

How Not to Build a World Wireless Network: German-British Rivalry and Visions of Global Communications in the Early Twentieth Century

Heidi Tworek  
Assistant Professor of International History  
University of British Columbia  
1873 East Mall, Room 1297  
Vancouver, BC V6T 1Z1  
Canada

This is a preprint version of an article that appears in *History and Technology: An International Journal* 32, no. 2 (2016): 178-200. The journal is published by Taylor & Francis.

The article DOI is: 10.1080/07341512.2016.1217599

The published version can be found [here](#).

Abstract: Edward Snowden's revelations laid bare an unprecedented scale of state influence on communications technology. But government elites have frequently shaped technological development through their beliefs about potentially nefarious uses of communications. This article argues that beliefs about how other states or groups might use a technology can shape innovation. In particular, German visions about the British use of cables spurred German investment in developing wireless telegraphy. Germans imagined that the British were using cable technology to damage Germany's reputation, spy on Germany and 'poison' neutral countries against the Central Powers. The German government and military at first created a colonial wireless network to bypass British cables. In World War I, however, they sought to establish a world wireless network. In the end, innovation was significantly shaped by how Germans imagined their enemies' uses of communications technology.

Keywords: wireless, radio, Germany, World War I, Britain, colonialism, imperialism

Sophus Larsen was in trouble. He needed money, and fast. In November 1917, his company, Larsen & Co., had signed a contract with the Chinese government to erect three wireless stations on Chinese soil. But the Chinese harboured suspicions. Larsen was Danish. He was a citizen of a neutral country in World War I. He had worked for the Chinese government before so he could probably be trusted. On the other hand, he had also worked for the German wireless company, Telefunken. Might Larsen be using his company to cover up funding from Telefunken and even the German government? Was he part of a secret plan to spread German propaganda in China and throughout Asia? Or might the Germans have grander, global designs?

Larsen had already paid a deposit of 10,000 Mexican dollars — a currency on the gold standard since 1905 and long used in China — when he signed the contract with the government to guarantee that he would fulfil its terms.<sup>1</sup> But the Chinese wanted more assurances. Officials demanded proof that Larsen was operating independently from any German company. He had to show evidence of 500,000 British pounds to the Chinese embassy in Copenhagen or Washington DC. That kind of capital bought credibility. Larsen had six months. He had until 15 May 1918. Otherwise, the contract would lapse and the Chinese would take another offer, probably from the British firm Marconi.

Unlike many wartime conspiracy theories, Chinese officials were right about German influence behind the scenes to construct a world wireless network. Larsen had signed an agreement with the private German firm Telefunken in early 1917 that he would convince the Chinese government to award him a contract. Telefunken's expenses, in turn, were paid by the German government that had initiated the scheme in the first place. The German government would also award Larsen a 10,000 Mark bonus if he used the wireless towers to disseminate German news in China.

Chinese demands provoked a swarm of correspondence, conjecture and confusion between the German government, Telefunken and Larsen's intermediaries. Larsen could not directly communicate his intentions back to Germany, because letters and telegrams travelled over enemy soil. He could not risk detection. Telefunken and the German government extrapolated from Larsen's letters to his siblings and other communication that he needed half a million British pounds. The Chinese government seemed to

have agreed to allow Larsen to erect a large wireless tower and two receivers. The Chinese government would take a credit for the amount that Larsen had spent to erect the towers and would repay him at an interest rate of eight percent. Larsen's company would operate the towers for the next thirty years. If the Chinese government took over the towers before that time, they would have to repay the credit in full. If the Chinese waited the full thirty years, they would receive the sites for free because of amortization. The plan offered opportunities for German influence long after the war had ended.

Even in the last, desperate summer of the war, even with the confusion over specific details and even without seeing a contract, the German government and Telefunken found it a good deal. In late April 1918, Hans von Bredow — a Telefunken executive and Post Office employee after the war — hastily travelled to Copenhagen to execute the transfer. It was too late. Larsen had already taken matters into his own hands. He had understood that he must do anything to stop the British firm, Marconi, from raising wireless towers in China. He could not communicate with the Germans. To prevent the Chinese government from awarding the business to the British, Larsen had transferred the contract to a Japanese firm. All the hard work by the Germans seemed lost.<sup>2</sup> This was no way to build a world wireless network.

Since mid-1916, the German government had subsidized and supported a plan for a world wireless network. China formed a vital element of the scheme to erect towers in neutral countries around the globe. A plan crystallized by late 1917. There would be four large stations in neutral countries: Mexico, somewhere in South America like Suriname, China and the Dutch East Indies. These would be supported by smaller receiving towers in other South American and East Asian countries. This network would allow Germany to circumvent British cables and to counter the poisonous information that Germans thought Britain was cabling to neutral nations. Innovation in wireless technology formed part of a long-term German vision for infrastructural and informational independence.

This article examines how Germans imagined foreign use of global communications technology from 1900 to the end of World War I. Those perceptions fundamentally drove German innovation in wireless technology. British censorship of information from South Africa during the Second Boer War (1899–1902) ignited German and French fears that the British might use their control over cables to censor

content.<sup>3</sup> As the British-German rivalry intensified, German officials became increasingly convinced that the British were using cables to damage Germany's reputation, spy on Germany and 'poison' neutral countries against it. The German Colonial Office in particular invested heavily to create a colonial wireless network. World War I seemed to confirm all of Britain's nefarious intentions: British ships cut the submarine cables from Germany across the Atlantic at the start of the war. Wireless was the way out.

German beliefs relied upon assumptions about cable ownership, government policies and technological innovation that did not necessarily bear out on the ground. But the imagined uses of technology were a powerful force in driving interactions between the German government and wireless companies to increase wireless' range and to create a world wireless network that would bypass British cables. In the first decades of the twentieth century, German investment fundamentally shaped the development of wireless. In turn, wireless technology remapped Germany's global visions. Paramaribo and Java could be more important than Poland and Japan. The world was no longer simply divided into land and sea. For Germans, the air had become the vital third dimension.

This article brings together work on German global and colonial visions with examinations of technological innovation. More broadly, this article contributes to the burgeoning literature on the transnational history of technology.<sup>4</sup> Much of this work has focused on how technological infrastructure created transnational solidarity, especially within Europe.<sup>5</sup> Others have shown how professional organizations created transnational solidarity or acted as fora to promote political goals.<sup>6</sup> Still, we need to incorporate the transnational history of technological perceptions alongside organizations and infrastructure. Moreover, transnational connections could often lead to rivalries rather than cooperation.

While spoken radio has received far more attention, interest in wireless telegraphy has grown recently.<sup>7</sup> Gabriele Balbi and Simone Natale have argued that radio experienced a 'double birth' of wireless and then spoken radio, while Graeme Gooday and Stathis Arapostathis have shown how rivalries surrounding wireless patents helped to create the notion of the lone inventor.<sup>8</sup> The comparatively small amount of scholarship on German wireless has concentrated on the company Telefunken, on the Navy or on attempts to connect Berlin with individual German colonies.<sup>9</sup>

Still, work on radio remains disconnected from scholarship on German colonial and global visions. After decades of debate about Germany's 'special path' to modernity and preoccupation with German national history, scholarship has recently sought to understand Germany in colonial and global contexts.<sup>10</sup> Germans were integrated into global trends of trade, migration and missionary activity from the early modern period, long before Germany became a unified nation in 1871.<sup>11</sup> Around 1900, however, Germans became particularly invested in what Markus Krajewski has called 'world projects'.<sup>12</sup> Many Germans understood their nation increasingly within a global context.<sup>13</sup> By 1900, Germans had developed the concept of a 'world economy' (*Weltwirtschaft*).<sup>14</sup> Politicians discussed 'world politics' (*Weltpolitik*). They wanted Germany to be a 'world power' (*Weltmacht*). Academics debated the question of 'world traffic' (*Weltverkehr*), which at the time meant trade, communications and transportation.<sup>15</sup> Germans also worried about world communications. In particular, they exhibited growing concern about the British 'world cable network' (*Weltkabelnetz*) that was completed with a line under the Pacific Ocean in 1902. German visions of British intentions for this world cable network spurred the German government to invest in their own cables as well as subsidize a world wireless network (*Weltfunktelegraphennetz*) to counter British cables.

These fears about Britain were tied to colonialism as well as globalization. Although Germany engaged in overseas empire comparatively late, colonialism was central for Germany from the mid-1880s. Germany's colonies were far smaller than British or French possessions. In 1913, German colonies contributed only 2.55 percent to the country's total GDP.<sup>16</sup> But these territories sparked the German imagination. Colonial motifs flooded advertising.<sup>17</sup> Working-class readers devoured colonial books; colonial products were everywhere in shops.<sup>18</sup> Colonial visions differed in scope and scale, but they affected German interactions with Eastern Europe and the Baltic alongside Germany's actual colonies in Africa and the Pacific.<sup>19</sup> Colonial thinking remained relevant even after Germany lost its colonies in 1918.<sup>20</sup> In the Nazi period, the German Colonial Society had 2.1 million members.<sup>21</sup>

Concerns about colonial rivalries on the global stage also informed German-British antagonisms, as cultural and military histories have explored.<sup>22</sup> Bernhard Rieger's comparison of British and German cultural perceptions of technology showed that the British often saw technologies as 'instruments to

stabilize an international *status quo* favourable to their nation, while Germans viewed products of engineering as tools to transform the international environment that stifled their political ambitions'.<sup>23</sup> While Rieger investigated steamships, airplanes and cinema, the same sentiment holds true for wireless.

This article builds on these analyses by marrying the cultural history of perceptions with the literature on technological innovation. Starting around 1900, Germans constantly observed other nations' approaches to technology. Whether it was wireless towers in the Belgian Congo or British plans for cables, Germans interpreted the world of communications through their increasingly firm belief that global powers needed global communications infrastructures. Conversely, if Germany had a world communications network, the country could assert itself as a world power. Communications and power were tautologically and inextricably intertwined.

Within this logic of global politics, the British inspired particular German attention. German fears of the British uses of cables spurred support for the new technology of wireless to bypass the apparent British stronghold on global communications. Wireless transmitted Morse code across the ether, but signals could be intercepted and were initially unreliable. Cables were reliable, but they had one big flaw. They could be cut in times of war. By investing in improving wireless technology, German officials sought to solve political problems. Like with ship-building, the German government and military's projections about British strength and intentions influenced the development of technology.<sup>24</sup>

Edward Snowden's revelations about the NSA's surveillance of communications laid bare an unprecedented scale of state influence on communications technology, for example with the installation of 'backdoors' allowing covert entry to various software programs. But government elites have frequently shaped technological development through their beliefs about potentially nefarious uses of communications. The crossed wires from China to Copenhagen to the Colonial Office in Germany formed part of an ambitious wartime plan to create a world wireless network. To achieve that goal, the German government invested or intended to invest millions of Marks in developing wireless' range and reliability. In the end, beliefs about how other states or groups might use a technology fundamentally shape innovation.

## **The poison of public opinion: how and why Germans came to resent 'British' control of cables**

German obsessions with controlling communications were new in the early twentieth century. When submarine telegraphy had emerged in the mid-nineteenth century, the Prussian and later German governments had shown comparatively little interest in subsidizing or laying cables. The German government did not intervene to support the Siemens Brothers when they attempted to compete with the Anglo-American Eastern & Associated Telegraph Company in the 1870s.<sup>25</sup> The international submarine cable system relied upon an oligopoly of private companies, mainly headquartered in London. Submarine telegraphy spread rapidly, reaching Asia, Australia and South America by the late 1870s. The International Telegraph Union (ITU) supported a system based on privately-owned Anglo-American submarine cables. ITU agreements focused on standards. The member-states critically could not agree upon protocols for communication during war.<sup>26</sup> Overall, the first few decades of submarine cables relied upon remarkable international cooperation and acquiescence to a privately-run global system.

In the 1890s, these attitudes changed for several reasons. First, certain Western states began to rethink their international roles. In particular, the United States and Germany morphed from continental into aspiring global and imperial powers. President McKinley pushed around 1900 for the US to explore new markets in South America and China. The US acquired colonial possessions in Cuba, the Philippines, Guam and Puerto Rico after the Spanish-American War of 1898. Like the US, the Germans were relative newcomers to overseas colonial administration. Long-time German chancellor, Otto von Bismarck, had thought that Germany should act as a broker within Europe rather than wasting time and money on colonial adventures. From the early 1880s, however, the German colonial lobby had increasingly gained the upper hand and seized colonies in East, West and South-West Africa alongside New Guinea and Samoa. Kaiser Wilhelm II forced Bismarck out of office in 1890 and appointed more imperially-minded chancellors, though a German Colonial Office only emerged in 1907 when it split from the Foreign Office. If Germany was an imperial and global power, then it needed the accoutrements like cables.

Second, states began to intervene in the cable business for economic and political purposes. The American government, for instance, looked to lay cables to South America to foster economic ties.<sup>27</sup>

Cables promised new markets. It did not work out that way, but states believed it would in the 1890s. Officials also came to see cables as part of statecraft. They sought to control landing rights for political purposes. The British created great consternation in Germany when they denied landing rights to a German-American cable in the late 1890s despite ten years of negotiations. The cable was laid via the Portuguese Azores islands instead. It was the longest submarine cable in the world when it opened in 1900.<sup>28</sup> The German government became deeply suspicious of the apparent British desire to control cables. French officials too aggressively subsidized and supported a strategy to lay cables to connect the French empire and counteract British influence.<sup>29</sup>

Although the cable companies were multi-national, the Germans classified them as British. German scholars in the 1890s often counted ‘national ownership’ of global cables.<sup>30</sup> Like many official stances, these German studies misinterpreted the cables. The vast majority of cables belonged to private, multinational companies. German studies imagined that companies headquartered in London were British and state-influenced. The British government might have controlled the landing rights for cables. But officials did not control the cables. The companies were also often Anglo-American, rather than solely British.<sup>31</sup> Regardless, Germans imagined that the British would put these cables to reprehensible uses.

The tension over British cables combined with concern over British content. The German Colonial Office worried that the German colonies in Africa mainly received news from the British news agency, Reuters. The main news agencies had operated a cartel system since the mid-nineteenth century. This divided the world into territories. Each agency reported on its appointed territories and exchanged that news with the other agencies. That enabled agencies to save costs on news collection. It also ensured their dominance within their territories, because these agencies were the only ones with such widespread access to global news. The system gave the British news agency, Reuters, and French news agency, Agence Havas, the largest amount of territory. Each agency covered its country’s colonial territories and any areas that seemed economically or culturally connected. Agence Havas covered Spain and South America, for instance. The German news agency, Wolff’s Telegraphisches Büro, mainly covered continental Europe because Germany had a comparatively small empire.



Reporting from the Algeciras conference after the first Moroccan crisis of 1905 heightened German concerns about their apparently lowly place in global news supply. Wolff did not have the right under the cartel contract to report from Algeciras. The agency distributed French news agency telegrams to Germany under the Wolff's label. A scandal broke out in German newspapers when major German newspapers such as *Frankfurter Zeitung* and the *Berliner Tageblatt* sent their own correspondents to Algeciras and discovered Wolff's absence.<sup>32</sup> Algeciras prompted German officials to worry that British and French reporting could even turn the German population against the Kaiser and the colonial enterprise.

German colonies were also part of official worries. The German news agency, Wolff, reported only on German colonies outside Europe.<sup>33</sup> Even there, the agency's news was overshadowed by Reuters. Newspapers in German colonial Africa generally subscribed to Reuters. In 1909, the Colonial Office became so concerned about Reuters' control over information to German colonies that it subsidized a Wolff's service to Africa.<sup>34</sup> After a trial period sending 20 words twice a week, a daily service of 30-word telegrams from Berlin to German South-West Africa began in January 1910. That service was subsidized by companies in the colony like the German Afrikabank and mining firms, the German Colonial Office, the Foreign Office, the Navy, and the *Deutsche Südwestafrikanische Zeitung*.<sup>35</sup>

But a subsidized news service of just 30 words could not counter British influence. Heinrich Schnee, governor of German East Africa, derided Wolff's news as so bad that the agency might as well not send anything at all. Schnee still relied upon Reuters, although its news had 'British colour.' Schnee called for further state subsidies to send more Wolff news.<sup>36</sup> The subsidies from South-West Africa were 17,065 Marks for 1912. Yet the service cost around 4000 Marks per month.<sup>37</sup> As the Colonial Office fretted about potential damage from British content, it needed to find ways to send more news from Berlin for less money.

Amidst these concerns about British cables and content, a solution presented itself. Wireless technology could bypass cables. And it could enable Germans to send news for much less money and effort than before.

## **Wireless wonders: the creation of colonial communications**

From its emergence around 1900, perceived political, economic and military needs directed the development of wireless. The navy in most nations initially seized upon wireless to direct their ships from the shore for the first time.<sup>38</sup> This military interest made German admirals like Alfred von Tirpitz particularly alert to international developments in wireless technology. The German Navy already saw Britain as its main rival. Indeed, many of Germany's most politically charged debates in the 1890s circled around ships. Germany had begun constructing warships rapidly, but jingoists and naval officials still obsessed about their comparatively smaller number of warships. East Asia also played a significant role in creating naval officials' understanding of the world. After the mid-1890s, every chief of admiralty staff but one completed a tour in East Asia. Naval officers dreamed of Germany becoming an 'East Asian power,' as Admiral von Tirpitz declared in 1896.<sup>39</sup> Along with German travellers like Ferdinand von Richthofen, naval officials saw German interests in China as one key to German global strength.<sup>40</sup>

The Navy's efforts gained vital support from Kaiser Wilhelm II. Wilhelm II was obsessed with new technologies.<sup>41</sup> Wireless was no exception. With support and pushing from Wilhelm II and the German government, two competing firms – Siemens & Halske and AEG – founded a joint subsidiary called Telefunken in 1903 to manufacture wireless devices and erect wireless towers. Telefunken employees also researched how to improve wireless receivers and transmission. The Navy chose Telefunken to manufacture its wireless devices to coordinate the 90 German warships. Government contracts like these supplied 70 to 80 percent of Telefunken's revenue in the early years. With that subtle form of subsidy, Telefunken became 'the main driving force in the development of wireless technology in Germany' until 1918.<sup>42</sup> This close private-public relationship made Telefunken a trustworthy partner for the German government's political, economic and technological aims.

By 1908, military officials became increasingly convinced of British and French plans for global wireless domination. General Helmuth von Moltke the Younger, the chief of the general staff, devoted multiple memoranda and committee meetings to discussing Marconi's purported plans to erect large wireless stations around the world. The Marconi Company was based in Britain, but the company's

founder, Guglielmo Marconi, had been born in Italy. For Moltke, it was clear that the first state with global wireless would garner significant military and political advantages. Though he had no specific evidence, Moltke believed that Marconi was planning a global network to create a monopoly over wireless. Germany had to react swiftly to connect German colonies to each other. No doubt thinking of the Herero uprising of 1905, Moltke wanted to prevent Germany from relying on foreign communications networks in case of unrest.<sup>43</sup>

Alongside Moltke's pleas from the military and political perspectives, legal and technological factors enabled the German Colonial Office to invest significant resources into planning wireless towers in its colonies. The government had secured the sole legal right to erect telegraph and telephony stations in German colonies in 1906.<sup>44</sup> Furthermore, Telefunken had now developed spark gap technology that reduced atmospheric disturbances. This system created constant waves and allowed the signals to reach thousands of kilometres.<sup>45</sup> It was technologically feasible to reach Germany's far-flung colonies from Berlin for the first time.

The German Colonial Office started to subsidize the construction of wireless towers in its African colonies first. The technological challenges seemed at times insurmountable. But the German Colonial Office drew inspiration from other powers' achievements in colonial wireless. The German consulate in Brussels, for instance, sent numerous reports about wireless towers in the Belgian Congo so that German colonial officials could learn from Belgian technical successes.<sup>46</sup> These towers promised to create more seamless communication between colonial officials and Berlin. It would also reduce the Colonial Office's subsidies to Wolff because wireless transmission would be cheaper than using commercial cables.

Fears about other nations' intentions with wireless constantly accelerated German plans. In July 1911, chief of the general staff Moltke reported to the Colonial Office that the French were looking into creating a global wireless network.<sup>47</sup> More worryingly, multiple sources claimed that Marconi was working with the British Postmaster General to erect an 'all-red line of wireless towers'.<sup>48</sup> A British global wireless network seemed dangerous for economic as well as political and military reasons. Marconi had originally

constructed his wireless as a closed system. Marconi devices could not correspond with Telefunken devices. If Marconi succeeded in creating a global wireless network, he would create a wireless monopoly.

The British apparently planned to create two lines around the world. The towers would only stand on British soil and would avoid American territory. The first, eastern route would run through stations at Poldhu, Gibraltar, Cyprus, Aden, Mumbai, Singapore and the northwest coast of Australia. The western route would run from Clifden on the west coast of Ireland via Glace Bay in Nova Scotia, Winnipeg, Vancouver, islands in the Pacific Ocean and the east coast of Australia. Marconi was apparently also planning branches independent of the British government to connect Italy and Portugal to their colonies.

Telefunken saw an opportunity. The company could exploit the German Colonial Office's fears about British use of wireless. On an enormous map, Telefunken officials drew the planned Marconi routes around the world. In a different colour on the same map, Telefunken sketched a German counter-route that it could create with government subsidies. The line could run from Berlin to New York and then Paramaribo in Suriname. Another line could run from Berlin to the German colonies in Africa and then the German island colonies in the Pacific of Nauru and Samoa.<sup>49</sup> If the British were planning a global network, the Germans just had to pre-empt them.

After 1912, these fears receded somewhat. A radiotelegraphic conference in London in 1912 mandated that wireless devices must be compatible. This was to avoid problems of rescue at sea. It also enabled Telefunken to prevent a Marconi monopoly. The two companies even shared patents in the last few years before World War I.

Ironically, the British government had actually fallen out with Marconi over the plans for an 'imperial wireless chain' in 1911. The Admiralty had cancelled a contract with Marconi in 1913.<sup>50</sup> Marconi disputed the decisions and continued to request compensation for lost revenue well into World War I. This became so acrimonious that Prime Minister Herbert Asquith even had to create a committee in March 1916 to clear up any outstanding questions.<sup>51</sup> Germans did not know the details of these internal disputes. German wariness of relying upon British wireless remained. Unlike the start of cable technology, Germans wanted their own wireless connections.

By the outbreak of World War I, the German Colonial Office could look with some satisfaction at its achievements. There had been setbacks like the collapse of the tower at Nauen in 1912. But now functioning wireless towers were standing in all Germany's major African colonies along with Qingdao and several Pacific islands. Building on the military subsidies that had helped Telefunken to develop spark gap transmission, the company had also erected two towers on the East Coast of the United States at Sayville and Tuckerton. These towers allowed Germany direct access to America. Fears about a British-subsidized and Marconi-constructed wireless chain had spurred rapid construction of wireless towers. It seemed to have secured German colonial communications from British interference.

Over the decade prior to World War I, the creation of a German 'All-Wireless Route' around the world became an integral part of *Weltpolitik*. But it was a colonial form of *Weltpolitik*. World War I would change that attitude swiftly. Colonial connections no longer cut the mustard. The Germans needed a world wireless network.

### **The start of a world wireless network**

On 4 August 1914, Kaiser Wilhelm II gave a powerful speech in the Reichstag, declaring that he no longer knew parties, but 'only Germans'. Known as *Burgfrieden*, this declaration of German solidarity incorporated even the Social Democrats in an apparent initial euphoria. Just when the 'spirit of 1914' seemed to sweep the German nation, the British created a more lasting legacy for public opinion both at home and abroad by cutting Germany's cables during the first days of the war.<sup>52</sup> Communications became a critical element of warfare.<sup>53</sup> The modern meaning of propaganda emerged during World War I; every belligerent government created new ministries or methods to influence public discourse. But behind the question of propaganda lay the question of infrastructure to disseminate that propaganda. In German eyes, the British were using their cables and Reuters news agency to spread lies about Germans throughout the world, particularly to neutral countries.

During the initial months of the war, wireless mainly provided more battle sites. To disrupt German communications, the Entente sought to conquer wireless towers in German colonies as quickly

as possible. Australian forces took German New Guinea on 11 September 1914 and attacked the German wireless station there in the battle of Bitapaka. British troops destroyed German wireless on the island of Yap the next month. In early 1915, the British also conquered German South-West Africa along with the wireless towers. The British were initially sceptical about using wireless for battle communications. But they worried about German global wireless communications infrastructure. In colonial contexts, they and their allies prioritized the removal of German wireless communications.

Germans swiftly retaliated by using submarines to cut British cables. From May 1915 to April 1917, the German Navy cut every cable starting from Britain, except those across the Atlantic. In one instance, a Norwegian repair team finally located a rheostat that the Germans had used to emit false electrical signals about where the break in a submarine cable had occurred. The capsule containing the rheostat held a note. It read 'No more Reuter war-lies on this line. From a 'Hun' and a 'Sea-Pirate'.<sup>54</sup> The German military also invested in supplying wireless devices to army units. Finally, war funds paid for expanding the wireless tower on the American east coast at Sayville that Telefunken had erected in early 1914. The tower could now receive signals from Nauen just outside Berlin more consistently.

Beyond expanding Sayville, the German military and government initially expended little further energy on wireless communications beyond the battlefield. Generals and politicians had foreseen a short war characterized by movement on both fronts. There would be no time to erect wireless towers or create comprehensive propaganda strategies. Moreover, wireless was still not wholly reliable. Atmospheric disturbances could interrupt signals, particularly in the early summer. Approximately ten percent of transmissions from Nauen did not reach the US in early 1915.<sup>55</sup> Plus wireless could not yet reach further than the east coast of the US from Berlin. Germans could communicate with places like South America and East Asia only via their towers in the US. This left the transmissions vulnerable to interception and American censorship. Only significant investment in improving wireless would overcome these problems.

As the war on the Western Front became a stalemate, the German military became ever more obsessed with wireless. The military began with using wireless to keep unreliable allies on board. Along with the military, the Colonial Office, Foreign Office and Post Office started working with the German

consulate in Istanbul to in mid-1915 to erect wireless towers in the Ottoman Empire, particularly in Damascus, Baghdad and Istanbul.<sup>56</sup>

Simultaneously, German officials worried about the effect of British propaganda on neutral nations. Some asserted that Great Britain had used cables to influence neutral countries against Germany long before the war.<sup>57</sup> In early 1915, officials started increasing their supply of news to the two Telefunken towers in the US. The news came from a government-owned news agency, Transocean.<sup>58</sup> The German ambassador to the US, Count von Bernstorff, sent fortnightly letters to Chancellor Bethmann Hollweg detailing what reports had arrived. The news was widely printed, though it seemed to have little effect on American officials' sentiments towards the war.

By mid-1916, German officials had changed their temporal, spatial and technological visions for wireless. They came to see wireless as a global enterprise. They wanted a *Welt-Funktelegraphen-Netz*, a 'world wireless network'. And they made it part of their longer-term planning beyond the war. As one bureaucrat noted in June 1916, it was better not to think about wireless 'from the viewpoint of the current war conditions, but rather to consider it from the viewpoint of the overall plan for a later German world wireless network'.<sup>59</sup> It would take several years to improve wireless technology enough to create a reliable global network with less atmospheric disturbances and greater range. But military generals were willing to invest millions of Marks to improve wireless' range and reception. That long-term vision increasingly guided the government in its technological aspirations.

Many military officials viewed a global communications network built on this new technology as the only method to bypass the nefarious British. One lieutenant suggested to the state secretary of the Foreign Office, Arthur Zimmermann, in January 1917 that Germany's 'lack of cables, which during the war mainly at the beginning made itself so damagingly effective, will be removed in a few years with the progressive [improvement of the] technology of wireless telegraphy'.<sup>60</sup> A captain asserted that German experiences in the war had shown that a world wireless network was 'virtually indispensable'. Wireless was particularly critical 'as a counterweight to a world cable network that mostly lies in enemy hands'.<sup>61</sup> A global

wireless network controlled by Germany would be a source of military and political strength as well as an insurance policy against informational isolation in future wars.

But the Germans had learned two things from their colonial communications strategy. First, there was only one method to ensure that the British would not destroy their towers. They had to erect them on neutral soil. Second, the network could not be colonial. It had to be global. The British and French had long supplied their news to neutral nations. This seemed to prejudice those countries against the Central Powers in German eyes. The only method of retaliation was to supply neutral countries with German news during peacetime too. German investment in wireless technology also enabled the shift from a colonial to global perspective. In early 1915, the wireless tower at Nauen could broadcast approximately 6500 kilometres to the east coast of the US. If the Germans wanted a world wireless network that bypassed the US, officials knew that they had to invest in improving the range of wireless. It would be cheaper to extend the range of towers so that the Germans could build fewer. There were also often large oceans or belligerent countries lying between Berlin and its target audience.

Officials planned their world wireless network around neutral countries. They focused specifically on East Asia and Latin America. The planning involved financial and strategic coordination between the Imperial Post Office, Colonial Office, Foreign Office, army and navy. The discussions about wireless were uncharacteristically cordial. The Navy too had viewed these regions as critical for a Germany with global aspirations, though the Navy had concentrated on China.<sup>62</sup> Every other ministry concurred about the importance of wireless. The German government needed wireless to circumvent British cables, because the German ministers could only imagine what nefarious cables the British were sending to neutral nations. Moreover, the Americans were censoring German news to South America and East Asia.<sup>63</sup>

The plan required technological improvements that only Telefunken could execute. By 1916, wireless technology still had many limitations. Some towers only received signals, while others could both send and receive at greater ranges. Officials foresaw 14 or 15 receiving stations in Latin America and East Asia with four large stations that could both send and receive information. In November 1916, officials decided to task Telefunken with erecting towers and securing concessions from the relevant governments.



Telefunken would operate as a private company to avoid neutral governments' suspicions about German military involvement. But the German war funds would pay Telefunken's costs for personnel, materials and technological improvement to towers.<sup>64</sup>

Telefunken's executives, Hans von Bredow and Georg von Arco, responded favourably and swiftly to the government's overtures. Prior to the war, Telefunken had erected towers around the world for private and government customers. While Telefunken had handed over control of many of these towers, Hans von Bredow had started to think about creating a world network as early as 1913. Now the company could pursue its goal with government support.

Telefunken suggested dividing the network into four areas: Central America, Eastern South America, Western South America, and East Asia. The company wanted to start with Mexico in Central America and China in East Asia, because these were simplest for technological and political reasons.<sup>65</sup> It was only 9700 kilometres to Mexico City and 8400 to Shanghai. These were feasible distances for Telefunken; by November 1915, Nauen had reached Honolulu, which was nearly 14,500 kilometres.<sup>66</sup> Telefunken would send a Dutch engineer, van de Woude, to New York. The Dutchman had worked for Telefunken for 12 years. As a citizen of a neutral country, he could operate relatively freely in the US. He left for New York in early January 1917.<sup>67</sup> Van de Woude was supposed to construct machinery in the US and purchase materials alongside the four receiving stations that Telefunken was already building on American soil. He was also supposed to commence negotiations for concessions with Central and South American governments.<sup>68</sup>

The German military was willing to put its money where its mouth was. Alongside erecting towers in neutral countries, the government would also have to improve the towers in Germany and on the East Coast of the US. Transmissions were sometimes unreliable. Atmospheric disturbances caused issues, particularly with early summer storms in the tropics between March and July. The War Ministry estimated that the cost of the world wireless network and improving existing towers would reach two to three million Marks. But the savings on telegrams and the political benefits would ultimately justify the costs.<sup>69</sup> The German government also believed wireless to be more secure than it actually was: the British had

intercepted the Germans' naval code books and were decoding their messages at a new department called Room 40. The German Navy in particular used wireless to try to compensate for its numerical disadvantages against the British.<sup>70</sup> Although there were sometimes communications issues between Room 40 and British naval officers in particular, wireless was not as good an alternative as the Germans supposed.

The planned locations and number of the large wireless towers changed constantly in late 1916 and 1917. Suggestions ranged from Mexico, Brazil, Uruguay and Sumatra to Paramaribo, Beijing and Bangkok. Because the German government and Telefunken relied fundamentally upon the good graces of neutral states, they had to adapt to changing circumstances. Original plans focused on stations in Mexico, China, and South America. But the German government added Java in early 1917 because the Dutch government proved so amenable to allowing Telefunken to erect a tower there.<sup>71</sup> A trial signal sent from Nauen to Java worked well in March 1917 and Telefunken sent the materials for a provisional receiving tower for Java from Holland in April 1917. Telefunken also gleefully reported that a station in Bandung was receiving well from Nauen. This had shown the Dutch Colonial Office that it did not need to follow the English plan of forcing Holland to use interim stations on English and Italian territory to reach Dutch colonies. After lengthy negotiations with the Dutch, Telefunken had defeated this purported British attempt to influence Dutch communications.<sup>72</sup> Telefunken sent engineers along with equipment to Java in April 1917. Tests continued constantly, as the engineers sought to connect with Nauen. Still, the stations never communicated properly with Nauen before the end of the war.<sup>73</sup> Wireless remained too subject to atmospheric disturbances to reach reliably across such great distances.

### **How not to build a wireless network in China**

Simultaneous to the diplomatic successes with the Dutch, the German government and Telefunken pushed forward with plans to counteract British and American influence in China. A neutral country in the first years of the war, China was embroiled in internal turmoil after a revolution in 1911 and the fall of the Manchu dynasty in 1912. China's neighbour, Japan, had entered the war on the Entente side in August 1914. In January 1915, Japan sought to take advantage of China's domestic trouble by

presenting '21 Demands' to the Chinese government for increased Japanese influence. While the Chinese government managed to rebuff many of the demands, military governors in southern China rebelled against the central authorities. The Japanese supplied the rebels and exploited these divisions within China to advance their own interests until China finally entered the war on the Allied side on 14 August 1917.<sup>74</sup>

Within the tumultuous situation in China, the German government and Telefunken sought an intermediary to operate on their behalf — the Danish engineer Sophus Larsen. Larsen seemed to be the perfect man for the job. He was from a neutral country and had connections with Germany and China. Before the war, Larsen had worked for Telefunken. He then started working for the Chinese government. In mid-1916, Larsen became severely ill in China and returned to a European sanatorium. While in Europe, Larsen travelled to Berlin. He told Telefunken that both the British firm Marconi and the American Federal Telegraph Company from San Francisco had proposed wireless projects to the Chinese Department of Transport. The Chinese government had rejected the offers because both companies had requested extraterritorial rights for the stations. It was time for Telefunken to act.

Telefunken proposed to the German Post Office that Larsen should offer to erect a wireless tower as powerful as the German station at Nauen. The Chinese government would own the tower, but Larsen's company would operate it under Chinese supervision. The Chinese would repay the cost of the tower over several decades. Telefunken's plan was only feasible with substantial German government support. The firm asked for three forms of subsidy. First, the government should act as guarantor to Telefunken for the Chinese government's repayments. Second, the government should reimburse Telefunken for any administrative or operational costs not covered by the income from the tower. Third, the government should undertake diplomacy to support Telefunken's actions.<sup>75</sup> Telefunken and the government would become inextricably linked in a private-public partnership to create a world wireless network.

In November 1916, Telefunken received permission to begin negotiations with the Chinese government to erect a large wireless tower that would become Chinese government property after the tower was operational.<sup>76</sup> Telefunken and Larsen had signed a contract to work together in February 1917. By March 1917, the German government and Telefunken had scaled down their ambitions for wireless in

China. In a meeting with representatives from the military, Foreign Office, Colonial Office, Treasury, and Post Office along with Larsen and other engineers from Telefunken, government officials determined that the present political situation made erecting a large wireless station impossible. They had intended to spend two million Marks. Instead, they asked Larsen to travel to China to set up a few receivers that would get news from Nauen. Larsen would use his own company to negotiate with the Chinese government. He would follow the same plan of operating the stations himself, but allowing the Chinese government to own the stations and buy them over the course of 20 to 30 years. Larsen would sail to China via the US where he could connect with the Dutch Telefunken engineer, van de Woude, who would help with materials and money.<sup>77</sup>

Officials emphasized to Larsen that he had to avoid written evidence as far as possible. The connection with Germany through Telefunken and government subsidies had to remain covert. Larsen should also ensure that any money he transferred for expenses should go to van de Woude in New York without mentioning the sum or purpose. To sweeten the deal, the German government offered Larsen a 10,000 Mark bonus if he succeeded in using the tower to disseminate German-friendly news. This was particularly critical if the German news services already in China – the news agency, Transocean, and newspaper *Ostasiatischer Lloyd* – were forced to cease operations.<sup>78</sup>

But the war intervened in Telefunken's cunning plan to manufacture towers in the US. By February 1917, the German Navy's unrestricted submarine warfare had prompted Woodrow Wilson to sever diplomatic ties with Germany. That made manufacturing in the US impossible. Telefunken turned to Swedish, Swiss and Spanish possibilities in April 1917. A Swiss former Telefunken engineer declined an invitation to start manufacturing in Spain 'for personal reasons'. On the Post Office's suggestion, Telefunken found appropriate firms in Sweden to supply raw materials and to construct a few masts, though these were expensive. The Swedish government also took an interest in the delivery and this delayed it by over six months in late 1917.<sup>79</sup>

On 21 April 1917, 17 days after the US had declared war on Germany, Larsen left Copenhagen for China via New York. He had already transferred the money from the Landmands-Bank in Copenhagen

to City Bank in New York.<sup>80</sup> Larsen docked in New York on 4 May and made his way across the US. Communication with Germany became tricky and, besides, officials had advised him against putting much in writing. Larsen telegraphed Telefunken eleven days later in English that he was 'leaving via Frisco end of May all relatives ok will cable permanent address soonest possible do not expect to be ready in Peking before autumn because war necessitates making of instruments in China Larsen'. Telefunken assumed that by 'relatives,' Larsen meant German officials and Telefunken employees.<sup>81</sup> Increasingly, Telefunken's and the German government's actions would be governed by how they imagined Larsen was proceeding and how they imagined the British might use wireless if they beat the Germans to a Chinese contract.

After arriving in China, Larsen mainly communicated with Germany through intermediaries. He sent letters and telegrams to his brother and sister in Denmark. The letters travelled via Russia. Larsen could not be sure, but he speculated that Russian censors would not stop private letters and telegrams. Sometimes, Larsen wrote in English, hoping that this would reduce the chances of censorship.<sup>82</sup> His siblings extracted relevant extracts, translated them into German, and sent them to Berlin. In July 1917, he wrote his brother that political confusion would probably delay negotiations with the Chinese government about erecting a hospital. Everyone in the German ministries knew what Larsen meant.<sup>83</sup>

That same month, Larsen established a company, S. Larsen & Co. Consulting and Contracting Engineers in Shanghai. The 'Co.' in this case was a Chinese partner, Mr. Pao, who was the director of the Bank of Communications in Shanghai. Pao often lent Larsen money to lubricate proceedings when Larsen ran short. The Chinese declaration of war on Germany in August 1917 seemed to have little effect on Larsen's progress.

Over the next few months, Larsen waited for the raw materials from the US. In November 1917, Larsen erected a wireless tower that received reports from Nauen. Reports of the success only reached Telefunken via a letter from Larsen's brother in January 1918.<sup>84</sup> By that point, the entire plan seemed to be in jeopardy. The *Daily Mail* in Britain had reported on 20 December 1917 that the British embassy in Beijing had managed to scupper the German-Chinese wireless plans. The embassy had instead secured a

monopoly for Marconi.<sup>85</sup> Ironically, Marconi was hardly that British either. The company's founder, Guglielmo Marconi, was born in Italy and maintained substantial connections there.

The news was very confusing and incomplete. At the same time as the German concerns about the British, Larsen seemed to be communicating that he had sealed the deal with the Chinese. His letter from his brother stated that Larsen had to pay 10,000 Mexican dollars to guarantee that he would finish the contract.<sup>86</sup> Larsen had also communicated that he needed to show the Chinese half a million pounds in his bank account to prove his capital. It seemed that Larsen had started to return to Europe on 22 December with two Chinese negotiators. This was just two days after the *Daily Mail* report so German officials speculated that even Larsen might not know the latest situation. Officials did not know what to do. Should they wait to take further steps until Larsen set foot in Europe? Or should they pre-empt the British by transferring this enormous sum of money?<sup>87</sup>

The German government and Telefunken could only act on highly imperfect information. Their imaginations ruled their decisions. Despite their fears about the British, caution reigned. The situation had become so complicated that Telefunken registered a subsidiary named Drahtloser Überseeverkehr A.G. in March 1918 solely to administer the creation of a world wireless network.<sup>88</sup> The company continued to report to the German government and to extrapolate further conditions of Larsen's agreement with the Chinese government. According to Telefunken's information in March 1918, the contract was still valid. But Larsen needed the 500,000 pounds in a Danish, Swedish, or Dutch bank by 15 May so that the bank could telegraph the National City Bank in New York that Larsen was good for the money. Otherwise the Chinese would renege on the contract. Larsen himself was delayed returning to Denmark so Telefunken could not consult with him.<sup>89</sup>

In late April, Telefunken threw caution to the wind. After receiving further information from travellers returning from China that Larsen's contract still stood, the firm sent its executive Hans von Bredow to Copenhagen to transfer the money. Bredow sent Larsen a telegram through neutral intermediaries that he was trying to fulfil Larsen's conditions.<sup>90</sup>

It was to no avail. Telefunken's reticence cost the company the contract. Larsen had become jittery. He thought that his plan could no longer succeed. Instead, Larsen had travelled to Tokyo and transferred the contract to a Chinese-Japanese company that appeared to have relations with Siemens, a parent company of Telefunken. Larsen hoped that the company would give him a subcontract to manufacture and deliver the wireless towers. In fact, Larsen had sent a telegram from Tokyo via Copenhagen informing Telefunken of the developments about a week before Bredow had even set off for Copenhagen.<sup>91</sup> The two men's telegrams to each other practically crossed paths. Bredow and Larsen were both operating on assumptions about the other's behaviour that turned out to be erroneous.

The story did not end there. Throughout the war, the British often imagined German plans for wireless in China, sometimes with evidence to support their speculations. The Marconi Company had almost succeeded in securing a contract for wireless with the Chinese government in April 1914.<sup>92</sup> That had fallen through. Like Telefunken, Marconi frequently played the nationalist card to secure finances. Starting in 1915, Marconi often asked for funds from the British government to fight Telefunken's attempts to obtain wireless contracts or erect wireless towers in China and the US.<sup>93</sup> Marconi even requested the exact same sum as Larsen of 500,000 pounds from the British government. But this was to subsidize wireless stations in China and the United States.

After the war, events took an ironic turn. To counteract Japanese influence in China, the British government decided to subsidize Marconi's contract with the Chinese government in 1919.<sup>94</sup> Marconi replaced the Japanese firm that had taken over Larsen's original contract. The British government financed Marconi to take over an agreement that was originally negotiated by a German-funded intermediary. In a complicated circle, German fears of British communications had prompted German plans for a wireless network. The Germans entrusted the execution to a Dane whose worries about losing the Chinese contract pushed him to transfer the contract to a Japanese firm. Finally, British fears of Japanese communications prompted British plans for a wireless network in China.

Within Germany, the plans for a world wireless network continued unabated until the end of the war. And it was spurred by fears of other nations' technological intentions. As late as mid-October 1918,

Telefunken executive Hans von Bredow reported that he had seen French plans for a world wireless network and that the French had set up a governmental commission in December 1917 to investigate the issue.<sup>95</sup> On 30 October, 1918, Telefunken also drew up a full draft contract with the Dutch Colonial Office for a concession in the Dutch colonial capital of Paramaribo in Suriname.<sup>96</sup>

Some connections even continued after the war in the new democratic state of the Weimar Republic. Telefunken executive von Bredow switched to work for the Postal Ministry in early 1919. Soon afterwards, Telefunken and the Postal Ministry signed a contract for Telefunken to deliver three large wireless stations to Java. The two engineers sent by Telefunken to Java in 1917 would erect the stations.<sup>97</sup> The change from monarch to democracy and defeat in World War I had not wholly stopped German dreams of a world wireless network.

## **Conclusion**

Soon after the war, Theobald von Bethmann Hollweg, German chancellor from 1909 to 1917, offered his diagnosis of the German defeat. Germany had failed to find an ‘offensive rallying cry’ to spur countries abroad to join the German cause. This failure stemmed from Germany’s disunity at home: ‘a people that has not yet grown together spiritually and nationally could not make a global case [for itself]’, wrote Bethmann Hollweg in his memoirs.<sup>98</sup>

During the war, concerns about German news supply at home mirrored gripes about Germany’s inability to influence neutral countries abroad. Critics consistently mentioned the cut cables as the main source of Germany’s weak position in global propaganda. Some Germans in the Weimar Republic would view the cable cutting as the turning point of the war, at least for public opinion on Germany abroad.<sup>99</sup> They saw it as the culmination of British machinations over the past decades to ensure that Germany would lose the war of words in neutral nations.

Wireless technology offered a solution both during and after the war. Plans for a world wireless network drew in private companies and citizens from neutral countries. Wireless technology seemed to hold great emancipatory potential to remove dependence on British cables. Over and above reducing cable



dependency, wireless seemed to offer Germans an opportunity to reach continents and countries that had never before received German news directly, such as South America or East Asia.

Wireless stood out as the only positive development during the war even to sceptics like Paul Eltzbacher, a lawyer who became a Bolshevik supporter after the war. Eltzbacher had denigrated all other aspects of German propaganda during the war as displaying ‘a certain unworldliness [*Weltfremdheit*]’. Nevertheless, he saw great potential in wireless, stating in 1918 that Germany’s radio service had become ‘very perfected’ since the start of the war and that it was now ‘our best means to influence countries abroad’.<sup>100</sup> Wireless technology presented itself to Germans of all political persuasions as the best means to undermine what they saw as British-dominated global communications. Germany still used and laid cables after World War I, but remained wary of relying on a technology that could so easily be removed.

The Germans did not achieve their world wireless network. Yet, the Allies certainly took German wireless seriously and wanted to weaken its ability to influence neutral countries. Article 197 of the Versailles Treaty forbade Germany from sending political news from Nauen, Hanover (Eilvese station) and Berlin (Königswusterhausen) for three months after the treaty went into effect.<sup>101</sup>

Moreover, World War I laid the groundwork for important behaviours and beliefs that would continue through World War II and up to the present. Events in recent years have made the connection between imagined use, technological innovation and government intervention all too clear. Germans have shown particular outrage at the revelations about the PRISM and Tempora programs created by the NSA to investigate personal communications. SPD chair and current vice-chancellor of Germany, Sigmar Gabriel, has decried ‘data capitalism’ and called the programs ‘a betrayal of our basic values’.<sup>102</sup> Meanwhile, Constanze Stelzenmüller has claimed that Germans have learned from their history with the Gestapo and Stasi about the dangers of snooping.<sup>103</sup> Daniel Ellsberg of Watergate fame also used German history to deplore American actions, declaring in June 2013 that Edward Snowden was ‘saving us from the United Stasi of America’.<sup>104</sup>

The debate remains controversial, particularly after discoveries that Germany also cooperated with the United States on surveillance on German soil. These revelations have started to influence policy and

technological developments within companies and in states like Russia. Many of the changes have less to do with the NSA's actual actions and more to do with a country's or company's beliefs about how the NSA may use a technology or information. The history of wireless communications during World War I can tell us about how imagined uses of new technologies for espionage and propaganda influenced their actual development in the past just as they have in the present. Then as now, there was intimate cooperation between governments, militaries and private companies.

It was during World War I that the modern definition of propaganda emerged. The experience of the war also spurred the first concrete plans for global wireless communications networks. Finally, it is when particular institutional arrangements and cultural beliefs surfaced that have lasted through multiple political regimes up to the present. If we want to understand the present, looking back a century is the best place to begin.

## **Bibliography**

- Aitken, Hugh G. J. *The Continuous Wave: Technology and American Radio, 1900-1932*. Princeton, NJ: Princeton University Press, 1985.
- Anduaga, Aitor. *Wireless and Empire: Geopolitics, Radio Industry, and Ionosphere in the British Empire, 1918-1939*. Oxford: Oxford University Press, 2009.
- Arapostathis, Stathis, and Graeme Gooday. *Patently Contestable: Electrical Technologies and Inventor Identities on Trial in Britain*. Cambridge, MA: MIT Press, 2013.
- Badenoch, Alexander, and Andreas Fickers, eds. *Materializing Europe. Transnational Infrastructures and the Project of Europe*. Basingstoke: Palgrave Macmillan, 2010.
- Balbi, Gabriele, and Simone Natale. "The Double Birth of Wireless: Italian Radio Amateurs and the Interpretative Flexibility of New Media." *Journal of Radio & Audio Media* 22, no. 1 (2015): 26–41.
- Baranowski, Shelley. *Nazi Empire. German Colonialism and Imperialism from Bismarck to Hitler*. Cambridge, UK: Cambridge University Press, 2010.
- Bender, Steffen. *Der Burenkrieg und die deutschsprachige Presse: Wahrnehmung und Deutung zwischen Bureneuphorie und Anglophobie, 1899-1902*. Paderborn: Schöningh, 2009.

- Bernhard, Patrick. "Borrowing from Mussolini: Nazi Germany's Colonial Aspirations in the Shadow of Italian Expansionism." *The Journal of Imperial and Commonwealth History* 41, no. 4 (2013): 617–43.
- Bethmann Hollweg, Theobald von. *Betrachtungen zum Weltkrieg*. Edited by Jost Dülffer. Essen: Reimar Hobbing, 1989.
- Birdsall, Carolyn. *Nazi Soundscapes: Sound, Technology and Urban Space in Germany, 1933-1945*. Amsterdam: Amsterdam University Press, 2012.
- Blackbourn, David. "Germany and the Birth of the Modern World, 1780-1820," 2012. [http://www.ghi-dc.org/files/publications/bulletin/bu051/009\\_bu51.pdf](http://www.ghi-dc.org/files/publications/bulletin/bu051/009_bu51.pdf). Last accessed 20 September 2015.
- Blackbourn, David, and Geoff Eley. *The Peculiarities of German History: Bourgeois Society and Politics in Nineteenth-Century Germany*. Oxford: Oxford University Press, 1984.
- Bönker, Dirk. "Global Politics and Germany's Destiny 'from an East Asian Perspective': Alfred von Tirpitz and the Making of Wilhelmine Navalism." *Central European History* 46, no. 1 (2013): 61–96.
- . *Militarism in a Global Age: Naval Ambitions in Germany and the United States before World War I*. Ithaca, NY: Cornell University Press, 2012.
- Bösch, Frank, and Dominik Geppert, eds. *Journalists as Political Actors: Transfers and Interactions between Britain and Germany since the Late 19th Century*. Augsburg: Wissner, 2008.
- Broadberry, Stephen, and Mark Harrison. "The Economics of World War I: A Comparative Quantitative Analysis." Working Paper. 2005. [www2.warwick.ac.uk/fac/soc/economics/staff/mharrison/papers/ww1toronto2.pdf](http://www2.warwick.ac.uk/fac/soc/economics/staff/mharrison/papers/ww1toronto2.pdf). Last accessed 27 September 2015.
- Campbell, Timothy C. *Wireless Writing in the Age of Marconi*. Minneapolis: University of Minnesota Press, 2006.
- Ciarlo, David. *Advertising Empire: Race and Visual Culture in Imperial Germany*. Cambridge, MA: Harvard University Press, 2011.
- Conrad, Sebastian. *German Colonialism: A Short History*. Translated by Sorcha O'Hagan. Cambridge, UK; New York: Cambridge University Press, 2012.
- . *Globalisation and the Nation in Imperial Germany*. Translated by Sorcha O'Hagan. Cambridge, UK; New York: Cambridge University Press, 2010.
- Douglas, Susan J. *Inventing American Broadcasting, 1899-1922*. Baltimore: Johns Hopkins University Press, 1987.

- Dunley, Richard. “‘Not Intended to Act as Spies’: The Consular Intelligence Service in Denmark and Germany 1906–14.” *The International History Review* 37, no. 3 (2015): 481–502.
- Ellsberg, Daniel. “Edward Snowden: Saving us from the United Stasi of America,” *The Guardian* (10 June 2013), [www.guardian.co.uk/commentisfree/2013/jun/10/edward-snowden-united-stasi-america](http://www.guardian.co.uk/commentisfree/2013/jun/10/edward-snowden-united-stasi-america). Last accessed 23 July 2015.
- Eltzbacher, Paul. *Die Presse als Werkzeug der auswärtigen Politik*. Jena: E. Diederich, 1918.
- Evans, Heidi J. S. “‘The Path to Freedom’? Transocean and German Wireless Telegraphy, 1914–1922.” *Historical Social Research* 35, no. 1 (2010): 209–36.
- Friedewald, Michael. *Die “tönenden Funken”. Geschichte eines frühen drahtlosen Kommunikationsystems 1905-1914*. Berlin: Diepholz, 1999.
- . “Telefunken und deutsche Schiffe, 1903-1914.” *Zeitschrift für Unternehmensgeschichte* 45–46 (2000): 27–57.
- . “The Beginnings of Radio Communication in Germany, 1897-1918.” *Journal of Radio Studies* 7, no. 2 (2000): 441–63.
- Gabriel, Sigmar. “Die offene Gesellschaft und ihre digitalen Feinde,” *Frankfurter Allgemeine Zeitung* (2 July 2013), [www.faz.net/aktuell/feuilleton/debatten/gastbeitrag-von-sigmar-gabriel-die-offene-gesellschaft-und-ihre-digitalen-feinde-12267309.html](http://www.faz.net/aktuell/feuilleton/debatten/gastbeitrag-von-sigmar-gabriel-die-offene-gesellschaft-und-ihre-digitalen-feinde-12267309.html). Last accessed 10 August 2013.
- Geppert, Dominik. *Pressekriege: Öffentlichkeit und Diplomatie in den deutsch-britischen Beziehungen (1896-1912)*. Munich: Oldenbourg, 2007.
- Griset, Pascal. *Entreprise, technologie et souveraineté: les télécommunications transatlantiques de la France, XIXe-XXe siècles*. Paris: Editions Rive droite, 1996.
- Handel, Kai, ed. *Kommunikation in Geschichte und Gegenwart: Vorträge der Jahrestagung der Georg-Agricola-Gesellschaft 2001 in München*. Freiberg: Georg-Agricola-Gesellschaft, 2002.
- Headrick, Daniel R. “Shortwave Radio and Its Impact on International Telecommunications between the Wars.” *History and Technology* 11 (1994): 21–32.
- . *The Invisible Weapon: Telecommunications and International Politics, 1851-1945*. New York: Oxford University Press, 1991.
- Hong, Sungook. *Wireless: From Marconi’s Black-Box to the Audion*. Cambridge, MA: MIT Press, 2001.
- Huber, Georg. *Die französische Propaganda im Weltkrieg gegen Deutschland 1914 bis 1918*. Munich: Dr. F. A. Pfeiffer, 1928.
- Huurdeman, Anton A. *The Worldwide History of Telecommunications*. Hoboken, NJ: J. Wiley, 2003.

- Klein-Arendt, Reinhard. *Kamina: des Kaisers Grossfunkstation in Afrika: Telefunken in der deutschen Kolonie Togo 1911-1914: Fotos und Dokumente*. Maisach: Togo-Contact, 2013.
- . *Kamina ruft Nauen! Die Funkstellen in den deutschen Kolonien 1904-1918*. Cologne: W. Herbst, 1996.
- Kopp, Kristin. *Germany's Wild East: Constructing Poland as Colonial Space*. Ann Arbor: University of Michigan Press, 2012.
- Krajewski, Markus. *Restlosigkeit: Weltprojekte um 1900*. Frankfurt am Main: Fischer Taschenbuch Verlag, 2006.
- Lagendijk, Vincent. *Electrifying Europe: The Power of Europe in the Construction of Electricity Networks*. Amsterdam: Aksant, 2008.
- Liulevicius, Vejas G. *The German Myth of the East: 1800 to the Present*. Oxford: Oxford University Press, 2009.
- Löhr, Isabella and Roland Wenzlhuemer, eds. *The Nation State and Beyond. Governing Globalization Processes in the Nineteenth and Twentieth Century*. Berlin: Springer Press, 2012.
- Lommers, Suzanne. *Europe - On Air: Interwar Projects for Radio Broadcasting*. Amsterdam: Amsterdam University Press, 2012.
- Müller, Simone M. “Beyond the Means of 99 Percent of the Population: Business Interests, State Intervention, and Submarine Telegraphy.” *Journal of Policy History* 27, no. 3 (2015): 439–64.
- . *Wiring the World: The Social and Cultural Creation of Global Telegraphy Networks*. New York, NY: Columbia University Press, 2016.
- Müller, Simone M., and Heidi J.S. Tworek. “‘The Telegraph and the Bank’: On the Interdependence of Global Communications and Capitalism, 1866–1914.” *Journal of Global History* 10, no. 2 (2015): 259–83.
- Nalbach, Alex. “‘Poisoned at the Source’? Telegraphic News Services and Big Business in the Nineteenth Century.” *Business History Review* 77, no. 4 (2003): 577–610.
- Naranch, Bradley, and Geoff Eley, eds. *German Colonialism in a Global Age*. Durham: Duke University Press, 2015.
- Nebeker, Frederik. *Dawn of the Electronic Age: Electrical Technologies in the Shaping of the Modern World, 1914 to 1945*. Hoboken, NJ: Wiley, 2009.
- Nelson, Robert L. *Germans, Poland, and Colonial Expansion to the East: 1850 through the Present*. New York, NY: Palgrave Macmillan, 2009.

- Passananti, Thomas P. "The Politics of Silver and Gold in an Age of Globalization: The Origins of Mexico's Monetary Reform of 1905." *América Latina en la Historia Económica* 30 (2008): 69–95.
- Poley, Jared. *Decolonization in Germany: Weimar Narratives of Colonial Loss and Foreign Occupation*. Bern: Peter Lang, 2007.
- Pomeranz, Kenneth, and Steven Topik *The World that Trade Created: Society, Culture, and the World Economy, 1400 to the Present*. Armonk, NY: M. E. Sharpe, 2006.
- Rantanen, Terhi. "Foreign Dependence and Domestic Monopoly: The European News Cartel and U.S. Associated Presses, 1861-1932." *Media History* 12, no. 1 (2006): 19–35.
- Reed Winkler, Jonathan. "Information Warfare in World War I." *Journal of Military History* 73, no. 3 (2009): 844–67.
- Rieger, Bernhard. *Technology and the Culture of Modernity in Britain and Germany, 1890-1945*. Cambridge, UK: Cambridge University Press, 2005.
- Roscher, Max. "Das Weltkabelnetz." *Archiv für Post und Telegraphie* 12 (1914): 373–89.
- Rüger, Jan. *The Great Naval Game: Britain and Germany in the Age of Empire*. Cambridge: Cambridge University Press, 2007.
- Schilling, Britta. *Postcolonial Germany: Memories of an Empire in a Decolonized Nation*. Oxford: Oxford University Press, 2014.
- Schot, Johan, and Vincent Lagendijk. "Technocratic Internationalism in the Interwar Years: Building Europe on Motorways and Electricity Networks." *Journal of Modern European History* 6 (2008): 196–216.
- Seligmann, Matthew S. *The Royal Navy and the German Threat 1901–1914*. Oxford: Oxford University Press, 2012.
- Sheehan, James J. "What is German History? Reflections on the Role of the Nation in German History and Historiography." *The Journal of Modern History* 53, no. 1 (1981): 1–23.
- Short, John Phillip. *Magic Lantern Empire: Colonialism and Society in Germany*. Ithaca: Cornell University Press, 2012.
- Silberstein-Loeb, Jonathan. *The International Distribution of News: The Associated Press, Press Association, and Reuters, 1848-1947*. Cambridge, UK: Cambridge University Press, 2014.
- Slobodian, Quinn. "How to See the World Economy: Statistics, Maps, and Schumpeter's Camera in the First Age of Globalization." *Journal of Global History* 10, no. 2 (2015): 307–32.
- Solari, Luigi. *Guglielmo Marconi*. Bologna: Odoja, 2011.

- Stelzenmüller, Constanze. “We Have Good Cause to Abhor the Surveillance State,” *Financial Times* (July 16, 2013), [www.ft.com/cms/s/0/d9818d66-ed75-11e2-8d7c-00144feabdc0.html#axzz2ZlgPSngU](http://www.ft.com/cms/s/0/d9818d66-ed75-11e2-8d7c-00144feabdc0.html#axzz2ZlgPSngU). Last accessed 23 July 2015.
- Strachan, Hew, *The First World War*. New York: Viking Penguin, 2004.
- Strasser, Ulrike. “A Case of Empire Envy? German Jesuits Meet an Asian Mystic in Spanish America.” *Journal of Global History* 2, no. 1 (2007): 23–40.
- Torp, Cornelius. *Die Herausforderung der Globalisierung: Wirtschaft und Politik in Deutschland 1860-1914*. Göttingen: Vandenhoeck & Ruprecht, 2005.
- . “The ‘Coalition of ‘Rye and Iron’” under the Pressure of Globalization: A Reinterpretation of Germany’s Political Economy before 1914.” *Central European History* 43, no. 3 (2010): 401–27.
- Tworek, Heidi J. S. “Der Weltverkehr und die Ausbreitung des Kapitalismus um 1900.” *Themenportal Europäische Geschichte* (2015), [http://www.europa.clio-online.de/site/lang\\_\\_en/ItemID\\_\\_737/mid\\_\\_11428/40208214/default.aspx](http://www.europa.clio-online.de/site/lang__en/ItemID__737/mid__11428/40208214/default.aspx).
- . “Political and Economic News in the Age of Multinationals.” *Business History Review* 89, no. 3 (2015): 474–74.
- . “The Savior of the Nation? Regulating Radio in the Interwar Period.” *Journal of Policy History* 27, no. 3 (2015): 465–91.
- van Meer, Elisabeth. “The Transatlantic Pursuit of a World Engineering Federation: For the Profession, the Nation, and International Peace, 1918-48.” *Technology and Culture* 53, no. 1 (2012): 120–45.
- Verhey, Jeffrey. *The Spirit of 1914: Militarism, Myth and Mobilization in Germany*. Cambridge, UK: Cambridge University Press, 2000.
- Vleuten, Erik van der. “Toward a Transnational History of Technology: Meanings, Promises, Pitfalls.” *Technology and Culture* 49, no. 4 (2008): 974–94.
- Vleuten, Erik van der, and Arne Kaijser, eds. *Networking Europe: Transnational Infrastructures and the Shaping of Europe, 1850-2000*. Sagamore Beach, MA: Science History Publications/USA, 2006.
- Wu, Shellen. “The Search for Coal in the Age of Empires: Ferdinand von Richthofen’s Odyssey in China, 1860–1920.” *The American Historical Review* 119, no. 2 (2014): 339–63.

### Acknowledgements

I am very grateful to my co-editor, Simone Müller, for her suggestions and for co-organizing the conference symposium at the International Congress on the History of Science, Technology, and

Medicine in 2013 that inspired this special issue. Many thanks to Graeme Gooday, David Hochfelder, and Michael Tworek for their insights and comments.

---

<sup>1</sup> Mexican pesos had long served as an international currency, but only Mexico and China still viewed them as legal tender in 1900. Under pressure from and in consultation with the United States, Mexico reformed its currency in 1905 to base the peso's value on the gold dollar. Germans generally referred to the currency as the Mexican dollar. See Passananti, 'The Politics of Silver and Gold in an Age of Globalization'; Pomeranz and Topik, *The World that Trade Created*, 182. Thanks to William French and William Chiriguayo for their help on the question of Mexican dollars.

<sup>2</sup> I have pieced together this story from letters and reports in Bundesarchiv Berlin-Lichterfelde (henceforth BArch) R1001/7192a, 7194, and 7195. See later in the article for the exact citations of the details.

<sup>3</sup> Bender, *Der Burenkrieg und die deutschsprachige Presse*.

<sup>4</sup> Vleuten, 'Toward a Transnational History of Technology.'

<sup>5</sup> Badenoch and Fickers, *Materializing Europe*; Lagendijk, *Electrifying Europe*; Lommers, *Europe - On Air*; Schot and Lagendijk, 'Technocratic Internationalism'; Vleuten and Kaijser, *Networking Europe*.

<sup>6</sup> van Meer, 'The Transatlantic Pursuit of a World Engineering Foundation'.

<sup>7</sup> For wireless, see e.g. Campbell, *Wireless Writing in the Age of Marconi*; Hong, *Wireless*; Solari, *Guglielmo Marconi*. There is an enormous literature on spoken radio. For the most important works on technological innovation in radio, see Aitken, *The Continuous Wave*; Anduaga, *Wireless and Empire*; Birdsall, *Nazi Soundscapes*; Douglas, *Inventing American Broadcasting, 1899-1922*; Griset, *Entreprise, technologie et souveraineté*; Headrick, 'Shortwave Radio'; Tworek, 'The Savior of the Nation?'

<sup>8</sup> Balbi and Natale, 'The Double Birth of Wireless'; Arapostathis and Gooday, *Patently Contestable*, chap. 6.

<sup>9</sup> Friedewald, *Die 'tönenden Funken'*; Friedewald, 'The Beginnings of Radio Communication'; Friedewald, 'Telefunken und deutsche Schiffe'; Michael Friedewald, 'Funkentelegrafie und deutsche Kolonie: Technik als Mittel imperialistischer Politik,' in Handel, *Kommunikation in Geschichte und Gegenwart*, 51–68; Klein-Arendt, *Kamina ruft Nauen!*; Klein-Arendt, *Kamina*.

<sup>10</sup> The path-breaking work in the *Sonderweg* debate is Blackbourn and Eley, *The Peculiarities of German History*. On the difficulty of defining 'German history', see the classic Sheehan, 'What is German History?'

<sup>11</sup> Blackbourn, 'Germany and the Birth of the Modern World, 1780-1820'; Strasser, 'A Case of Empire Envy?'

<sup>12</sup> Krajewski, *Restlosigkeit*.

<sup>13</sup> Conrad, *Globalisation and the Nation in Imperial Germany*.

<sup>14</sup> Slobodian, 'How to See the World Economy'; Torp, *Die Herausforderung der Globalisierung*.

<sup>15</sup> Tworek, 'Der Weltverkehr und die Ausbreitung des Kapitalismus um 1900'.

<sup>16</sup> Calculated from Broadberry and Harrison, 'The Economics of World War I', 25.



- 
- <sup>17</sup> Ciarlo, *Advertising Empire*.
- <sup>18</sup> Short, *Magic Lantern Empire*.
- <sup>19</sup> Conrad, *German Colonialism*; Kopp, *Germany's Wild East*; Liulevicius, *The German Myth of the East*; Naranch and Eley, *German Colonialism in a Global Age*; Nelson, *Germans, Poland, and Colonial Expansion to the East*.
- <sup>20</sup> Baranowski, *Nazi Empire*; Poley, *Decolonization in Germany*; Schilling, *Postcolonial Germany*.
- <sup>21</sup> Bernhard, 'Borrowing from Mussolini: Nazi Germany's Colonial Aspirations in the Shadow of Italian Expansionism', 621.
- <sup>22</sup> Bönker, 'Global Politics and Germany's Destiny "from an East Asian Perspective"'; Dunley, "Not Intended to Act as Spies"; Geppert, *Pressekrige*; Bösch and Geppert, *Journalists as Political Actors*; Rüger, *The Great Naval Game*; Seligmann, *The Royal Navy and the German Threat*.
- <sup>23</sup> Rieger, *Technology and the Culture of Modernity*, 18.
- <sup>24</sup> On ships, see Bönker, *Militarism in a Global Age*; Rüger, *The Great Naval Game*.
- <sup>25</sup> Müller, *Wiring the World*, chap. 2.
- <sup>26</sup> Headrick, *The Invisible Weapon: Telecommunications and International Politics, 1851-1945*, 44–45; Müller, 'Beyond the Means of 99 Percent of the Population.'
- <sup>27</sup> Müller and Tworek, 'The Telegraph and the Bank', 270–272.
- <sup>28</sup> Hurdeman, *The Worldwide History of Telecommunications*, 308.
- <sup>29</sup> Griset, *Entreprise, technologie et souveraineté*.
- <sup>30</sup> E.g. Roscher, 'Das Weltkabelnetz'.
- <sup>31</sup> Müller-Pohl, Simone, 'Working the Nation State: Submarine Cable Actors, Cable Transnationalism and the Governance of the Global Media System, 1858-1914', in Löhr and Wenzlhuemer, *The Nation State and Beyond*, 101–127.
- <sup>32</sup> Geppert, *Pressekrige*, 222–227.
- <sup>33</sup> On this system, see Nalbach, 'Poisoned at the Source?'; Rantanen, 'Foreign Dependence and Domestic Monopoly'; Silberstein-Loeb, *The International Distribution of News*, chap. 7.
- <sup>34</sup> BArch R1001/2692, 102.
- <sup>35</sup> BArch R1001/2693, 75-76 and BArch R1001/2696, 9.
- <sup>36</sup> Letter from Schnee to Colonial Office, 23 November 1911, BArch R1001/2695, 197.
- <sup>37</sup> BArch R1001/2696, 9. Wolf's bill to the Colonial Office in October 1913 was 3917 Marks, for example. BArch R1001/2696, 252.
- <sup>38</sup> On the military use of wireless, see Nebeker, *Dawn of the Electronic Age*, chap. 1.
- <sup>39</sup> Cited in Bönker, 'Global Politics and Germany's Destiny "from an East Asian Perspective"', 95.
- <sup>40</sup> Wu, 'The Search for Coal in the Age of Empires'.

- 
- <sup>41</sup> Rieger, *Technology and the Culture of Modernity*.
- <sup>42</sup> Friedewald, 'The Beginnings of Radio Communication', 459.
- <sup>43</sup> Letter from von Moltke to War Ministry, 23 January 1908, BArch R1001/7184, 7-8.
- <sup>44</sup> 28 June 1906. Reichsgesetzblatt Nr. 37, p. 843. Located in BArch R1001/7200, 4.
- <sup>45</sup> BArch R4702/122, 82. On the spark gap system, see Friedewald, *Die 'tönenden Funken'*.
- <sup>46</sup> See letters in BArch R1001/7199.
- <sup>47</sup> Report from chief of the army general staff to Colonial Office, July 1911, BArch R1001/7198, 26.
- <sup>48</sup> Report from German Consulate in Sydney, 26 July 1911, and report from German Foreign Office, 31 October 1911, BArch R1001/7198, 37-38 and 50-51.
- <sup>49</sup> Letter from Telefunken to German Colonial Office, 18 November 1911, BArch R1001/7198, 61-62.
- <sup>50</sup> The National Archives, London (henceforth TNA), ADM 116/1409.
- <sup>51</sup> TNA T 1/11971/25592 and CO 323/716.
- <sup>52</sup> For a critical investigation of the 'spirit of 1914,' see Verhey, *The Spirit of 1914*.
- <sup>53</sup> Reed Winkler, 'Information Warfare in World War I'.
- <sup>54</sup> *ibid.*, 858.
- <sup>55</sup> Evans, 'The Path to Freedom?', 219.
- <sup>56</sup> Letter from von Kühlmann to Bethmann-Hollweg, 27 March 1917, BArch R1001/7193, 35-42.
- <sup>57</sup> For a collection of suggestions, see Politisches Archiv des Auswärtigen Amts, Berlin (henceforth PA AA) R120995 and R120996 and Geheimes Staatsarchiv Preußischer Kulturbesitz, Berlin (henceforth GStA) PK I. HA Rep. 77 tit. 949 11a.
- <sup>58</sup> Evans, 'The Path to Freedom?'; Tworek, 'Political and Economic News in the Age of Multinationals'.
- <sup>59</sup> Reinhard Koch to State Secretary of the Foreign Office, 15 June 1916, BArch R1001/7192a, 68.
- <sup>60</sup> Strictly confidential letter from Lieutenant Karl von Lösch to Zimmermann, 27 January 1917, PA AA R120996.
- <sup>61</sup> Hauptmann Schlee from German Embassy in Istanbul, 26 February 1917, BArch R1001/7193, 42.
- <sup>62</sup> Bönker, 'Global Politics and Germany's Destiny "from an East Asian Perspective"', 95.
- <sup>63</sup> Confidential letter from War Ministry von Stein to Chancellor and Foreign Office, 16 January 1917, BArch R1001/7192a, 183.
- <sup>64</sup> Meeting on the creation of a world wireless network for the German empire, 23 November 1916, BArch R1001/7192a, 148-153.
- <sup>65</sup> Telefunken plan to erect wireless receiver stations, 7 December 1916, BArch R1001/7192a, 174-177.
- <sup>66</sup> 30 November 1915, article in *New York Times*, forwarded by Telefunken to Imperial Post Office on 5 January 1916, BArch R1001/7192a, 24.

- 
- <sup>67</sup> Telefunken report to Colonial Office, 12 January 1917, BArch R1001/7192a, 188.
- <sup>68</sup> Meetings and plans from Telefunken, December 1916, BArch R1001/7192a, 167-179.
- <sup>69</sup> Confidential letter from War Ministry von Stein to Chancellor and Foreign Office, 16 January 1917, BArch R1001/7192A, 184.
- <sup>70</sup> Strachan, *The First World War*, 205-207.
- <sup>71</sup> Meeting in Imperial Post Office, 25 October 1918, BArch R1001/7195, 39.
- <sup>72</sup> Secret letter from Telefunken to Imperial Post Office, 7 April 1917, BArch R1001/7193, 19-22.
- <sup>73</sup> Monthly reports in BArch R1001/7194 and 7195.
- <sup>74</sup> Strachan, *The First World War*, 73-75.
- <sup>75</sup> Letter from Telefunken to Imperial Post Office, 29 August 1916, BArch R1001/7192a, 122-123.
- <sup>76</sup> Letter to Telefunken from Colonial Office, 15 November 1916, BArch R1001/7192a, 142.
- <sup>77</sup> Secret meeting in Imperial Post Office on plans to erect wireless stations in China, 17 March 1917, BArch R1001/7193, 3-8.
- <sup>78</sup> *ibid.*
- <sup>79</sup> Letters from Telefunken to Imperial Post Office, April 1917, BArch R1001/7193, 13-16, 45-48.
- <sup>80</sup> BArch R1001/7193, 30.
- <sup>81</sup> Letter from Telefunken to Imperial Post Office and Colonial Office, 15 May 1917, BArch R1001/7193, 69.
- <sup>82</sup> Larsen described his censorship evasion strategies in a letter to his sister (18 June 1917) and brother (25 July 1917), BArch R1001/7193, 172 and 182.
- <sup>83</sup> Letter from BArch R1001/7193, 176-177.
- <sup>84</sup> Monthly report from Telefunken to Colonial Office, 9 January 1918, BArch R1001/7193, 270.
- <sup>85</sup> Article cited in letter from Telefunken to Colonial Office, 22 December 1917, BArch R1001/7193, 254.
- <sup>86</sup> Monthly report from Telefunken, 9 January 1918, BArch R1001/7193, 277.
- <sup>87</sup> Meeting in Imperial Post Office, 8 February 1918, BArch R1001/7193, 327.
- <sup>88</sup> Telefunken also transferred the operation of Nauen to the new subsidiary. Secret letter from Telefunken to Imperial Post Office, 3 December 1917, BArch R1001/7193, 241. The company had 10 million Marks of share capital. BArch R1001/7193, 404.
- <sup>89</sup> Letter from Telefunken to Imperial Post Office, 28 March 1918, 388-390.
- <sup>90</sup> Monthly report from Drahtloser Überseeverkehr (Telefunken's subsidiary), BArch R1001/7194, 18-19.
- <sup>91</sup> Letter from Drahtloser Überseeverkehr, 3 May 1918, BArch R1001/7194, 27.
- <sup>92</sup> TNA FO 233/255.
- <sup>93</sup> E.g. TNA MT10/1314/11 and T1/11971/25592.

---

<sup>94</sup> TNA T1/12269/988.

<sup>95</sup> BArch R1001/7194, 253.

<sup>96</sup> Drahtloser Übersee-Verkehr to Post Office, 31 October 1918, BArch R1001/7195, 11-26.

<sup>97</sup> Contract between Federal Postal Ministry and Telefunken, April-May 1919, BArch R1001/7195, 160-165.

<sup>98</sup> Bethmann Hollweg, *Betrachtungen zum Weltkriege*, 181–182.

<sup>99</sup> E.g. Huber, *Die französische Propaganda im Weltkrieg*, 14.

<sup>100</sup> Eltzbacher, *Die Presse als Werkzeug der auswärtigen Politik*, 57–58.

<sup>101</sup> The Foreign Office interpreted the clause literally, allowing broadcasts from Norddeich, which Article 197 had omitted.

<sup>102</sup> Gabriel, 'Die offene Gesellschaft und ihre digitalen Feinde'.

<sup>103</sup> Stelzenmüller, 'We Have Good Cause to Abhor the Surveillance State'.

<sup>104</sup> Ellsberg, 'Edward Snowden: Saving us from the United Stasi of America'.