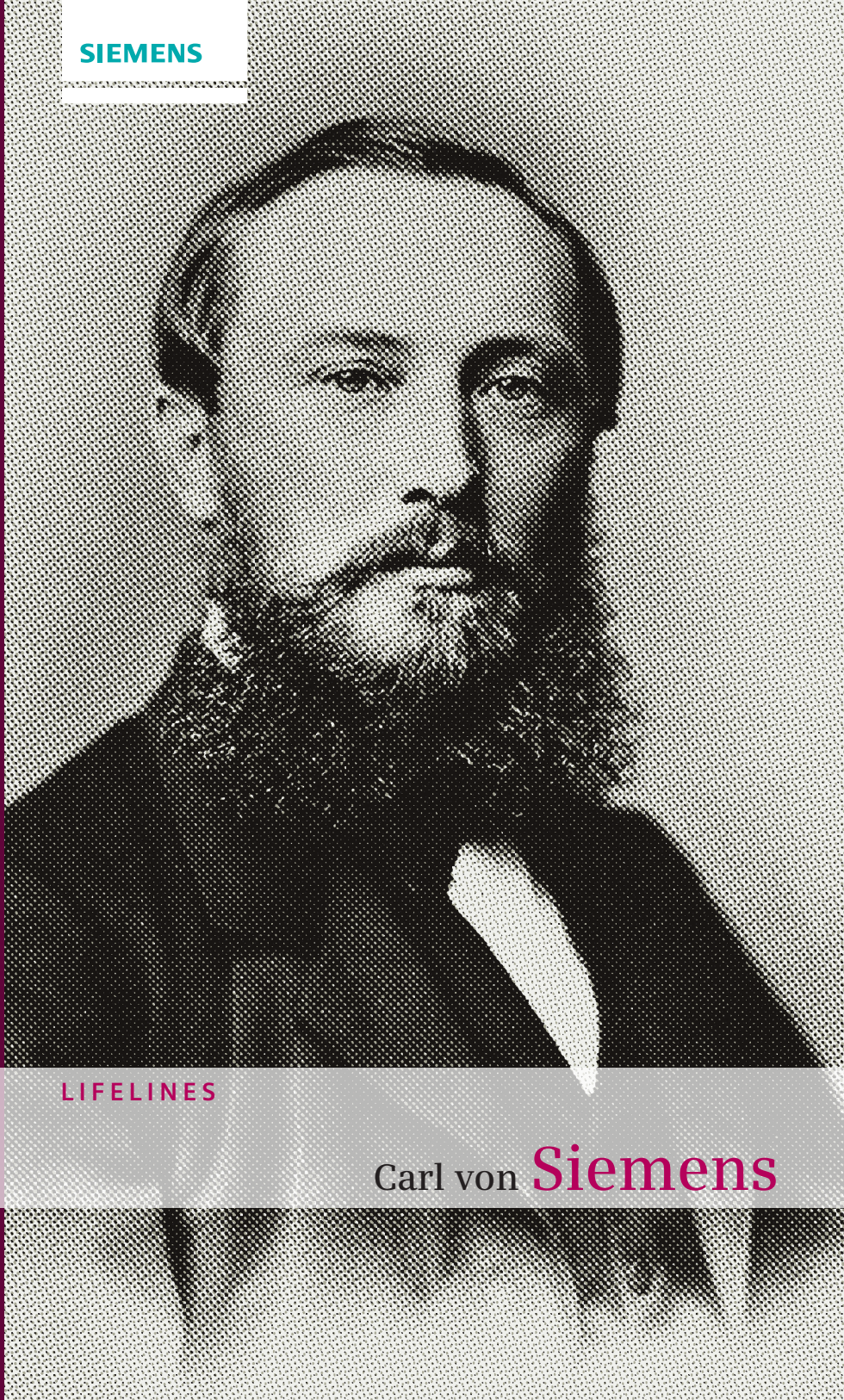
SIEMENS



LIFELINES

Carl von Siemens

Carl von Siemens was instrumental in turning the Berlin Telegraphen-Bauanstalt von Siemens & Halske into a global company in the second half of the 19th century. The Siemens Historical Institute marks this achievement with a biographical portrait of the younger brother and business partner of Werner von Siemens.

The brochure is the second volume in the new series **LIFELINES**, which is dedicated to introducing the men and women who have done the most to shape the history and development of Siemens. This group includes businessmen who led the company, members of the Managing Board, engineers, inventors and creative thinkers. A conscious effort has been made to include the lives and contributions of those individuals who are not always counted among the company's most prominent figures.

Carl von Siemens

Carl von

Siemens

3. 3. 1829 – 3. 21. 1906

LIFELINES

Carl von Siemens, ca. 1870

Introduction

Electrical telegraphy revolutionized communications beginning in the mid-nineteenth century. The electric telegraph, including the model built by Siemens & Halske, was the Internet of its day technology fundamental to the subsequent developments of "globalization" that we encounter all around us today.[1] Businesses like the Telegraphen-Bauanstalt von Siemens & Halske (Telegraph Construction Company of Siemens & Halske), founded in 1847, benefited from increasingly interconnected political, economic, social, and cultural trends to grow into international enterprises, while simultaneously driving forward globalization as both instigators of and actors in these processes. Carl von Siemens was a key architect of these trends at Siemens for decades.

The younger brother of electrical engineering pioneer Werner von Siemens was born in the northern German hamlet of Menzendorf, but he soon went forth into the wider world. Carl began his career in science and technology and savored the life of an entrepreneur in Berlin in the late 1840s. His skills were put to the test in subsequent assignments in London, Paris, and Warsaw. Carl von Siemens achieved his greatest successes in Russia, where early in his career he developed the primary engine of growth for the entire company—the international business of Siemens & Halske. Beginning in 1869, he played a key role in the construction of the Indo-European Telegraph Line and the laying of a transatlantic cable. Both of these large projects enhanced the international reputation of the electrical engineering company and helped it develop into a global enterprise.

Carl von Siemens was a man of flexibility and resolve who did not shy away from risk. Occasionally his bold ventures overshot the mark, sometimes resulting in serious financial losses. Nurturing a company over the long term with a focus on sound business practices was not necessarily his strength. But his fondness for

adventure turned out to be very important for Siemens & Halske. Carl's personality perfectly complemented the strategic and inventive thinking of his brother Werner, the perfectionism of the precision mechanic and business partner Johann Georg Halske, and the focus on basic scientific research pursued by the other Siemens brother, William. Carl was involved with the company longer than any of the others in the founding generation. When Siemens & Halske was incorporated in 1897, 68-year-old Carl was appointed its first Chairman of the Supervisory Board. During that period, in his role as the senior manager, he supervised the process of handing the company's management over to the second generation—a precarious transition for many businesses.

By that time, Siemens & Halske had long been established as a global enterprise with worldwide operations. Carl von Siemens played a major role in this development, thanks in part to his sometimes spectacular ventures in the world of telegraphy. It is not without reason that his brother William called Carl—even from an early age—the "best industrialist of us all".[2] His diplomatic skills and integrity also helped keep the Siemens brothers together, ensuring the company's survival. For Carl, family and the global business were inextricably linked.

Childhood and youth

Carl von Siemens was born into a large family on March 3, 1829.[3] He was the tenth child of Christian and Eleonore, née Deichmann, and was born on the Menzendorf estate where his parents had worked as tenant farmers since 1823. The couple had another four children after him, which led to such financial privation that the older children had to begin working to help support the family. Childhood on the farm was made more difficult by disease and death: Three of the fourteen children succumbed to childhood illnesses.

Carl von Siemens was born a subject of Mecklenburg-Strelitz, one of over 30 sovereign member states of the German confederation. His home in today's state of Mecklenburg-Western Pomerania was largely rural and lacked railway transportation or other harbingers of the industrial age. One had to travel some 50 kilometers to Lübeck to observe the first signs of the new era that had begun decades earlier in England. Life in Menzendorf was peaceful, but this serenity ended abruptly with the sudden deaths of Christian Siemens in July 1839 and Eleonore Siemens in January 1840, when Carl was only ten years old. His older siblings—above all, his brother Werner, 13 years his senior—were already independent. After the death of their parents, the younger children were taken into the care of various family members. Carl and his brother Friedrich, two years his senior, were sent first to an uncle in Lübeck. Here he received several years of secondary school instruction at the Hanseatic city's venerable Katharineum.

1820s An agricultural crisis strikes Germany's rural economies severely.

1835 The German Federation's first steam-powered railway goes into operation between Nuremberg and Fürth.

The estate in Menzendorf, birthplace of Carl von Siemens, 1910

From the Baltic Sea to the Prussian capital

Carl was never really happy in the restrictive environment of Lübeck, far from his siblings, so in 1843 Werner von Siemens brought him to Berlin where he was serving as a lieutenant in the Prussian artillery. After Werner also brought brothers Walter and Friedrich to Berlin, four of the nine Siemens brothers lived in close quarters as "roommates" in the mid-1840s. Money was tight: The officer's salary that Werner von Siemens received was hardly enough to pay for the living expenses and education of his younger brothers. Werner's letters from this time contain many complaints about the financial situation.[4] But he developed an extraordinarily strong sense of responsibility for his younger brothers, supervising their academic progress with strict discipline and encouraging above all their scientific interests and talents—which at least in Carl's case was reflected in good grades.

Carl was soon helping his elder brother with all kinds of scientific experiments. In the autumn of 1845, the family moved to a new, "much larger and more comfortable apartment" on Luisenstraße, close to where the Berlin-Friedrichstraße train station stands today. Excited about the possibilities in Berlin, Carl von Siemens wrote to his brother William, who had been living primarily in England since 1843: "I love the kitchen, because if I happen to brew up something malodorous, I don't have everyone around me in an uproar."[5] So it was a kitchen—not the obligatory garage of today's startups—where Carl got his start as an entrepreneur.

This "kitchen work"—for example, using electrical currents to apply a metallic coating to objects—became increasingly important in the experiments conducted by Werner von Siemens, who at the time was working feverishly on various scientific and technical projects.[6] He had long since lost interest in the life of an artillery officer and yearned for a career in the sciences. He was especially excited by developments in the field of telegraphy, which was undergoing groundbreaking scientific and technological advances. Two English inventors had patented the first electrical telegraphic device in 1837. Seven years later, Samuel Morse began operating the first electric telegraph line in North America. Werner von Siemens, thanks in no small part to his brother William in England, was well informed of these events and breakthroughs. He worked with precision mechanic Johann Georg Halske to develop their own telegraph, which he was soon able to test in

1840 The Katharineum is the city of Lübeck's oldest gymnasium (a secondary school that prepares students for university study); in the 1890s, the Nobel Prize-winning author Thomas Mann will attend this school.

1843 It's necessary to cross several national borders when traveling between Lübeck and Berlin.

1840s Berlin develops into a center of German industrialization.

Werner von Siemens, ca. 1847

the field thanks to his excellent contacts in the Prussian military. These auspicious beginnings led him to found together with his partner Halske the Telegraphen-Bauanstalt von Siemens & Halske in October 1847.

By this time, Carl von Siemens had already taken the initial steps in his career. Upon completion of his penultimate year of secondary school, he began working for the Moabiter Zementfabrik Haslinger & Schondorf, a cement factory that hired him primarily for his knowledge of chemistry. He didn't settle in for very long, however. In March 1848, Berlin was in the grip of a revolution in which liberal-minded citizens took to the barricades calling for freedom and a German nation-state—and protesting the authoritarian monarchy. Filled with national pride, 19-year-old Carl joined his brothers Werner, William, and Friedrich in fighting the Danes in the war for Schleswig and Holstein. Soon, however, business interests gained the upper hand: That summer, the Prussian state hired the ten-man firm of Siemens & Halske to build a telegraph line between Berlin and Frankfurt am Main. Another order for a Berlin-to-Cologne line soon followed. Werner von Siemens ended his career as an officer and now devoted all his energies to the company.

1839 The first electric telegraph line to be used commercially is put into operation for Great Western Railway in the greater London area.

March 18, 1848 Street fighting breaks out in Berlin between reform-minded citizens and the Royal Prussian military.

Early experiences abroad

Carl initially showed no inclination to follow the example of his older brother. After a few months as a volunteer at the fortress of Friedrichsort, he joined his sister Mathilde in Kiel, where he proceeded to do … nothing. He was strangely lethargic, perhaps disenchanted by the defeat of the liberal revolution and the restoration of the monarchy in the German states. Werner von Siemens, in a letter to brother William, described the situation as follows:

"I am also worried about Carl. […] He is a fine young man, but he is too apathetic."[7]

For a while, Carl von Siemens considered joining his brother Friedrich, who was planning to emigrate to the United States to pan for gold in California. The discovery of gold at Sutter's Mill in January 1848 triggered a veritable gold rush that had even spread to Germany. After several months of self-discovery, Carl finally decided to join the telegraph company. His early activities involved checking the cables installed in northern Germany for defects and producing technical drawings. In the spring of 1851, he was given his first big assignment: The company sent Carl to London to represent Siemens & Halske at the Great Exhibition.

London was the political center of the British Empire and the capital of a country where for decades industrialization had been transforming society from the ground up. The contrast with Menzendorf could hardly have been greater; even Berlin must have

Crystal Palace, London 1851

seemed downright idyllic compared to the city on the Thames. In London's spectacular Crystal Palace, Carl von Siemens intended to introduce an international audience to the telegraph and other products from Berlin. For the young telegraph construction company, much was at stake. Their business relationship with the Prussian telegraph authority had been good at first, but then all orders were withdrawn, most likely the result of disputes relating to the quality of the lines. The goal now was to keep Siemens & Halske afloat by securing contracts abroad—and exhibiting in London was a key component in this strategy. The 22-year-old Carl, who had no experience whatsoever on the international stage, performed his duties as well as could be expected under the circumstances. He talked to many people, forged contacts

1850–1855 More than 700,000 Germans emigrate, mostly to the U.S.; many disappointed Liberals are among the emigrants.

1848 More than 410,000 people live in Berlin; the number of residents has more than doubled over the previous 30 years.

Ca. 1850 The United Kingdom produces nearly 90 percent of the world's coal and 70 percent of its steel.

with potential customers from southern Europe and the U.S., and won a coveted "Council Medal" on behalf of the company. This distinction "played a key role in giving the company international visibility".[8] The Great Exhibition did not yield any solid contracts, however, which led to a worsening financial situation at Siemens & Halske.

Another attempt was made to compensate for the loss of the Prussian state contacts by securing foreign business. Carl von Siemens travelled to Paris in December of 1851 to establish a marketing office for pointer telegraphs. But things did not go as well as hoped in France, either. Carl did not fare well in this new environment. He did not speak French well, and his financial situation was precarious in the expensive city. There was not enough capital to build a workshop on par with the one in Berlin. A collaboration with the French partners he met in the spring of 1852 offered a potential remedy. By mid-April, Carl and two local co-investors had founded the Société pour la fabrication des appareils télégraphiques, one of Siemens & Halske's first international partnerships. But the working relationship was unsatisfactory from the beginning. Carl did not get along with his business partners at all: He felt exploited, and was ultimately drawn into a legal battle between the two other shareholders. At the end of 1852, his frustration was such that he requested the liquidation of the French company, leaving a Frenchman in charge to represent Siemens & Halske in Paris.

By early 1853, Carl von Siemens had tied up his personal and business affairs and prepared for his departure. In a final letter to his brother Werner, he offered a sobering assessment of his "unhappy" time in Paris: "Spent a lot, earned nothing, all while living poorly."[9]

1878 Siemens opens a branch office in Paris under the name Siemens Frères – Ingénieurs électriciens.

He wrote to his older brother again just three weeks later, this time from London: "As far as I'm concerned, I want to make it perfectly clear that I'll go wherever I need to go to be of use to you."[10] Carl von Siemens would soon have the opportunity to make good on this pledge. A project was taking shape at that time that would lead him to the other end of the European continent and would prove to be of major importance for the future of Siemens & Halske.

Back in the summer of 1852, the company had performed a small job for the Russian telegraph authority in the port of Riga. This was now followed by a much larger job: The Russian government hired the Berlin-based company to build a telegraph line from Warsaw to the Prussian-Russian border. In the spring of 1853, Carl von Siemens arrived in Warsaw full of energy to prepare for construction of the telegraph line, which was completed by summer. The Warsaw–Mysłowice line was the beginning of a series of telegraph projects that would overshadow everything Siemens & Halske had accomplished thus far. The project also marked the beginning of a phenomenal business success for Carl, which prompted this praise from Werner von Siemens in his 1892 autobiography:

> *"We owe it mainly to his [Carl's] energy and ability that the Russian business now grew so rapidly and to such proportions."*[11]

1852–1855 To keep up with the development of Western Europe, the Russian State invests in the building of a modern telegraph network for its empire.

Adventurous young entrepreneur in Russia

In early 1853, Carl von Siemens arrived in St. Petersburg, the grand capital of the Russian Empire that was founded 150 years earlier by Peter the Great. His first business contact was Hermann Kap-herr, a banker of German descent who Werner von Siemens had hired a year earlier to represent Siemens & Halske in Russia. Kap-herr had good contacts within the Russian government—especially Count Kleinmichel, who headed the telegraph authority and was responsible for awarding contracts. Carl quickly found his place in the Russian capital.

He did outstanding work on his first assignment, the installation of a telegraph cable in the Czar's Winter Palace. He brought the same reliability to bear in laying a cable from St. Petersburg to the nearby island fortress of Kronstadt, a project that was also a technical breakthrough. The team of specialists he led succeeded in laying one of the first submarine cables along the six kilometers from Oranienbaum to Kronstadt, and it remained in permanent operation. Kleinmichel was duly appreciative of the work of the "Prussky Ingener Siemens".[12] In just a few months, the 24-year-old had established himself as Russia's leading authority in telegraph construction; even the civil servants, most of whom were older than him and members of the nobility, treated him with respect. This laid the foundation for what would define the life of Carl von Siemens and the business of Siemens & Halske for the two years to follow.

War erupted in October of 1853—initially between the Russian and Ottoman Empires, with Great Britain and France ultimately joining the Ottomans. The project to build a high-quality electric telegraph network suddenly became a top priority for the Russian military leadership. At the end of the month, Carl von Siemens was hired to construct an above-ground line between St. Petersburg and Warsaw. At about 1,000 kilometers long, this was the biggest project Siemens & Halske had ever managed. Carl quickly made preparations during the cold winter months, with actual construction beginning in May. On July 26, 1854, the telegraph line was ready for operation. And that was just the beginning.

In the autumn of 1854, the British and French troops landed and the Crimean peninsula became the primary battlefield. Submarine cables made it possible for the western European powers in London and Paris to communicate more quickly with their troops on the front than their rivals. The Baltic Sea was also the site of military clashes, so the Russian military leadership felt it was wise to expand the telegraph network. Carl von Siemens hastily secured the construction contracts and then had to begin building a telegraph line from Moscow via Kiev to faraway Odessa on the Black Sea just as winter was beginning.

His brother Werner and Werner's partner Halske were completely overwhelmed by the bold developments in Russia. Would the small Berlin telegraph company be able to manage the huge contracts? Werner von Siemens harbored doubts: "You have taken on enormous projects", he wrote to his brother in Russia on November 22, 1854, "and I am nervous when I think about how it will be done! Building 1,400 versts [about 1,500 kilometers] in winter by May 7 seems simply impossible to me".[13] But fortunately, it was possible. With hard work, a great talent for organization, and a good dose of luck, Carl completed construction on the southern

Prior to 1853 The Russian Empire expands its borders in Eastern and Central Asia and in the Caucasus; nearly 7,000 kilometers lie between Vladivostok and the capital city of St. Petersburg.

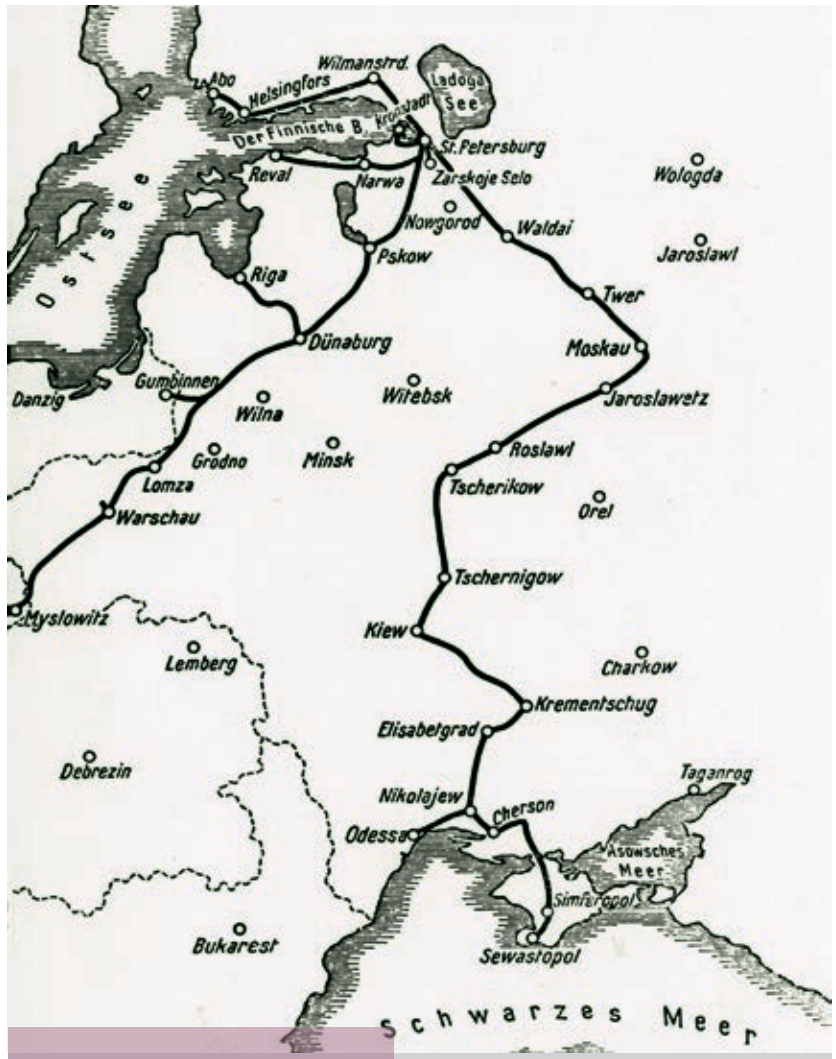
1853–1855 The Crimean War rages between the Russian Empire on one side and an alliance comprising the Ottoman Empire, the United Kingdom and France on the other.

Russian and Baltic lines. He traveled thousands of kilometers, negotiated, planned, organized, and brokered without rest throughout the winter.

In just a two-year period, Siemens & Halske laid a total of some 9,000 kilometers of telegraph cable in the Russian Empire, several times as much as all the telegraph construction company's previous projects combined. As a result, the small workshop grew rapidly into a business of significant magnitude. Before the Russian contracts, the company had just under 50 employees, but by 1856 there were over 330—two-thirds of them in Russia. Siemens & Halske sent technical specialists from Berlin and recruited the unskilled workers locally. Revenues also grew accordingly and came largely from Russia, with foreign revenues at times accounting for over 80 percent. When he visited St. Petersburg in the spring of 1855, Werner von Siemens was able to see for himself how the Russian telegraph business had grown. He reported his impressions to his wife: "Carl has left for Riga, and I'm running the entire business, which is truly colossal, all by myself. I wish you could observe the striking difference in my life and, I believe, my spirit when I am here as compared to home. Every minute here is filled [...]."[14]

Long-term maintenance contracts, which provided the company with a reliable source of income until 1867, proved more financially rewarding than the actual construction of telegraph lines. Carl von Siemens had signed these so-called remonte contracts with Count Kleinmichel.

The Russian telegraph authority originally intended to maintain and operate the lines itself, but their workers were not able to cope with the long distances and extreme weather conditions, and they lacked the necessary technical expertise. The cable southwest of Moscow was out of commission for two whole weeks in



The Russian telegraph network, ca. 1855

1855 The Russian Empire's only railway links St. Petersburg with Moscow.

Kap-herr family (left to right): Father-in-law Hermann Kap-herr, his son Louis, his son Charles with wife Amelie, Charlotte with husband John, Hermann with wife Elisabeth; on the right Marie with Carl von Siemens, ca. 1860

December of 1854, for example, before the problem was identified. Carl von Siemens managed to find an effective, affordable model for maintaining the telegraph network by building monitoring stations every 50 kilometers along the lines that were equipped with service personnel and measuring equipment. This made it possible to locate and repair problems within a few hours, in most cases, ensuring a reliable communication network. Company historian Richard Ehrenberg believes that the remonte contracts became the "real cash cows of the company".[15] Werner von Siemens and Johann Georg Halske recognized the huge importance of the Russian ventures and decided to reward Carl appropriately for his high-risk efforts. In the spring of 1855, he was accepted as a managing partner of the Telegraphen-Bauanstalt von Siemens & Halske and appointed manager of the new St. Petersburg office.[16] Carl expressed his elation in a letter to Berlin:

> *"[I would like to express] my heartfelt thanks to you and Halske for taking me on as a partner, and I promise [...] to do everything in my power to ensure you never have cause to regret this step."*[17]

The year 1855 was important on a personal level as well. On November 24, the 26-year-old Carl married the daughter of his business partner Hermann Kap-herr and settled in St. Petersburg. Marrying into the banker's family represented a significant step up in society. Carl von Siemens also enjoyed great recognition in his role as a technical expert and managing director of Siemens & Halske, the largest electrical engineering company in the Russian Empire. In late 1859, he was granted Finnish citizenship and thereby became a subject of the Russian Czar.

1853 Hermann Kap-herr, a banker and merchant with German roots, introduces Carl von Siemens into St. Petersburg society.

1809 After the Finnish War (1808–1809), Sweden cedes major portions of Finland to Russia. The Grand Duchy of Finland remains part of the Russian Empire until 1917.

Looking for new challenges

At first glance, Carl von Siemens seemed to be a complete success: He had completed several large contracts for the Russian state to the utmost satisfaction of his customers and secured long-term service contracts that provided a reliable income. He also enjoyed the full confidence of his senior partners in Berlin—and the self-confidence of a young man who had in short order developed the Russian telegraph business into the company's most important sales market. But the situation at the end of 1855 was anything but simple: Russia had lost the Crimean War, and no further investments in the telegraph network were planned. Worse yet, Count Kleinmichel—who had been the inside contact for Carl up to then—was resigning as head of the telegraph authority. How could the company continue to protect and grow their business in Russia under these new circumstances?

But Carl was not lacking in entrepreneurial courage. The successes of the past years had demonstrated convincingly that he had a keen sense for business opportunities, which he also generally knew how to seize—not infrequently to the horror of his partners in Berlin. He benefited less from his scientific and technical knowledge and ingenuity and more from his organizational and improvisational talent, flexibility, and willingness to take risks. And he certainly benefited from a kind of luck that had eluded him in Paris. So Carl was optimistic when he set out to find new business to compensate for the loss of the Russian government contracts. After all, the coffers were full and he was very

Carl von Siemens, ca. 1865

well connected in St. Petersburg. He was overflowing with ideas for business ventures over and above telegraphy: constructing blast furnaces, smelting iron ore, building pipelines, building fortresses, and manufacturing cannons. The partners in Berlin initially indulged him. After all, even Carl's brother Werner was experimenting with many ideas unrelated to telegraphs. Only when Carl began to run up debt with huge investments did the alarm bells sound in Berlin.

In 1861, Carl von Siemens bought a glass factory near Illmensee south of St. Petersburg and proceeded to squander much of the

1855 After losing the Crimean War, Russia intensifies its modernization efforts but continues to fall further and further behind Western Europe.

1858 Carl von Siemens represents Aktien-Gesellschaft Vulcan Stettin, a major German industrial company in what is now the Polish city Szczecin, for the sale of ships and locomotives in Russia.

profits from the telegraph business there. This was quickly followed by the next misstep: a sawmill near Narva, west of St. Petersburg, that was ultimately torn down in 1868 after bleeding money for years. The year 1862 saw the third business fiasco, the purchase of an expansive piece of property in Finland that Carl hoped to use for logging. But the timber could not be brought to market without a rail connection. Now the senior partners in Berlin began to take notice: What exactly did glassmaking and logging have to do with the core competencies of Siemens & Halske? Nothing. These high-risk ventures led Johann Georg Halske to distance himself more and more from his business partners. The meticulous precision mechanic had long taken a skeptical view of the expansionist drive of the Siemens brothers, and in 1867 he finally withdrew from the company. He was replaced by William Siemens, who joined the company as head of the London office. Siemens was now exclusively a family-run business.

Werner von Siemens showed the most understanding for the "special interests"[18] of his younger brother. That's why he supported him in the next venture, which finally proved successful and developed into the brothers' biggest "side business" outside of electrical engineering. In early 1864, Carl von Siemens purchased the Kedabeg copper mine (Gadabay) in the Caucasus and developed it into one of Russia's largest copper works, despite a host of technical and logistical problems.[19] Copper production was not entirely unrelated to the core business, because copper from the Kedabeg mine was also used in the Siemens cable plant in St. Petersburg beginning in 1882. From copper, the company got into the business of oil extraction and processing, which experienced a veritable boom in the Caucasus in the 1860s. Carl von Siemens acquired a series of oil wells and invested in a refinery. In 1886, he used plans developed by his brother Friedrich to retrofit a large smelter to run on oil—before anyone else in the world, according to a Kedabeg historian.[20] A few years later, he had a modern Mannesmann pipeline to Kedabeg installed. The copper works was being developed into a model of innovation for Russian industrialization and was visited by many prominent politicians.

Kedabeg copper mine, ca. 1865

1865 Countries such as the United States and the United Kingdom already have an extensive railway network. In the Russian Empire, on the other hand, only 3,800 kilometers of tracks have been laid.

1881 The Siemens brothers control 270 oil wells in the Caucasus.

1890 Italy's crown prince, who will later later become King Victor Emanuel III, visits Kedabeg (Gadabay).

Family ties

After the death of his parents, Carl von Siemens found strength in his siblings: He developed no personal friendships outside the family. His older brother Werner was his emotional reference point and most important adviser when it came to business matters. Although Carl and Werner never again lived in the same place after 1850, they remained very close and maintained an ongoing written correspondence for the rest of their shared life. "I rarely received less than one letter a week from him, or he from me", wrote Carl in 1892 after the death of his beloved brother. "So we always actually lived together, even though we were so often physically separated."[21]

Aside from Werner, Carl shared a deep love with his wife Marie, who he married in 1855. Marie, née Kap-herr, was of weak constitution and suffered from frequent migraines. Their children were also frequently unwell. Of the five children she bore, two died in childhood: Only the two daughters Charlotte and Marie would outlive their father. These misfortunes repeatedly led to severe physical illnesses and relapses during which Carl was unable to work. The most devastating was the premature death of his wife, who passed away in Berlin on February 1, 1869, following a long illness. Although important business decisions were awaiting his attention at the time, von Siemens cared selflessly for Marie. A few days before her death, Werner expressed his concern to William: "Things could hardly be worse with Marie! [...] Poor Carl is wearing himself out amid all the misery and the complete lack of rest." The older brother did not always show so much understanding for his family's burdens, however. The previous summer, he insisted emphatically that Carl fulfill his responsibilities to the company: "However hard things become for you and her [Marie]—do not neglect necessity and responsibility."[22] Responsibilities notwithstanding, the welfare of Carl's family was his absolute priority.

Relations among the Siemens brothers were not always harmonious; even Carl and Werner had their occasional differences. But the success of Siemens & Halske in Berlin, St. Petersburg, and London was based on strong family ties. If the brothers fought,

March 3, 1869 Carl von Siemens' eight-month-old daughter Eleonore dies just four weeks after the death of his wife Marie in Berlin.

Marie Siemens, née Kap-herr, wife of Carl: undated photo

the multinational family-owned business was in danger. The relationship between Werner and William was particularly precarious, with repeated altercations, wounded egos, and personal slights. Carl, the youngest of the three, often had the thankless task of brokering the peace. His diplomatic skills helped him again and again to defuse serious conflicts that, if allowed to escalate, could have jeopardized the company's continued existence.

"Carl was the true connecting link between us four brothers [Werner, Wilhelm, Friedrich, Carl], who indeed differed radically from one another."[23]

Family played a key role in the life of Carl von Siemens even beyond the circle of his siblings: A fundamental mistrust of outsiders meant that important management positions in the company were usually filled by family members, even in Russia. Needy relatives were naturally supported with financial assistance, sometimes for years at a time. Carl also took a keen interest in the development of his many nieces and nephews.

As for his own children, misfortune struck again with the death of his first-born, Werner, in July of 1900. The sudden death of his 43-year-old son meant the "extinction of the male line"[24] of the Siemens family tree—a great stigma according to the standards of the day.

Five Siemens brothers (standing from left): Walter, Carl, Werner, and Otto; seated in the foreground, William with wife Anne, ca. 1860

1855 William Meyer, a childhood friend of Werner von Siemens, begins working for Siemens & Halske. Meyer is one of the first employees from outside the Siemens family to hold a senior position in the company.

1860–1871 Walter Siemens, an engineer, and Otto Siemens, who holds a doctorate in chemistry, work for the company in the Caucasus.

Globalization of Siemens & Halske

After this digression into the private life of Carl von Siemens, let us return to business matters. In the second half of the 1860s, Siemens & Halske was offered the opportunity to establish a continuous telegraph link between London and Calcutta, the capital of British India. This was a project of great significance. At the time, a letter sent by ship from Calcutta around the Horn of Africa to London required several months. The construction of an overland link between the Red Sea and Mediterranean Sea dramatically reduced the travel time, but mail still took 44 days to arrive. Now the electric telegraph would revolutionize communications between Europe and the Indian subcontinent.[25]

Carl von Siemens pushed the project. He believed that Siemens & Halske—with branch offices in England, Prussia, and Russia—was absolutely predestined to construct and operate the Indo-European Telegraph Line ("Indoline"). The line would run from London through Prussia, across Russian territory and the Caucasus, through Persia, and onward to India. Despite the most severe logistical and bureaucratic difficulties, Carl managed to push the planning for the mammoth project forward. The actual construction work presented the biggest challenge: The technical equipment and iron telegraph poles from the Siemens factories in Great Britain and Berlin had to be transported by ship at great expense over the Volga to Astrakhan. From there the route continued across the Caspian Sea to a Persian port and then by donkey and camel caravan to the country's interior.[26]

1857 The "Great Mutiny" in India causes difficulties for British colonial rule and provides further impetus for establishing an electric telegraph link with the mother country.

Siemens & Halske overcame all of these challenges to complete the Indoline in two years. It was formally inaugurated on April 12, 1870, with a large public ceremony. The first telegram sent from London crossed the 11,000 kilometers in just 28 minutes. The completion of the Indoline was one of the great triumphs for Carl von Siemens, and it catapulted Siemens & Halske overnight into the premier league of international telegraph companies. This was especially important for the Siemens Brothers English subsidiary in London, because that was where the most important contracts in the global telegraph business were being awarded. Meanwhile, business in Russia had been stagnating for years. The Russian Empire offered no attractive prospects for the ambitious businessman. In the autumn of 1869, Carl moved his entire family to London, where he would spend the next decade working to develop the international business.

"Connecting the world"[27]

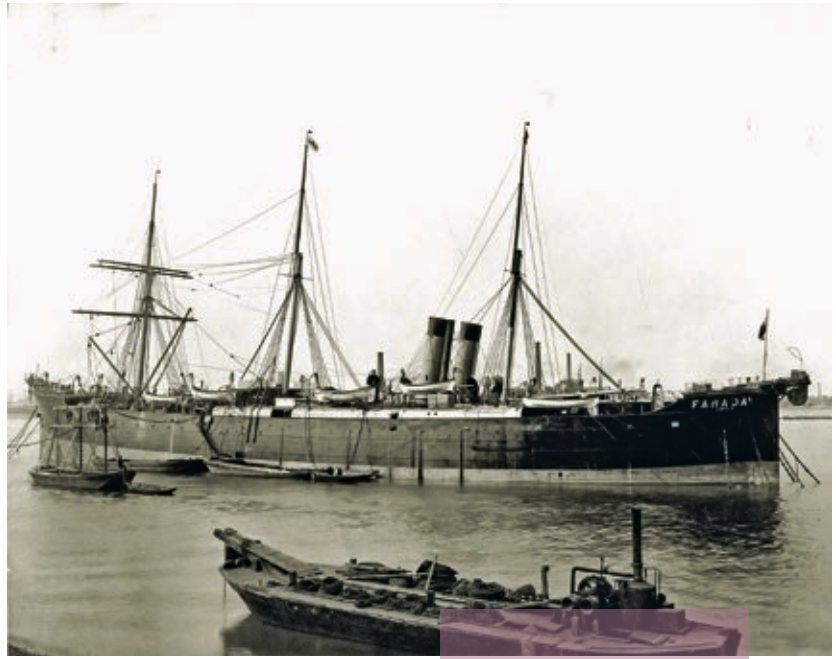
This global business was increasingly focused on submarine cables, so Carl von Siemens began by ordering the expansion of the Siemens cable factory in Woolwich near London. One of the first big orders came from the Great Northern Telegraph Company of Denmark for a 4,000-kilometer submarine cable to connect Vladivostok, Nagasaki, Shanghai, and Hong Kong. Other submarine cable contracts from South America followed. But the installation of a transatlantic cable developed into the most important project by far, and gave Carl the opportunity to use all his talents.[28]

The first challenge was to win his brothers over to the mammoth project, which turned out to be quite difficult. Submarine cable projects required huge amounts of capital and carried great risk. All too often, the expensive cables tore, were overgrown by

1858 American businessman Cyrus W. Field commissions the first transatlantic cable between North America and Ireland; it's only in operation for a few weeks.

coral, or were permeated by seawater under mechanical stress and became unusable. The Siemens Brothers had already experienced these problems many times, and suffered huge losses as a result. So Werner von Siemens and his brother William had their reasons for being skeptical of the transatlantic cable project. At the beginning of the 1870s, three cables connected Europe and North America, and all three were owned by the Anglo American Telegraph Company. The high price of telegrams meant that operating communications lines was an extremely lucrative business. Carl von Siemens was unrelenting in his efforts, and expressed his views quite clearly in a letter to his brother Werner in the summer of 1872: "The realization of this [transatlantic] project is almost an existential question for us. We won't be respected as a cable business until we have completed a cable to America."[29] Finally, he managed to convince his brothers, and the Siemens Brothers joined the Direct United States Cable Company (DUS) in March of the following year in founding a publicly traded business that would finance the expensive project.

It was finally time to lay the cable with the help of the specially constructed cable steamer "Faraday" — with Carl on deck to head the project. He and his team faced the challenge of laying the cable, which was more than 3,000 kilometers long, at depths of up to 5,000 meters. The work required overcoming storms, torn cables, returns to port with repeated work interruptions, problems finding the broken cable on the ocean floor, and other challenges. The expedition tested all those involved to their breaking point. The cable was finally ready for operation on September 15, 1875. For Carl von Siemens, the successful laying of the transatlantic cable just a few years after completion of the Indoline represented another professional triumph; for Siemens Brothers, it was a quantum leap that soon brought in more submarine cable contracts. By the



The cable ship Faraday, 1874

end of the nineteenth century, Siemens Brothers had laid nine of the 16 transatlantic cables operating at that time. A look at the employee numbers illustrates the overwhelming significance of the global submarine cable business for Siemens & Halske: In 1874, when the transatlantic cable was manufactured in Woolwich, at times Siemens Brothers employed over 1,600 people, nearly 70 percent of the overall Siemens workforce.[30] The English subsidiary also managed to build their business in non-European markets. By the end of the 1870s, Siemens Brothers had contacts

1866 The first permanent submarine telegraph cable between Europe and North America goes into operation; it's mainly financed by British businessman John Pender.

Sept. 15, 1875 Stockbrokers organize a competition for the fastest telegraph transmission between New York and London; Siemens Brothers' cable wins.

in Asia, Africa, Australia, and South America. Siemens was a major supplier to the Japanese market and employed a sales representative in China.

Economic interconnectedness, global waves of migration, and social, political, and cultural exchanges—in short, what we now call globalization—grew rapidly around the world in the last third of the nineteenth century. Communications technology—or telegraphy, to be more precise—played a major role in this trend, revolutionizing global communications in just a few short years. So globalization is not just a phenomenon of the last three or four decades; its roots lie in the nineteenth century. Pioneering entrepreneurs like Carl von Siemens played an important role in its origins.

1870s Steamboats and transcontinental telegraph lines accelerate globalization.

Return to Russia

For some 20 years, Carl von Siemens was active primarily in the field of telegraphy. The large-scale cable projects of the 1850s through the 1870s were milestones on Siemens & Halske's path as it grew into a "global company",[31] which was the grand youthful ambition of Werner von Siemens. However, the electrical engineering industry, though still young, had already begun to change by the mid-1860s. The field was no longer synonymous with telegraphy alone. Groundbreaking developments like the dynamo—in which Werner von Siemens played a key role—opened up new avenues for electricity. This had a profound effect on both the technological foundation of the business and on the market environment.[32]

How does someone nearly 50 years old confront such challenges? If your temperament resembles that of Carl von Siemens, you engage it with optimism and enthusiasm. In early November of 1880, he returned to St. Petersburg with his two daughters; this followed a period of several years during which he'd felt less than challenged in London. Carl also had a hard time accepting that in England he had failed to achieve the same social status he enjoyed in Russia. During all the years in London, he was overshadowed by his older brother William, whom the English regarded as the "true" Siemens.

It's no wonder, then, that Carl's return to the Russian capital awakened his youthful energy. After just a few weeks, he wrote to his brother Friedrich that he "felt a great deal better here than

1879 At the Berlin Trade Exhibition, Siemens & Halske presents the world's first railway powered by an external source of electricity.

in England" and had already "become much happier".[33] In the business realm, this enthusiasm culminated in the building of a Siemens cable factory in the St. Petersburg suburb of Chekushi. The factory was the first major electrical engineering plant in the Russian Empire. In the autumn of 1882, Siemens & Halske introduced Russia's first electric train at the All-Russian Arts and Industrial Exhibition in Moscow. Czar Alexander III and his family and ministers took great delight in riding back and forth on the train. Carl reported the event in a letter to Berlin: "When the train began moving, the crowd erupted in a tremendous 'hurrah'—and that's the way it was all along the route on both runs. It was a genuine triumph."[34]

Siemens & Halske's electric train at the Moscow Industrial Exhibition, 1882

The "imperial fondness for electric light"[35] was also what brought Siemens & Halske its first major lighting contract in Russia in 1885: a project to install electric lights in the Czar's Winter Palace. Some 12,000 light bulbs illuminated the palace for a court ball in January 1887—and this was a powerful marketing event for the Russian lighting industry. By 1886, Carl von Siemens had consolidated all business activities relating to electric lighting in the Gesellschaft für elektrische Beleuchtung of 1886 (commonly called Lichtgesellschaft, i.e. "Lighting Company"), which enjoyed a state monopoly to install and operate electrical plants and grids throughout the country. The Lichtgesellschaft developed into the industry leader in Russia. This business was instrumental in helping Siemens & Halske once again dominate the electrical engineering market in Russia following the difficult 1870s.

Siemens & Halske faces competition

The new market for "light" and "power"—the contemporary designations for lighting systems and power plants—also brought competitors into the field, most notably AEG, the company founded by Berlin entrepreneur Emil Rathenau. Within just a few years, AEG was fighting Siemens & Halske for leadership in the European electrical engineering industry. As a publicly traded company with a healthy supply of capital and state-of-the-art organizational structures, AEG was expanding with a speed that was too much for Carl and Werner von Siemens (William had died in 1883) to match. Since the Siemens founder insisted on sticking to his youthful ambition of having a multi-generational family-owned

1881 Czar Alexander II is assassinated; his son Alexander III ascends the throne.

1879 Thomas Alva Edison files for a U.S. patent for the electric light bulb.

1883 In Berlin, Emil Rathenau founds Deutsche Edison-Gesellschaft für angewandte Elektricität, a company for producing electrical equipment.

company, listing Siemens & Halske on the stock market was not an option. Instead, the electrical pioneer spent the 1880s worrying about how the aging brothers could begin handing over the operation of the company to the next generation. Carl von Siemens, unlike his brother Werner, saw quite clearly the danger posed by the well-funded AEG. But he was not able to win over his older brother with his suggestion that Siemens also turn to the capital markets to finance the urgently needed investments. And so Siemens & Halske wasted valuable years, during which AEG gained more and more ground.[36] This neglect led the company to fail to bring production methods up to date and establish modern management structures.

Passionate brotherly strife

So far, the three brothers had managed to hold the wide-ranging businesses within their company together thanks to good family relations. Werner von Siemens always referred to this as an "integrated business"[37]—by which he meant Siemens & Halske in Berlin, Siemens Brothers in London, and Siemens & Halske St. Petersburg. One Siemens brother was in charge of each of the three companies: Werner in Berlin, William in London, and Carl in St. Petersburg.[38] When it came to broader issues such as major projects, all three partners had a vote. This arrangement worked, not always without friction: but thus far, the three brothers had always managed to find common ground despite differences of opinion.

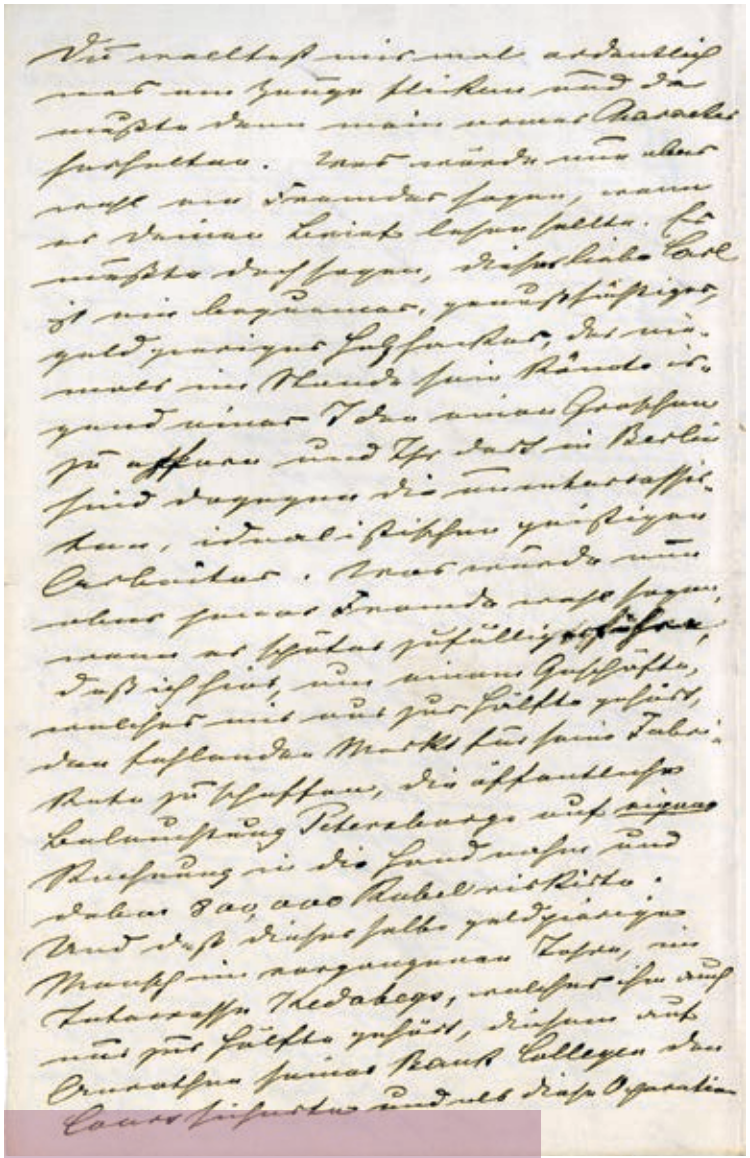
William's death in November 1883 changed the situation profoundly. Because he had never had children, there was no direct heir who might have taken over the primary role in the London portion of the integrated business. Werner reluctantly agreed to entrust a hired manager named Ludwig Löffler with the management of the London operations. The mechanic and marine cable specialist had been working for the English subsidiary since 1858 and had led several large cable expeditions.

Carl knew Löffler from his time in London and trusted him to keep Siemens Brothers on the path of success. But his opinion changed when Löffler began to ambitiously expand the Siemens Brothers business with a focus on South America, Africa, and Asia, for which London served as an excellent base of operations.

1880s–1890s The electrical engineering market in Germany grows at enormous speed, and a series of innovative companies press onto the market.

1880s The colonial expansion of European powers approaches its peak.

1870s Ludwig Löffler becomes the driving force behind Siemens Brothers' business.



Page of a letter from Carl von Siemens to his brother Werner on January 11, 1888

Löffler quickly fell into conflict with Werner von Siemens, who saw a threat to the interests of the Berlin headquarters. Carl was drawn into these disputes, which by 1887 evolved into a real conflict between the two brothers.

For Werner von Siemens, the situation was clear: He had founded the electrical engineering company in 1847 with Johann Georg Halske in Berlin. This meant the branch offices in London and St. Petersburg were "children" of the parent company in Berlin[39]—the term "multinational corporation" did not yet exist. And so in the eyes of its founder, Siemens & Halske was a company with German roots and whose management should remain German.[40] Carl saw their enterprise as more differentiated. Although he respected the position of his older brother as primus inter pares, he regarded Werner's "preferential weakness"[41] for the Berlin site to be extremely problematic. He had urged his elder brother back in 1884 to "emancipate himself from his patriotic feelings for Germany and his special paternal devotion to the Berlin offices".[42] A rational observer could see that London was much better suited to serve as the headquarters for the global operations of Siemens & Halske.

The tone of the correspondence between Berlin and St. Petersburg became harsher from letter to letter, and in late 1887 the conflict broke out into the open. In more than 30 multi-page letters, some of which were highly emotional, Werner and Carl argued about their worldviews, entrepreneurial success, and about key issues surrounding the future of their company.[43] Even Carl, usually so patient in his relationships with his siblings, became enraged and felt he had been treated unfairly by Werner. After all, Carl argued, Werner had not built the company all by himself: It was the successful collaboration of the three brothers that made Siemens & Halske into a "global company". Carl von

1880s The United Kingdom is the dominant colonial power, and London is the political and economic center of the global British Empire.

Siemens wanted this to be appropriately acknowledged. In early January 1888, he wrote to Berlin:

"I seem to be born to great ventures, because wherever I've gone so far, great things have always arisen. [...] [A]ll the major business transactions that were completed during my 11 years of slave labor in London – the Indo-European and Russian-Japanese cables, DUS cable, French cable – [would not have] happened without my help."[44]

Their tempers grew calmer as the month wore on. Guided by the conviction that in matters of business, each partner must "always trust in the good sense of the other partners" if one is to avoid "upending the cart",[45] both men returned to their day-to-day business.

1879 Siemens Brothers lays a submarine cable between Brest, France, and Canada's East Coast.

Setting the course for the future

Eventually it came to the point where the Siemens brothers had to take action. Business as usual was not enough in light of AEG's successful development. Building and operating electric trains, power plants, and municipal lighting systems required large investments that Siemens alone was unable to raise—which is why Carl von Siemens felt that an initial public offering was just the right thing. However, brother Werner continued to reject the conversion of Siemens & Halske into a stock corporation. He also shied away from the financial risk associated with long-term investments in infrastructure projects. In his opinion, that kind of "entrepreneurial business required [...] young, daring bosses who are always willing to risk their existence to complete a major business project".[46] He even signed a contract with AEG's Emil Rathenau in 1883 in which he promised not to enter the field of power plants, which were the foundation for the rapid expansion of municipal electrical grids. Siemens & Halske in Germany restricted itself to producing electrical products, and missed out on the opportunity to compete in a growing and lucrative segment.

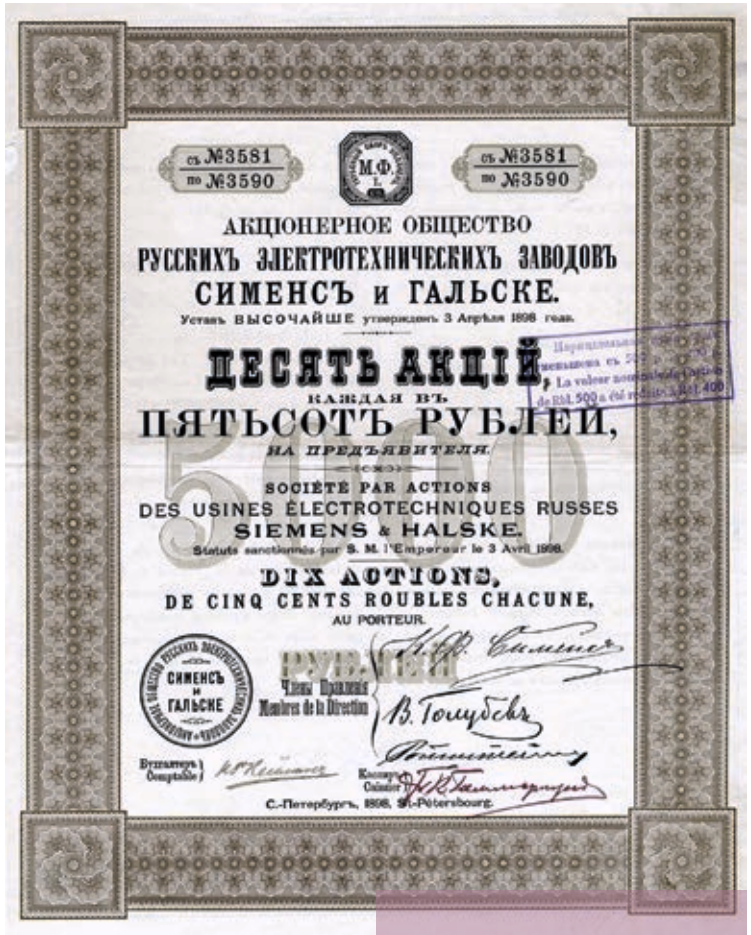
In Russia, Carl von Siemens took a different approach. His Lichtgesellschaft was a stock corporation that was able to expand rapidly in Russia's municipal lighting market. Given this experience, he urged his brother to quickly implement the necessary business reforms in Germany as well—or risk being "reduced to mere manufacturers".[47] The focus on their family—which had been one of the strengths of the integrated business—now seemed to

1887 Emil Rathenau changes the name of the Deutsche Edison-Gesellschaft to Allgemeine Elektricitäts Gesellschaft (AEG) and lists the company on the stock exchange.

the 59-year-old to be a major drawback. At Christmas in 1888, he predicted a long and bitter fight with AEG that would "inflict serious damage on both sides [...] Without the help of their shareholders, AEG could never have become so big and powerful in such a short time, and soon they will overshadow us".[48]

The initial public offering that Carl desired only became possible after Werner von Siemens' death. Carl—working with his two nephews Wilhelm and Arnold, who had also served as general partners of Siemens & Halske since 1890—engaged his cousin Georg Siemens from Deutsche Bank to make the necessary preparations. He could not and did not wish to act entirely without the family's help. Siemens & Halske AG was formally established on July 3, 1897. At this time, the company had the same market capitalization of 35 million Reichsmarks as AEG, which had been established only ten years earlier.[49]

Despite the issuing of stock, the family did not turn over control of the company. All shares were initially held by the family, and even the Chairman of the Supervisory Board was a family member. Incidentally, this tradition was maintained until 1981. Carl von Siemens, as the last representative of the generation of founders, became the first Supervisory Board Chairman in 1897— which was practically a foregone conclusion. At this point, he began to withdraw more and more from day-to-day operations. In 1893 he had already handed over the management in St. Petersburg to Hermann Görz, who he had recruited a short time earlier from AEG, of all places. Five years later, the St. Petersburg offices also went public under the name Russische Elektrotechnische Werke Siemens & Halske AG.[50]



Share of Russische Elektrotechnische Werke Siemens & Halske AG, 1898

1981 Bernhard Plettner is the first Chairman of the Supervisory Board of Siemens AG from outside the Siemens family. He remains in office until 1988.

1890s Under Minister of Finance Sergei Witte, liberal economic reforms are implemented in Russia, and the country achieves Europe's highest growth rates.

After relinquishing his management role in Russia, Carl von Siemens moved back to the city that he had left for London over 40 years earlier, as a young man. In Berlin, the 69-year-old businessman—who had since been bestowed the title of "von Siemens"—supported his two nephews when they asked for his help, but he did not offer unsolicited advice. "Everyone wants to learn things for himself",[51] he wrote to his nephew Wilhelm in July 1898. In this spirit, Carl limited his role primarily to honorary duties and took on additional supervisory positions. The company was now entirely in the hands of the second generation. Carl only regretted that his own son showed neither the talent nor the ambition to assume a management position in the company.

Siemens & Halske was well equipped for the challenges ahead. The company grew rapidly both in Germany and abroad in the lighting, railway, and industry markets. Berlin had developed by that time into the most important market in the world for the electrical engineering industry, and Siemens & Halske had a sizeable market share. Within a decade, their workforce tripled in size. In spite of this trend, however, the company lost the dominant position it had achieved in many markets in the years since its founding in 1847.

Ca. 1900 Nicknamed the "Elektropolis," Berlin has nearly two million residents; about three and a half million people live in the greater metropolitan area.

From "slave to business" to gentleman

As he withdrew from day-to-day business operations, Carl von Siemens carved out more and more space for his personal life—which he urgently needed. In October 1896 he wrote in a letter to his nephew Wilhelm:

> *"All my life, I've been a slave to my business, and at long last I'd like to finally enjoy a bit of freedom."*[52]

Frequent illnesses, lengthy and recurring spa visits, family misfortunes—all of this had taken a heavy toll on him over the decades. Now he was finally wealthy enough that he could enjoy the comfortable life he had yearned for all those years.

Life in the country held a special appeal for him, perhaps due to memories of his early childhood in Menzendorf. In 1889 he purchased the Gostilitzy estate near the Czar's Peterhof Palace, about 40 kilometers west of St. Petersburg.[53] The estate was easily accessible by train and soon served as a country manor befitting his social position, with high-profile visitors from the capital coming and going regularly. AEG manager Felix Deutsch, recalling his visit to Russia in late 1889, wrote: "Carl [von] Siemens is a genuine grand seigneur and a very kind host, and I recall with special fondness the evenings spent in his lovely home."[54] During the autumn months, he hosted battues in the forests that covered his spacious grounds, and many influential individuals from the nearby capital were regular guests. Carl von Siemens had a keen sense for maintaining his excellent contacts with political and

1883 The industrialist Felix Deutsch joins the Deutsche Edison-Gesellschaft für angewandte Elektricität (which will become AEG in 1887) as a senior executive.

administrative leaders—and also exploiting them for business purposes.

Then as now, a businessman's reputation depended in part on demonstrating social responsibility and a commitment to the arts. However, Carl von Siemens never showed much interest in art and culture at any time during his life: He was more interested in promoting the sciences. He helped establish the electrical engineering department of the Russian Imperial Technical Society. He also made regular donations to Lutheran congregations in St. Petersburg and to various institutions within the German community in the Russian capital. In 1890, he also began supporting an orphanage. Entrepreneurial success combined with charitable activities burnished the social standing of the bourgeois businessman and earned him numerous distinctions. At the zenith of his social ascent, Czar Nicholas II elevated his "loyal subject" in February 1895 "into the hereditary nobility of the Russian Empire [...] in recognition of his extraordinarily useful activities on behalf of our national industry and as compensation for his achievements".[55]

This may seem surprising given his liberal ideals during the revolution of 1848, but Carl von Siemens had long since ceased to give critical thought to political issues. He maintained pragmatic relations with the state power brokers and had made his peace with the monarchy, both in Russia and Germany. Unlike his brother Werner, who for a time sat in the Prussian House of Representatives as a member of the liberal Progress Party, Carl was never politically active.

Now semi-retired and a member of the nobility, Carl von Siemens devoted himself to his interests. The manor house and grounds of the Gostilitzy estate gave him and his family a great deal of pleasure; his daughters and their husbands and children were frequent guests. He also traveled more, preferring Mediterranean destinations during the winter months. In 1898 Carl and his son Werner traveled to the Nile Valley. In 1902, two years after his son's untimely death, his nephew Wilhelm accompanied him to Carthage. But his business never entirely lost its hold on him. His name, reputation, and excellent contacts remained of great importance for the Russian office. He also continued to serve as Chairman of

Carl von Siemens on the occasion of his ennoblement, 1895

1894 Czar Nicolaus II assumes the throne of the Russian Empire; he will be the last of the Czars.

the Supervisory Board for Siemens & Halske AG, a position he resigned only in December of 1904 due to increasing health problems. At the time, the 75-year-old had been involved with the company for 55 years—longer than founder Werner von Siemens.

Carl von Siemens with his cousin Georg (left) and Georg's mother Marie, 1900

For posterity

As he grew older, Carl von Siemens turned his attention to the legacy of the Siemens brothers. Werner, William, and Carl had risen above their humble beginnings to build a global company, which in 1900 was among the largest industrial enterprises in Germany. Carl was the last of the three brothers, and he began to develop increasingly strong feelings for the historical significance of the family heritage. So he was very receptive when Richard Ehrenberg, professor and business historian at the University of Rostock, approached Siemens & Halske in 1902 with a proposal to write a history of the company.[56] He gladly shared his recollections with the professor and even allowed him to study the surviving documents from the past decades. The written correspondence between the Siemens brothers proved to be a unique treasure trove that allowed Ehrenberg to construct a detailed picture of not just the development of the company but also the family history over a period of more than 40 years.

Carl von Siemens had the letters that were in Berlin sorted and also brought in documents from St. Petersburg and London. In June 1902, he told Ehrenberg that he would continue "sending documents until you write and tell me to stop".[57] The professor responded with enthusiasm. He urged Carl to preserve the letters in a "central family and business archive"[58] so they would be available to future generations. The Siemens Archive, as Ehrenberg called it, was founded in 1907 and was among the first company archives in Germany. But Carl did not live to see its doors

1870–1900 Georg von Siemens is the key founder of Deutsche Bank; he strongly influences the bank's development for decades.

1905 In preparation for its 100th anniversary, a corporate archive (Germany's first) is set up for Krupp, a company founded in 1811.

open. After resigning his position as Chairman of the Supervisory Board in December 1904, his health compelled him to spend most of his time in hospitals and health spas. In early 1906 he was admitted to a sanatorium on the French Riviera, where he died on March 21 at the age of 77.

Unlike his brothers Werner and Friedrich, Carl von Siemens did not create any significant inventions. He did not conduct basic research like William Siemens, nor did he earn any honorary doctorates for outstanding achievements in science and technology. And yet he was indispensable in the development of Siemens & Halske. Carl von Siemens has gone down in the company's history as the "organizer of great business ventures". This "special talent," wrote the Siemens-Jahrbuch on the 100th anniversary of his birth in 1929, enabled him to "create a solid foundation for the financial ascent of Siemens & Halske".[59]

2014 The Siemens brothers maintained regular correspondence throughout their lives. The Siemens Historical Institute's collection includes about 8,000 of their letters.

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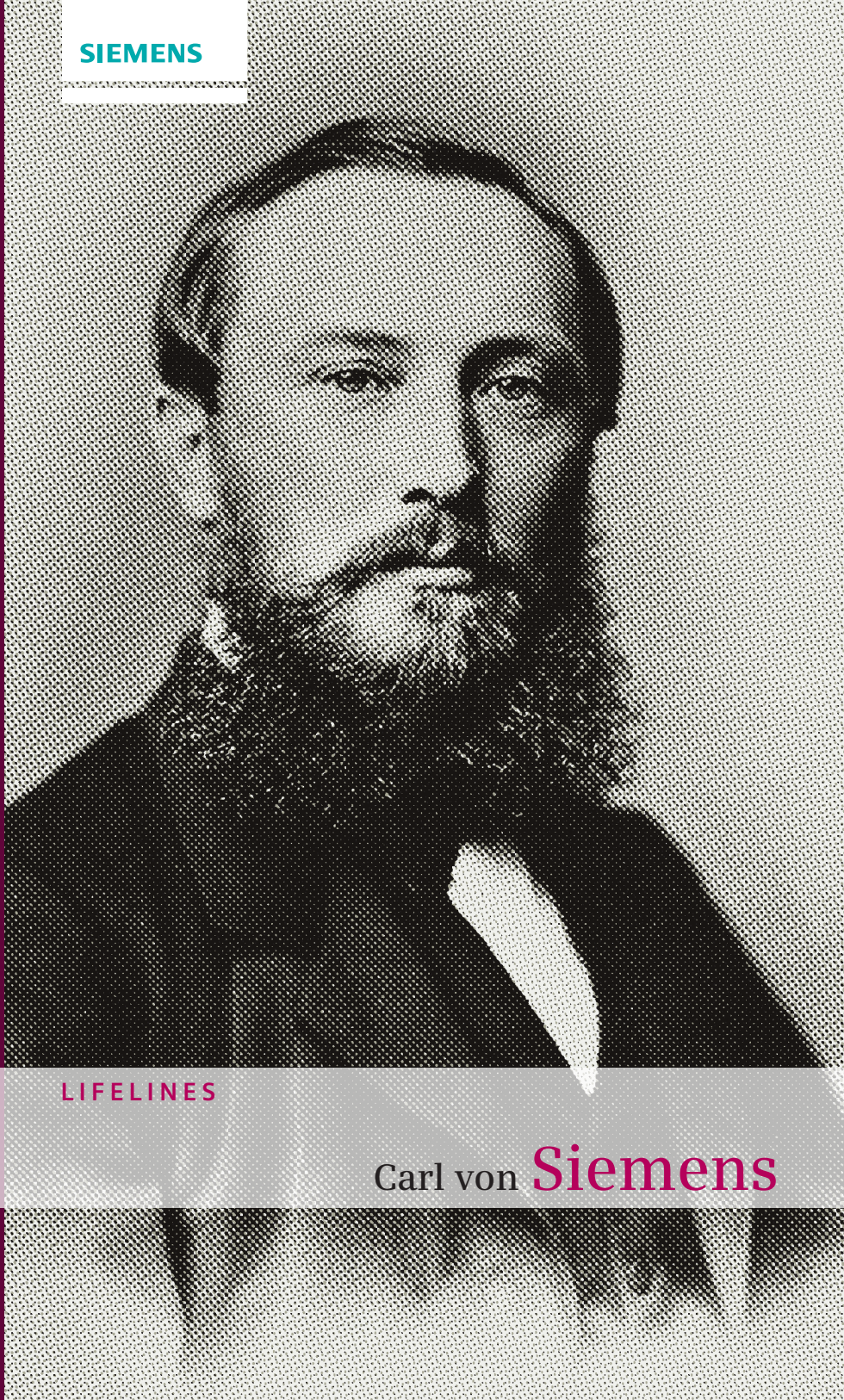
Carl von Siemens was instrumental in turning the Berlin Telegraphen-Bauanstalt von Siemens & Halske into a global company in the second half of the 19th century. The Siemens Historical Institute marks this achievement with a biographical portrait of the younger brother and business partner of Werner von Siemens.

The brochure is the second volume in the new series **LIFELINES**, which is dedicated to introducing the men and women who have done the most to shape the history and development of Siemens. This group includes businessmen who led the company, members of the Managing Board, engineers, inventors and creative thinkers. A conscious effort has been made to include the lives and contributions of those individuals who are not always counted among the company's most prominent figures.

SIEMENS



LIFELINES

Carl von Siemens