at the dots and dashes. As late as 1955, when the demise of the telegraph as a communication tool was obvious, its signal was still command and connected the operator's nervous system with the wire: „What the ether or the wire commands, is an irrevocable command for every Morsist."[53] Every second counted, and if the transmission was instantaneous or nearly instantaneous, decoding should not take too long.

Under the influence of Wheatstone's attempts to measure of the velocity of electricity, which quickly became known in England and North America, Morse went a step further and stated: „It was perceived by the philosophers of a past age that Electricity was so rapid in its passage through a conductor that, in the attempt to measure the speed through many miles, it was pronounced to be instantaneous." This assumption of instantaneity, Morse continued, had a practical plausibility and was the basis of his own inventions. But even if, as Wheatstone had shown, electricity was not instantaneous, this fact would not interfere with the foundations of telegraphy: „It is, nevertheless, evident that while the discovery may be of practical use for other purposes, it does not affect nor modify the invention of a telegraph based on the formerly received hypothesis of the instantaneity of electrical transmission."[54] Instantaneity means that there is no delay and consequently no interval between two events. Wheatstone's experiments

[52] Cf. Galison, *Einstein's clocks, Poincaré's maps*.
[53] „Was der Äther oder der Draht befiehlt, ist ein unumstößliches Gebot für jeden Morsisten." Sonnleithner, *Morsen*, p. 12.
[54] Morse, *Modern Telegraphy*, p. 37.

supposedly determined this interval. But still, the velocity of electricity seemed irrelevant to Morse because the desired speeds for a successful business were easily achieved. Even if an electrical signal travelled at the assumed speed of 288,000 miles per second, this was ten times longer than any practical cable on the planet. Thus, even if the telegraph was not instantaneous, as Morse had initially presupposed, it would be wrong to turn this deficit into an accusation. At that time, no one knew that the speed of an electric signal differs in relation to the length and material of the cable, as Michael Faraday and William Thomson were to demonstrate a decade later.[55] Morse's attempt to justify the instantaneity of telegraphy while at the same time insisting on its velocity seemed plausible from a pragmatic point of view. At such speeds, delay is not crucial (at least not for his intentions of telegraphing; it is of utmost importance for all technical media ever since). But this was not evident. On the contrary, this evidence was produced by grounding the telegraph in the phantasmatic dimension of telegraphy and scientific research.

The subsequent developments are well documented and have been described from multiple perspective. The prevalence of telegraphy began in the 1850s. At that time, 43 North American cities were connected. In 1846, there were only Morse's 40 miles between Washington and Baltimore. Two years later, there were 2000 and four years later 12,000 miles. From 1850 on, many telegraph companies all around the world were founded and connected the lines to networks. In the 1860s, the first long-distance lines from London to Calcutta (in operation until the 1930s) or from San Francisco to New York, and a direct sea route from London to New York were established.[56] Companies such as the Western Union Telegraph Company, Eastern and Associated Telegraph Companies and the American Union Telegraph Company rose as communication empires, without which no traditional empire could exist.[57]

With the transmission of information made possible by the success not only of Morse's telegraph, the desire for immediacy found new articulations as a desire for the latest business news or gossip. News agencies like Reuters, Havas or Wolffs began to fill the newspapers, which started to use 'Telegraph' in their name.[58] The proximity induced by the telegraph required a redefinition of diplomacy, war and economy, a reorganization of news and journalism, love and the world. During the nineteenth century, telegraphy and other media became elements of economic planning and objects of investment.[59] However: „It tells us almost on the instant what is said in Paris, Berlin, Vienna, or Trieste, but the story is not always worth telling."[60] All this was

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[55] Cf. Hunt, *Michael Faraday, Cable Telegraphy and the Rise of Field Theory*.
[56] See Aschoff, *Geschichte der Nachrichtentechnik*.
[57] Boyce, *Submarine Cables as a Factor in Britain's Ascendancy as a World Power*.
[58] See Amelia Bonea article in this book.
[59] Cf. Winseck/Pike, *Communication and Empire*.
[60] Anonymous, *The Electric Storyteller*, p. 2.

related to the discussion of the new status of near and far which was related to the telegraph. In a concluding step, I wish to highlight some of the consequences of this for the self-descriptions and negotiations of identity in the emerging global networks.

Part 3 – Vital Cords of Each with All

During the nineteenth century, the economic and technological arrangements of information retrieval changed rapidly.[61] The need to control no longer referred to the accessible environment or to face-to-face arrangements between factory directors and merchants, but to relations of spaces that were distant and therefore required time-critical media. Control, understood as the ability to exercise power at other places, had to be fast and increasingly depended on the speed of the railroad or the express boat. At the same time, factories began to ship by rail and to produce on the fly. Raw material was processed immediately after delivery, because storage became expensive and transportation available. To ensure the time-sensitive distribution of these resources, communication was needed that was faster than physical transport: telegraphy. The 'crisis of control' that characterized the middle of the century was soothed and sometimes also intensified by telegraphic transmission. It established the means to exercise power in other places at the same time. Telegraph and railways as well as modern bridges, channels and cable networks allowed a management of contingency. But these achievements were reinforced by instantaneity. According to the London *Times* of August 6th, 1858, „We may, now that this the most difficult problem of all has been solved, be justified in anticipating that there is no portion of the earth's surface which may not be placed in immediate communication with us. We now know that we have in our hands the means of a practical ubiquity. Distance as a ground of uncertainty will be eliminated from the calculation of the statesman and the merchant."[62] Instantaneity was a common antidote to all forms of uncertainty.

During the long nineteenth century, these reveries of electricity operated with a whole repertoire of metaphors and narrations which connected different sources of knowledge. They were part of the deparadoxization of the new relation from near and far, local and global. In this respect, they were of utmost importance for the cohesion of new global communities. 'Community' is used here in the sense of recent philosophical debates mainly from France[63], in which community was described as always already imaginative. Community always is a product of imaginations about the shape and connections inside of it. Only as such does it become a political actor. Thus, its self-descriptions play a crucial role for the definition of their agency. With the rise of the telegraph, a new global structure of space emerged in which the categorical status of near and far

[61] Cf. Beniger, *The Control Revolution*.
[62] The London Times, August 6, 1858, cf. Holtorf, *Das erste transatlantische Telegraphenkabel von 1858*, p. 24.
[63] Cf. for example Nancy, *Being Singular Plural*.

had to be negotiated in different ways. A new idea of community emerged which relied on the media of its connection. The cable did not connect one with absentees, but distributed a precarious form of presence on its network.

The „intimate connection between nations, with race and race"[64] which had already been expected in 1858 with the advent of transatlantic telegraphy, was supposed to expose the outdated nationalistic politics of exclusion as „stagnation and death"[65], as Charles Briggs and August Maverick said in their influential and exemplary book *The Story of the Telegraph* in 1858. In the middle of the nineteenth century, the cable was described as a „vital cord" of „free and unobstructed interchange of each with all."[66] I will highlight two dimensions of these discourses.

First, the connection was often described as animate. As Laura Otis has shown, comparisons of telegraphic cables and nerves were common and of importance for both engineering and physiology. [67] For example, Carl August von Steinheil, a pioneer of telegraphy in Germany, called it „the most powerful bond of living creation."[68] It was typical for such comparisons to expand the metaphoric realm: cables were not only like nerves, they were nerves, as Ernst Kapp underlined in his *Grundlinien einer Philosophie der Technik* in 1877.[69] Thomas Soemmering described his telegraph in the same manner. If we take these metaphors or their expansion seriously, connection is alive when it is immediate – as a 'bond of living creation' – and dead when it embodies division and difference. Instantaneous telegraphy, Steinheil and Kapp implied, provided a presence without interruption or difference, because electricity was supposed to be everywhere at the same time. This presence came alive as the opposite of absence and death. In this sense, difference was emptiness, vacuum, forlornness, and loneliness. The separate elements, the reveries suggested, came to life only as a unity. The cable brought its related elements into a proximity of living touch, which has been connected to life traditionally.[70] The presence created by immediate connections is a presence of touch and of life while a mediate connection including difference can only be dead from the start.

Symptomatic for the imaginative economy was, secondly, the connection of everyone with everyone else, as Briggs and Maverick suggested when they wrote that the telegraph provided a „free and unobstructed interchange of each with all."[71] This kind of connection is specific for the new communities of electricity, which described themselves as constituted by instantaneous

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[64] Briggs/Maverick, *The Story of the Telegraph*, p. 21.
[65] Ibid.
[66] Ibid.
[67] Cf. Otis, *Networking*.
[68] „Das gewaltsamste Band der lebendigen Schöpfung[…]." Steinheil, *Ueber Telegraphie,* p. 3.
[69] Cf. Kapp, *Grundlinien einer Philosophie der Technik*; Soemmering, Ueber Sömmerings electrischen Telegraphen.
[70] Derrida: *On Touching*.
[71] Briggs/Maverick, *The Story of the Telegraph*, p. 21.

communications and media over all distances. Connection meant not only that each individual was connected with other individuals, but with all at the same time. The connection existed not only between isolated people, but as a network of everybody with all. The telegraph, said Steinheil in almost the same words, „reproduces in each what is given to all".[72] If everyone was connected with all others and all with each through a „vital cord" then there can be no other and no outside.[73]

This idea is an idea of unity occupied by metaphysical and religious thought. Difference cannot be a part of this unity. And a unity without difference may be excluding, even in political ways. It leads to an essentialistic and politically explosive conception of community, which is still in use today when, for example, Manuel Castells writes about the „annihilation of space and time by electronic means."[74] His idea of a network society is the conceptual result of an extensive analysis of social practices of synchronisation. Everyone in Castells' "network society" is connected simultaneously by the power of instantaneous electricity. The notion that this society exists „without reference to either past or future" by electronic means is analogous to McLuhan's „electric nowness"[75]. Both have their genealogical origins in the instantaneity of telegraphy.

The vitality of cable-connections and the 'each with all' were accompanied by an ignorance of the related mechanisms of exclusion. Electric presence had no difference. The white spots on the map, the places which were not part of the network, or the villages without radio or television were excluded. Such a space necessarily has a blind spot: the outside that is not part of the figure. But this outside is needed to determine what is inside. The cohesion of the community of instantaneous electricity, as it has been commonly described at least since Morse's telegraph, differs from other communities because the essence of this community and its similarity to other such communities derives from the media of their connection.

As a result of these new modes of community, the world became a project and the projection of bodies, organs and senses, similar to a figure resembling Shakespeare's Puck aka Robin Goodfellow.[76] The frontispiece of Alexander Jones' *Historical Sketch of the Electric Telegraph*, which appeared more than ten years before the laying of the transatlantic cable in New York, showed the imagination of what would occur some years later.[77] The actual success only fulfilled what had been imagined. This figure holds the two ends of world-connecting cable in her hands and pulls them on one end. Instantly, the other end moves. The figure is receiver and transmitter at

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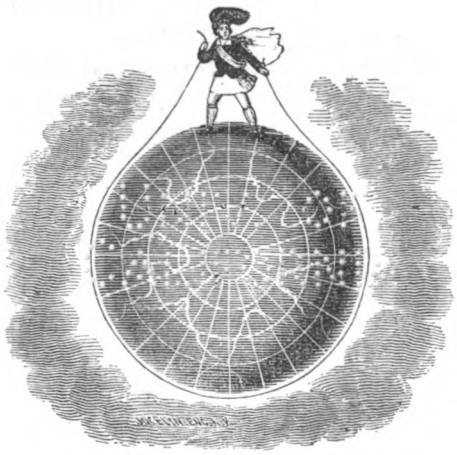
[72] Steinheil, *Ueber Telegraphie*, p. 3.
[73] Ibid.
[74] Castells, *The Information Age,* p. 379.
[75] Ibid., p. 386; McLuhan/Nevitt, *The Argument*, p. 2.
[76] For the world as a project see Krajewski, *Restlosigkeit.*
[77] Jones, *Historical Sketch of the Electric Telegraph.*

the same time. Significantly, this cable is not routed across the poles, but across the equator. The cable not only connected the individual spaces with each other but formed a connection that ended where it began, as the phrase quoted from Shakespeare's *Midsummer Night's Dream* notes: 'I'll put a girdle round about the earth in forty minutes.' Electricity, these reveries say, conducts its power instantly around the world like a vital cord to each with all.



"I'll put a girdle round about the earth in forty minutes."— SHAKSPEARE.

Abbildung 3: Jones, Alexander. *Historical Sketch of the Electric Telegraph*. New York: Putnam, 1852. Frontispice.

The presence of electricity was also used against telegraphy: perhaps electricity only produces apparitions of presence and threatens the social community. Telegraphy may violate the laws of nature. The tamed flash could become wild again, as Presbyterian Reverend Cortlandt van Rensselaer preached in 1858:

> „It is not, indeed, to be disguised that the telegraph may also be employed for purposes of evil. If Satan transformed himself into an angel of light, it is no marvel if he still uses the agency of light in strengthening his influence and dominion. But, for the purposes of the wicked, light is the most hazardous and self-destructive of all weapons. The devil, in his attempts to quote Scripture, was overwhelmed by the replies of the Son of Man. All assaults upon the cause of truth and liberty through the telegraph, will be repelled by the avenging power of right, in the Providence of the Most High."[78]

These sentences were part of a sermon to celebrate the first transatlantic cable at September 1st, 1858 in Burlington/New Jersey. The event was accompanied by an hour of ringing the church bells. To praise the new global connection, the event featured not only *The Star-Sprangled Banner* and *God Save the Queen*, but also the *Marseillaise*. At the end of this festivity, an ‚Introductory,

[78] van Rensselaer, *Signals from the Atlantic Cable,* p. 19.

written by request, by a young Lady', was read. Electricity, it implies, is necessarily, contrary to better knowledge and despite all satanic fears ‚Immediate!' because otherwise it could not maintain its promises:

Time is, yet is not! Distance stands,
Thought, flying on electric chain, across
The deep, dark Ocean, now can find response
Immediate! God, in mercy, deigns,
To give to man another wondrous power.[79]

The electric victory over the ocean accomplished a few weeks earlier was supposed to become stasis in instantaneity: a presence that has waited at the end of acceleration and will eat up all distances, space and time in an „electric allatonceness"[80] or an „electric union"[81] of a *global village*. To follow such notions of an 'annihilation of space and time by electronic means' in understanding media means to risk losing sight of the phantasmatic dimension of technical media, their actual *modi operandi* and their micro-temporal politics.

[79] Ibid., p. 3.
[80] McLuhan, *The Gutenberg Galaxy*, p. 63.
[81] van Rensselaer, *Signals from the Atlantic Cable,* p. 5.

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