Discussions of the Crimean War (1853–56) often emphasize its leaders’ military and political incompetence and logistic failures, which led to heavy losses both on the battlefield and to disease. This portrayal ignores the significant entrepreneurial and technological novelties that emerged from the war. Begun and fought for the most part along traditional lines, the Crimean War became a stage for the display of innovative technologies ranging from telegraphy to photography, railways to steamships, and ironclads to sanitary hospitals. It became a business opportunity for entrepreneurs to promote their enterprises and to gain prestige, with the sanction of patriotism. These technologies, new and untried on such a scale though they were, began to shape the way in which the war was organized, fought and reported. More importantly, they generated enormous public excitement and helped make the war a spectacle for distant audiences, presented swiftly and vividly through the new media of telegraphy and photography.

Keywords: Crimean War and technology; telegraphy; photography; Roger Fenton; Charles Baudelaire; the Crimean railway; Isambard Kingdom Brunel’s Renkioi hospital

INTRODUCTION

Historians, pointing to the political, military and logistical deficiencies of the management of the Crimean War, have generally depicted it as a case of incompetence and failure, epitomized in Alfred Lord Tennyson’s ‘The Charge of the Light Brigade’. Such military strategies and political confusions have been amply studied, and they are not the focus of this paper. Furthermore, the narratives of death, suffering, maladministration, malnutrition and disease that have dominated the popular history and public image of the Crimean War have kept us from seeing the war as something else just as significant: a theatre of exuberant technological enterprise. The war became a great opportunity for entrepreneurs, inventors and promoters to test inventions, expand businesses and gain prestige, while in the process having their enterprises blessed as patriotic contributions. Many technological innovations that were to define the century were still new and some had yet
to be tried fully. The railway, steamships, telegraphy, photography and sanitary hospitals, for example, went on public display to prove their military worth.

Focusing primarily on Britain, the centre for these technologies and enterprises, this paper will first show how the war offered their advocates unique opportunities for testing them, arguing for their value over older technologies, popularizing them and, not least, promoting their future commercial potential. This is not to suggest that the war was a technological enterprise, design or experiment in itself, but rather that new technological innovations gave it publicity, displaying Britain’s industrial revolution and its techno-entrepreneurial spirit, dominated by private initiatives. The word ‘enterprise’ stresses this characteristic.

Second, these technologies aroused not just commercial interest but, more importantly, general public interest and curiosity about the war, thanks to the newspapers and magazines that advertised them as modern wonders. The public attention created by this technological show in the Crimean War recalls the industrial manufactures of the Great Exhibition at the Crystal Palace in 1851. More directly, the exhibition served as a model, giving inventors and entrepreneurs confidence and encouragement in their industrial enterprises and preparing the public to expect a continuing stream of wonders of manufacturing.

Third, this paper will show that these technologies, being new and untried in a locale far from home, proved to be fragile, needing enormous effort to install, operate and maintain. They were not effective ‘tools of empire’. They were more significant for their symbolism, future promise and ingenious uses of propaganda.

Fourth, the participating governments encouraged the introduction of these technologies as a response to the criticisms of the incompetence and failure that resulted in so many deaths, not so much on the battlefield, but rather from cold, lack of sanitation, and epidemic diseases. The new technologies were expected to solve logistical problems and thereby improve political and military capabilities, but such expectations were not always met. Their unexpected effects proved to be equivocal. Photography could not avoid revealing the bleak state of the war, while telegraphy turned out not to be an outright convenience for the military. Rather, these two technologies helped to bring the conduct of the war into sharper focus, inviting closer public scrutiny. In fact, despite that scrutiny, there was nothing particularly deficient or incompetent about the conduct of the Crimean War in comparison with previous wars. It is true that there had been no major wars in Europe since the end of the Napoleonic Wars in 1815, and therefore the European military and governments were ill-prepared for a war of this scale. But what was new was the relatively swift and visual way in which perceived or real incompetence was relayed to a wider public, with a powerful voice that the British government dared not ignore. This rapid, direct information thus tended to democratize the discussions of the war, and consequently influenced politics: via the new media, public opinion became a driving force.

This paper does not propose to give a complete account of the many technological innovations associated with the war. Steamships and gunboats, ironclad warships, the arms industry, Joseph Paxton’s wooden huts, William Fairbairn’s floating workshops, William Armstrong’s hydraulic inventions, and medical innovations will have to be omitted. The treatment here is limited to the Crimean railway, photography, telegraphy and a novel hospital.

Having lost its military and economic power, by the start of the war the Ottoman Empire had become vulnerable to an invasion by Russia, which was growing in power. From the 1830s, the other European powers, Britain in particular, became alarmed by the Russian expansion to Europe and its territories elsewhere. They promoted a European alliance
with the Ottoman Empire to check this threat.\(^5\) Fighting began in the autumn of 1853, as the Ottoman–Russian War. In March the following year Britain and France joined in on the side of the Ottomans, turning the war into a major European conflict.

Although they will not be treated here, a brief statement is necessary on steam and naval shipping, especially given the location of the seat of the war. Steamers were already a significant factor in shipping, especially in river and coastal navigation. During the Crimean War, steamships and steam gunboats began to take on a considerable role in actual naval warfare, but they proved to be even more helpful in the transportation of men and supplies.\(^6\) Steamers and steam frigates, mostly owned by Britain, made up a relatively small part of the entire naval forces, but even the relatively limited number of their steam naval vessels gave the Allies a considerable advantage.\(^7\) The war generated a boom in steamers and the steam navigation industry. The British government hired most of the newly built ships for the Crimean service, and also purchased many of them, leading an extraordinary campaign to mobilize steamers in order to cut down on travel times to and from the Crimea.\(^8\) In one case, the government chartered all the steamers of the General Screw Steam Shipping Company.\(^9\)

The war became a significant business opportunity especially for the flourishing steamship enterprises. Steam companies and ship-owners benefited financially from the war when oceangoing shipping was otherwise not very profitable. The benefit was even greater in the iron shipbuilding industry during and after the war. Britain’s shipyards were busy building for the government iron vessels, wooden ships with iron frames, and other steamers. Early in 1856 the Clyde shipbuilders Robert Napier & Sons completed the armour-plated \textit{Erebus} (a 16-gun iron screw floating battery) for the war in three and a half months.\(^10\)

\textbf{THE CRIMEAN RAILWAY: THE WORK OF ‘ENGINES, MEN AND HORSES’}

Land transportation presented problems of its own. Upon learning of the reports of logistical difficulties encountered in the Crimea, a group of British railway entrepreneurs – Samuel M. Peto, Edward Betts and Thomas Brassey – offered in the autumn of 1854 to build at cost a railway to move troops and supplies from the harbour of Balaklava (the Allied base) to the front (Sevastopol), a distance of about 10 miles (see figure 1). The British government welcomed the offer. Work on the line, which \textit{The Times} referred to as ‘a noble and most difficult enterprise’, began in February 1855.\(^11\) By the end of April, the tracks reached the British camp (7 miles from the harbour) and became operational. This first line had double tracks, along with single-track extensions and branch lines. The rails were fastened to wooden sleepers which were laid over a bed of stones on the road. Some parts of the line were subsequently re-laid and branches were added, bringing the length of line to more than 15 miles. The railway was initially worked by horses walking on planks placed between the rails. Frederic Robinson, a surgeon with the British army, observed in mid March 1855:

\begin{quote}
I walked to the railway, now advanced to a short distance from our camp, this afternoon. It is being constructed on an inclined plane, intervening for about the distance of a mile before the heights in front of Sebastopol. An even surface of three or four miles then extends to the divisions in front. The course of the line is very serpentine, every elevation being avoided as much as practicable.\(^12\)
\end{quote}
Stationary engines were subsequently used to pull the trucks by wire ropes. In the last stages of the war, locomotives were brought from Britain. For the most part, the railway was worked by stationary engines, horses, mules and men. Human and animal power was not superseded.

Although this railway was quickly and simply built, it proved vital, especially in the rainy season when the ground was muddy, as long as the railway itself did not succumb to the mud. In his heroic narrative of this railway, the historian Brian Cooke went so far as to hail it as ‘the railway that won a war’. Cooke’s claim perhaps takes at face value the excitement that the railway generated in contemporary news media when drawings and photographic images of it began to be disseminated by illustrated magazines and exhibitions (figure 2). For example, *The Times* in mid May dismissed criticisms of logistics:

we have railways and steamers, a secure haven, a transport corps, admirable charts, horses, mules, ponies, buffaloes, camels, oxen, drivers of all kinds of beasts of burden . . . and yet the supply of materiel has run out, and our military Oliver Twists are asking for more, to the great astonishment, no doubt, of our Overseers at home.

It suggested looking back to ‘the sieges conducted in the dark ages, which knew not Peto and Brass[e]y and Watt, and electric and submarine telegraphs, with surprise and admiration’.
But it is true that the Allies were becoming more dependent on the railway for moving supplies and munitions to the front, especially large new guns and mortars, whose sizes were increasing dramatically. During the war’s final, decisive campaign, the siege of Sevastopol, the main Russian base, *The Times* reported that: ‘The other day the railway was injured by a storm, and it was computed that ten days would thereby be lost in the siege.’\(^\text{17}\) There were complaints, for example, that it often malfunctioned, and in some places where the layer of stones under the sleepers proved insufficient, mud did indeed prevent its smooth functioning.\(^\text{18}\) *The Times* wrote in late December 1855 that: ‘Heavy rains have fallen, and the roads have been severely tried, but they have, on the whole, stood well. The railway is there, though the destruction of tr[u]cks has made it nearly useless.’\(^\text{19}\)

It was not free from accidents either. For example, in April 1855, Robinson’s diary records a serious one:

> A sad railway casualty occurred last night . . . A party of the 71\(^\text{st}\) Highlanders was returning by railway, from the trenches to their camp near Kade-koi, when . . . owing to remissness in not putting on the break early enough, whilst going down the inclined plane, the chain broke, and the train went off the line; consequently the carriages were upset. Three men, it is said, have been killed, and seven wounded.\(^\text{20}\)

Reporting the accident a little differently, *The Times* wrote that ‘many men were pitched out and severely injured. One man was killed on the spot, and several will have to undergo surgical operations.’\(^\text{21}\)

Besides its significance for the war effort, the railway had a social impact too. At the small village of Kadikoi nearby, Robinson wrote in early April 1855 that ‘there has
sprung up quite a small town of huts, where ordinary want and some few luxuries can be now supplied. Even a “restaurant” has been established. Books, too, (railway publications, chiefly) are procurable there.\textsuperscript{22} The rail link with the Balaklava port formed part of a continuous line of communication that included steamers and other railways. The normally secluded fishing village of Balaklava suddenly became a very active harbour and a place familiar throughout Europe, helped by photography and telegraphy.

**PORTRAYING THE WAR: DRAWING AND PHOTOGRAPHY**

The war put on public display the new media of photography and telegraphy, as alternatives to older forms of relaying news. Although photographic images and even telegraphic reports still had to be transported, steamers expedited and regulated the process. Yet promises of more direct communication were not always fulfilled. Photography might transmit true images of the war for the illustrated news but it was also a strategic means, a propaganda tool, for presenting the war in a particular, and usually positive, light. Would photography and telegraphy limit the romance and emotionality of the old forms: on-the-spot sketching by artists, and lengthy reports by correspondents – best exemplified by those of William H. Russell of *The Times*? As it happened, photography, because of the cost and technical difficulties of the processes, and telegraphy, being confined to military service, saw limited use, despite the immense publicity surrounding them.

By the start of the war, successive innovations in wood engravings and lithography had made possible almost unlimited reproductions of inexpensive prints. Beginning in 1840, electrotyping allowed printing blocks to be duplicated. These developments, together with photography, made the Crimean War the most illustrated war to date and helped turn it into a visual spectacle.\textsuperscript{23} Photographic images began to dominate the text they illustrated, and often became news themselves, attracting detailed commentaries in the press.\textsuperscript{24} However, they could not be reproduced directly in the illustrated press for general public viewing. They had to be viewed privately through purchase or private circulation or else be seen at public exhibitions.

Drawings and paintings remained the dominant forms of illustrating news and reports. They were more artistically expressive and emotionally appealing. When the war started, the demand for them was so huge that William ‘Crimean’ Simpson, one of the war’s greatest artists, made his first war drawing while he was still in London, inspired, like Tennyson, by the reports in *The Times*.\textsuperscript{25} The *Illustrated London News* kept several ‘special artists’ in the Crimea and Istanbul, among them Joseph Archer Crowe and Constantin Guys, who were also reporters.\textsuperscript{26} Guys, an avant-garde artist, was to be called ‘the painter of modern life’ by the French poet and art critic Charles Baudelaire, who praised his Crimea drawings (figure 3) as ‘infinitely preferable to any other’.\textsuperscript{27} He wrote that: ‘No journal, I declare, no written record, no books could express so well this great epic of the Crimean War, in all its distressing detail and sinister breath’.\textsuperscript{28} Baudelaire dismissed the grand genre of heroic battle painting as ‘nationalist nonsense’ and cajolery but praised Guys’s sketches of ‘battlefields littered with the debris of death, baggage trains, shipments of cattle and horses; they are the “tableaux vivants” of an astonishing vitality, traced from life itself, uniquely picturesque fragments.’\textsuperscript{29} In them, the artist was not a mere ‘flâneur’, but a philosopher, lover and interpreter of life.\textsuperscript{30} Thus, in Guys’s
drawings, Baudelaire thought, all gain a majestic and dazzling soul, with the soldier as poetical, interesting and beautiful as the ‘lorette’.  

Like drawings and paintings, photographic images communicated ideas and views that could not be expressed in words. But while drawings and paintings tended to modify and idealize, photography, acting as a ‘witness’, provided ‘authenticity’, not a mere representation. Attempting a mechanically objective view, photography in theory transmitted distant events unmediated by an artist. It suggested that the work of artists in illustrating news and reports was becoming obsolete. Thus, Baudelaire feared in his ‘Salon of 1859’ that photography would corrupt art and imagination; genuine art would then in time lose its significance. He was responding to what he believed to be ‘the universal infatuation’ of the masses with photography and ‘industrial arts’. They took photography to be the ultimate art form, reproducing nature exactly.

In practice, however, photography did not necessarily allow direct or objective experience since it was impossible without human intervention. It was not an unmediated medium that transcended human agency. In addition to its technical limitations and political manipulations, the photographic process was affected by ‘skill, taste, gender and class’. Photography could hardly, therefore, be imagined as a mechanism necessarily objective and free of interpretations. The photographer selected the view and often staged the scene, manipulating the image and what it conveyed. Roger Fenton, the Crimean War’s premier photographer, for example, is assumed to have photographed scenes that showed the war in a positive light for the Allies. When he arrived in the Crimea in March 1855, he found ‘everything seemed in much better order than The Times led to expect’.

There is no evidence, however, to suggest that his work was sanctioned by the government with
the intent that his photographic images would serve as evidence to counter the criticism of the war in the news media.\textsuperscript{38} Rather, the war simply provided Fenton with an opportunity to pursue his interest in photography. Nevertheless, he avoided scenes of combat and devastation, perhaps because of the cumbersome nature of the photographic process. Action photography was not possible. Fenton’s elaborate ‘Photographic Van’ (figure 4) and two assistants signify the difficulty of preparing for an exposure and processing it.\textsuperscript{39} Of course they were also ways to seek gentlemanly prestige and attach importance to his mission. From his letters from the Crimea, we know that he was busy courting officers and commanders to have their portraits taken.

During his stay in the Crimea until late June 1855, Fenton took 360 photographs. Most of them were portraits of dignitaries and officers or, in his words, ‘pictures of the persons and subjects likely to be historically interesting’.\textsuperscript{40} Some of his scenes show selectivity and even staging. In his most famous shot, the exceptionally gloomy \textit{The Valley of the Shadow of Death}, the cannonballs seem handpicked and rearranged.\textsuperscript{41} This photograph has two versions: the familiar one (figure 5) showing cannonballs scattered across a road, and the other with the road clear.\textsuperscript{42} In a letter to his wife, Grace Fenton, in early April 1855, he described the scene: ‘in coming to a ravine called the valley of death the sight passed all

Figure 4. Roger Fenton’s ‘Photographic Van’ in the Crimea, with his assistant Marcus Sparling seated. (The Roger Fenton Crimean War Photograph Collection, Library of Congress, Prints & Photographs Division, LC-USZC4-9240.) (Online version in colour.)
imagination […] round shot and shell lay in a stream at the bottom of the hollow all the way down you could not walk without treading upon them’.43 It fits well Tennyson’s description: ‘Cannon to right of them, Cannon to left of them, Cannon in front of them, Volley’d and thunder’d, Storm’d at with shot and shell’.

Fenton’s selectiveness reflected, in addition to any political or artistic considerations, the commercial concerns of his sponsor, the publisher Thomas Agnew & Sons, regarding the taste of the intended customers, middle-class Victorians who generally disapproved of scenes of violence, blood and death. Yet Fenton’s photographs still could not avoid conveying a generally bleak view of the war. There was a limitation to how much a photograph could be manipulated. The gloom and bleakness were also the result of features of the photographic process, which produced images lacking colour, energy and light. The treeless landscape was a factor too. In commercial terms, Fenton’s photography was not a great success. The photographs did not sell well.44

Although Fenton is the best known of the Crimean War photographers, there were others. James Robertson, who was in the employ of the Ottoman government as an engraver at the Imperial Mint, formed a partnership with another British photographer, Felice Beato, and visited the Crimea, following Fenton.45 They produced photographs, again mostly portraits, but their subjects included many ordinary soldiers and prisoners.46 In mid December 1855, The Times introduced an exhibition of Robertson’s photographs taken

Figure 5. The Valley of the Shadow of Death (1855), Roger Fenton’s most famous photograph of the war. (The Roger Fenton Crimean War Photograph Collection, Library of Congress, Prints & Photographs Division, LC-USZC4-9217.)
after the capture of Sevastopol. It praised Robertson’s photographs of ‘the Redan and Malakhoff from several different points of view, shivered by the powerful artillery of the allies – the enormous guns, some in position, and curiously protected by mantelettes of cordage against the Miinié; others dismounted and useless.’ It informed readers that ‘the more painful evidences of the carnage had been removed before these views were taken, but every object in them bears token to the fury of the contest’, and so it invited a careful examination:

though the minuteness with which details are rendered may on a superficial survey create feelings of disappointment, visitors who take the trouble to search the photographs closely will gain from them a far more accurate conception of the siege than can possibly be acquired in any other way.

The newspaper also observed that ‘from their minute microscopic character photographs are not well adapted for public exhibition; only one person can examine each at a time, and in this respect they belong more to the library than the gallery of art’. Nevertheless, it accepted that

the application of the discoveries of Fox Talbot, and Daguerre to illustrate the scenes and incidents of the great war in which we are engaged forms one of the most interesting and remarkable features amid the many novelties which the present momentous contest offers, as compared with those of past times.

The photographs taken by these and other men began to appear in the illustrated press in the form of engravings. Fenton’s images were published almost weekly in the Illustrated London News in the autumn of 1855. His Crimean photographs were also displayed in exhibitions in London beginning in September that year. The number of such exhibitions and the variety of their locations increased rapidly. For example, on 4 March 1856, The Times announced three exhibitions in London: Fenton’s photographs, Robertson’s photographs, and ‘pictures painted from sketches and photographs made on the spot by officers’.

The rich and the nobility began to make their own private collections of war photographs. Queen Victoria and Napoleon III acquired extensive photographic albums of the Crimean War. Thus in the latter part of the war, photography was emerging as a powerful visual documentary medium. Through this medium, the distant battlefield gained new meaning, and moved closer. Heroes and celebrities as well as the sick and the enemy came to life in more naturalistic images, but perhaps at a cost, losing their mystery and heroism, qualities easily emphasized if not exaggerated in painting.

Photography also offered a new way in which to experience the Orient, which continued to fascinate many Europeans. The war, due to its location, only heightened this appeal. Collections of photographic (as well as artistic) images of the war, for example, often included exotic scenes of ‘oriental’ life and manners. Taking advantage of this interest, by 1854 Robertson had opened a studio in Istanbul, where he produced photographs of the city’s sites and residents for the European market. Later, he offered views of other places in the Ottoman Empire, as well as in Greece and Malta. Roger Fenton, too, carried his interest in ‘oriental themes’ back to his London studio, where he produced several photographs modelled on harem paintings. One of the few surviving images by another Crimean War photographer, the Romanian court painter Carol Popp Szathmari, depicts a ‘basibozuk’ or irregular Ottoman soldier, enjoying the company of his exotic odalisque in an obviously staged scene.
The interest in orientalist paintings was nevertheless boosted by the Crimean War. The paintings and also photographs of ancient buildings, ruins and people from Turkey and neighbouring places attracted wide attention in Europe. Painters and photographers sent to view the Crimean War visited other sites of interest in Turkey. The interest among European intellectuals in oriental ruins and palaces was not only archaeological. The appeal was also associated with the Romantic Movement, represented most recently in Britain by John Ruskin’s drawings and photographs (daguerreotypes) of ruins of Italy in his three-volume *The Stones of Venice* (1851–53). This interest was carried over to photography, which was initially considered a form of art. One of Fenton’s well-known photographs, taken a year before he travelled to the Crimea, is that of ‘The Cloisters, Tintern Abbey’, which had been publicized by Turner’s paintings in 1794 and 1795 and Wordsworth’s ‘Tintern Abbey’ in 1798. This interest expanded to oriental buildings and ruins. Nevertheless, paintings of oriental palaces, motifs and figures remained popular. The paintings of Jean-Léon Gérôme (1824–1904), Frank Dillion (1823–1909) and Edwards Poynter (1836–1919) are only a few examples. Baudelaire’s fear, then, that photography was to become art’s ‘mortal enemy’ would not be fulfilled, at least in the short term.55

**TELEGRAPHY: MESSAGE OF THE MEDIUM**

During the Crimean War, just as drawings and paintings remained dominant in spite of photography’s promise of authentic images, in the same way, non-telegraphic, mechanically delivered, reporting was the main medium for public news, in spite of excitement over telegraphy for reporting and gathering intelligence. It was in the sphere of military command and government, rather, where the electric telegraph really made itself felt. To one recent telegraph historian, it was the telegraph that made the war a ‘modern’ one.56 Another calls the conflict the ‘first armchair war’, suggesting a distant audience viewing it through newspapers and illustrated journals at home.57 This phrase could also apply to the way in which command and control were now exercised. Sovereigns, governments and their war ministers thousands of miles away could take command by sending almost instant orders to the generals and commanders on the battlefield. Commanders began to use the telegraph to coordinate the war effort, organize campaigns, gather intelligence and direct the fighting more effectively. This turned out not to be easy. They complained about the extra work it created for them in the form of reading and writing telegrams. Meanwhile, its potential value as a new medium for public news reporting worried governments and militaries.

When France and Britain first joined the Ottoman forces in early 1854, the fastest message from the Crimea took about five days to reach London: about two days to Varna by steamer, and three days by horse from there to the first telegraph station at Bucharest.58 On the Russian side, the situation was better. Begun in 1833, Russia’s Chappe-type semaphore telegraph spanned a large part of the empire, linking Moscow and St Petersburg to the European system at the Austrian frontier. The line from the Austrian frontier to St Petersburg had about 220 stations, spaced every five or six miles, and each staffed by six operators.59 When the war began, Russia already had a line in working order between Sevastopol and Moscow via Odessa. The system proved invaluable to the Russian army early in the conflict as it could convey short messages to
Moscow in about two days. The reliability of this semaphore system had made the Russian government reluctant to adopt electric telegraphy. But with the outbreak of the war looming, the Russian government contracted with Siemens & Halske of Berlin to build a network of electric telegraphs. In the early months of the conflict, the empire was connected with the European electric telegraph network at St Petersburg via a line from Warsaw. This caused a serious concern in Britain that the Russians were receiving accurate intelligence of the movements of the British and French via the newspapers, especially *The Times* reports. That is, it was possible for Russian agents and reporters in London and Paris to telegraph to St Petersburg the reports and news in the daily press in those cities.

Like the railway, the electric telegraph as a possible aid to the war effort received intense attention in Britain in the late autumn of 1854. In mid December, the British government, under heavy criticism for slow communication, promptly accepted an offer from R. S. Newall & Company, the major manufacturer and layer of submarine cables, to connect Balaklava with Varna on the Black Sea. In February 1855 it signed a formal convention with France to connect by electric telegraphy the headquarters of the allied armies with their governments. France then undertook to build a 125-mile overland line between Varna and Bucharest. This speedily constructed line was completed in April, putting Varna in telegraphic communication with London and Paris.

With a view to establishing full electrical communication for the allies, Newall & Company’s scheme envisaged two submarine lines: Varna to the Crimea, and Varna to Istanbul. At 340 miles, the Crimea line would be the longest one the company had yet attempted. A large number of civilian workmen, as well as military personnel of the Royal Artillery and Royal Engineers, cooperated in the laying of the cable. Several chartered steamers worked with two navy ships. In late April 1855, the submarine cable from Varna to Balaklava was complete and working, putting the governments in Paris and London in direct telegraphic communication with their armies in the Crimea. Messages took about five hours to pass to Paris and London, with as long as two hours spent carrying the messages across the Danube by boat. Except for the shore ends, which were protected inside a cable sheath, the submarine cable was unarmoured, and laid with very little slack. Nevertheless, it gave good service for nearly a year.

The successful laying of this cable, a major engineering undertaking of the day, was a great encouragement for the company and for the cable industry at a time of uncertainty about long-distance undersea cables. It stimulated funding and raised confidence in telegraph companies. The telegraph promoter and historian Taliaferro P. Shaffner declared it ‘the boldest and yet the most triumphant feat in submarine telegraphy’, and an ‘extraordinary enterprise’, which crossed ‘the most restless and turbulent sea upon the face of the earth’, and also ‘[gave] note of the progress of that war of empires’. Furthermore, it raised hopes for a telegraphic link between Europe and America. *Scientific American* hailed it as ‘an important triumph of modern engineering enterprise’, and praised the British for making ‘the ocean a highway of thought’. In October, the company completed the 150-mile cable from Varna to Istanbul, the seat of the Ottoman government and the primary destination and transfer point for the Allied troops and supplies, with hospitals for the sick and wounded. This cable likewise was unarmoured except for the shore ends, and did not last as long as the Varna–Balaklava cable.

Meanwhile, the Electric Telegraph Company was helping to set up an electric telegraph system on land in the Crimea itself to expedite communication among the army
headquarters. The work began in late December. The company provided equipment and 24 miles of copper wire and also trained briefly in London a telegraph detachment of 25 men from the Royal Corps of Sappers & Miners created to operate the system. In addition, the company’s engineer, Samuel Alfred Varley, headed a group of 15 civilian experts who travelled to the Crimea to help with laying and running this telegraph. By the end of the war, they had established a system of 21 miles and eight stations. The line used a special Wheatstone single-needle telegraph instrument, unlike the Black Sea and Varna–Bucharest lines, which used the Morse system.77

Among the novel equipment that the Electric Telegraph Company developed was a ‘terrestrial cable-laying plough’ designed by its chief engineer Josiah Latimer Clark to bury the cable in the ground (see figure 6). Concerns about exposing the wires to enemy interruption probably persuaded the designers not to use the conventional poles. The plough was probably modelled on a similar ox-drawn plough designed by Ezra Cornell for Samuel F. B. Morse. Morse tried it during the construction of his Washington–Baltimore line (1843–44) but quickly abandoned it.78 Likewise, Clark’s cable plough proved to be of little practical value. Many difficulties were encountered in laying cables, especially when the ground was dry and hard. Even if successfully laid, the cable remained vulnerable to breaks, injury and interruption.79 The system did not work well, mostly because of insufficient insulation.

In its effort to make the telegraph more mobile, the Electric Telegraph Company also designed two wagons for the service (figure 7),

each containing a complete set of instruments, batteries, and telegraphic apparatus, and a sufficient supply of insulated wire, to establish at a moment’s notice a telegraphic communication to a distance of 10 or 12 miles either on land or under water.80

Each wagon was ‘intended to be drawn by six horses, and to be accompanied by a staff of mounted officers and men’.81 It is not clear if these wagons were useful or if they were even used at all but they were showy enough to advertise the company and the romance of the electric telegraph.

But there was a more mobile system operating in the Crimea. After joining the war, the French government sent a team of civilian telegraph experts equipped with a mobile version

![Figure 6. The Crimean ‘terrestrial cable-laying plough’. (Courtesy of the Royal Museum of Signals.)](image)
of the Chappe system, with improved signalling. Its equipment was light enough to be carried by a couple of mules. They first tried the system around Varna. When this place was put into electrical communication with Bucharest, the mobile semaphore was moved to the Crimea itself, where it was set up and continually relocated, adapting to the movement of the troops and operations of the war.

Observing it in operation, Russell thought that 'it was rather singular that the French preferred the old-fashioned semaphore' (figure 8). By the end of the war, however, the French had transmitted some 4,500 dispatches by this system. It was reportedly easier and quicker to set up, and appears to have been more reliable, than the electric telegraph. As well as providing greater mobility than the electric telegraph it offered greater security, since interruption by enemy agents and enemy fire was more difficult. Nevertheless, this was the last semaphore telegraph system used, as France completely abandoned it in favour of the electric telegraph. But that abandonment was not a result of the war: France had begun to change over to electrical telegraph systems in the late 1840s, first to the electrical Foy–Breguet telegraph and later to the Morse system.

Thus the Crimean War saw the establishment of military field telegraphs and the use of two telegraphic systems: optical (Chappe) and electrical. The electrical system was still being developed and the rival optical system had not been superseded. Although Britain was no longer using the optical system, its electrical communication was divided between the Wheatstone and Cooke needle telegraph and the Morse system, for land and for submarine telegraphs respectively. In France, while the electric telegraph system was expanding, the government continued to use the optical system for most of its military communication, because it had proved reliable, safe and sufficiently swift for military operations. The war thus brought together different telegraph systems, lines above ground and underwater, military and civilian engineers, and operators transmitting to each other in several languages. Differences and deficiencies naturally came to light and the experience gained under the pressure of war helped overcome them. Back at home, it was
not just the telegraph system and its problems that came under scrutiny, but also its service to the war effort. More generally, its promises as a medium of communication raised tension and generated debate.

TELEGRAPHS, MILITARY INTELLIGENCE AND NEWS REPORTING

The media culture critic James W. Carey has asserted that the electric telegraph decisively separated communication from transportation and thus freed it from the constraints of space and time.\(^\text{87}\) But during the Crimean War, the electric telegraph still depended on transportation and attendance. Nevertheless, it provided a new medium in which news and information could travel faster than ships, horsemen and horse-drawn carriages. Sensitive war news sent by telegraph and reported in newspapers could thus find its way to enemy countries quickly enough to compromise the war effort. The British government and generals often blamed the press for revealing too much.\(^\text{88}\) This problem eventually generated debate on information security and telegraphic censorship during conflicts.\(^\text{89}\)

The Crimean telegraph was normally restricted to military and intelligence use. This, therefore, was where the electric telegraph had an immediate effect, while at the same time it created tension between the government and its generals and bureaucrats.\(^\text{90}\) The generals began to receive their orders from their faraway governments and lost their independence of action. As a result, their status and power underwent a transformation.
Emperor Napoleon III of France and Queen Victoria of Britain demanded daily telegraphic reports from their military commanders in the Crimea.\(^9\) James Simpson, the British commander-in-chief (following Lord Raglan), and his French counterpart, Aimable Jean-Jacques Péliissier, found themselves under increasing pressure to respond to their governments’ demands.\(^9\) Lord Panmure, the British Secretary of State for War, often had to ask Simpson for more telegrams for the Queen, although he did so reluctantly.\(^9\) Lord Palmerston, the British Prime Minister, was no less dissatisfied with Simpson’s parsimonious use of the telegraph:

> It has cost us a large sum of money, and we ought to have value for it in daily communications. The Russians contrive, by means of telegraphic communication, to reprint in the evening at Petersburg the leading articles and most interesting foreign news of *The Times*, published here in the morning, and, on the other hand, Simpson’s communications, at a moment of intense interest, have ever since the announcement of the capture of Sebastopol been of the most meagre kind – few and far between, and telling us nothing of what we wanted to know. All we have learnt of what has been done since has come to us from Péliissier.\(^9\)

But Simpson, and Péliissier too, complained of the problems the telegraph had created for them. Simpson thus wrote:

> The ‘paper-work’ and the correspondence that demand my time and attention here are beyond all belief, and interfere sadly with my military duties. In fact I am at my desk from four in the morning throughout the whole day, while I ought to be outside attending to more important matters. What with the two mails a-week, and the electric telegraph, the writing is incessant, and much interferes with more urgent duties. This I find is my great difficulty.\(^9\)

In its review of its army in the Crimea, shortly after the war, the French Ministry of War reported that: ‘All the orders of the Emperor and of the Minister of War were transmitted by telegraphy with the greatest regularity and promptitude.’\(^9\) It made no references to the difficulty and tension that the telegraph had created in the relations between the Emperor and Péliissier. The telegraph had very quickly become part of the military system, no matter how much the commanders deplored it.

In contrast to this immediate military use of the telegraph, in news reporting it was a different story. The war generated a huge demand for verbal and visual news. *The Times* and the *Illustrated London News* saw their business flourishing and readership expanding dramatically. Newspapers were becoming cheaper thanks to steam-powered rotary presses. *Punch*, a popular weekly magazine of humour and satire, joked that Britain had gone to war for the benefit of the *Illustrated London News*.\(^9\) The *Daily Telegraph* was founded in June 1855 to help satisfy this public demand for news from the Crimea. The newspapers and journals sent out their own reporters and artists.

News reports and commentaries from the Crimea, especially those by Russell, helped create the war’s most enduring images, such as ‘The Charge of the Light Brigade’ and ‘the Lady with the Lamp’. Politically, they led to strong criticism of the government over the conduct of the war, and the large number of soldiers dying from disease, malnutrition and lack of medical services. This criticism was the main reason that the British government led by Lord Aberdeen collapsed in January 1855.\(^9\)

Although it is not uncommon to read references such as ‘Russell’s dispatches via telegraph from the Crimea’, or ‘the dispatches sent over by the recently invented

---

\(^9\) Y. Bektas

---
telegraph wire by *The Times* correspondent’, there is no evidence that Russell used the telegraph to send directly any of his reports from the Crimea or Istanbul.99 All extended news reports and correspondence still depended on overland mail, now carried by steamers and trains. Yet brief telegraphic news intelligence was now reaching the British newspapers often enough from the Crimea via international telegraph stations – usually at Vienna, Marseilles and Paris – to begin to affect reporting of the war and the writing of news stories.100

Nevertheless, most of the excitement was not due to the news the telegraph transmitted but was about the new medium itself. This is what Marshall McLuhan meant when he said, ‘the medium is the message’: that is, that the new system was more important than the news or information it transmitted.101 The excitement was also driven by anticipation of, and speculation about, the electric telegraph’s future applications. Such promises were enhanced by speculation in the financial and business sense and promotion by ‘electrified’ newspapers and fast-growing telegraph companies, which received a mighty boost from the Crimean War.102

The reports from the Crimea brought to light the desperate condition of medical care, spurring another innovation: specially designed prefabricated hospitals. Again, this initiative, although supported by the government, was championed by private individuals. The prime example was Isambard Kingdom Brunel’s Renkioi hospital complex. Brunel himself did not travel to the Crimea, but he personally managed the enterprise from London.

**BRUNEL’S INNOVATIVE HOSPITAL COMPLEX**

More than 80% of the deaths in the Crimean War were caused by diseases such as typhus, typhoid, cholera and dysentery, owing to a lack of hygiene and sanitation.103 A cry for help provoked public and private initiatives back in Britain. Florence Nightingale began to nurse at the Ottoman Selimiye Barracks, turned into a temporary military hospital, which she is credited for reorganizing and improving its hygiene and sanitation.104 These very problems of ventilation, hygiene and sanitation were receiving increasing attention in medical theory and hospital designs of the time.105 Such developments were exemplified in an innovative work of medical engineering: the Renkioi hospital, designed by Isambard Kingdom Brunel as a set of prefabricated buildings, built in Britain and transported to Turkey.106

Facing a public outcry in Britain over the increasing deaths of soldiers, in February 1855 the War Office asked Brunel to design temporary prefabricated buildings to use as a hospital for the sick and wounded of the war. The idea was promoted publicly by Brunel’s close friend and brother-in-law Benjamin Hawes, at the time deputy undersecretary at the War Office.107 After studying information and reports from medical experts and hospital managers, including a report from Nightingale on the problems of sanitation and organization, Brunel had an experimental model erected on the premises of the Great Western Railway at Paddington and invited experts to examine it. Their critique allowed him to work out the principles to follow in the final version.108 Within a few weeks the construction began, the work being shared among multiple contractors. The project consisted of a complex of 36 main and other service buildings. Each main building included two ward rooms, each with 26 beds (see figure 9), ‘one nurse’s room, a small store-room, bath-room, and surgery, water closets, lavatories, and ventilating apparatus’.109
Central to its design was the dominant medical theory that disease was caused and carried by ‘bad air’. The ventilation system, along with the provisions for sanitation and hygiene, is a reflection of this understanding. The ward rooms, for example, were ‘wide enough and high enough to ensure a good space of air to each bed’, and each room was ‘furnished with a small fan, or rotatory air-pump, which, easily worked by one man, is found capable of supplying 1,000 to 1,500 cubic feet of air per minute, or 20 to 30 feet for each patient’. In addition to this ‘mechanical supply of air’, opening windows are provided along the whole length of the eaves, and spaces left immediately beneath the roof at the two gables, amply sufficient together to ventilate the rooms thoroughly if any breezes are stirring, without the help of the fan.

The Times correspondent who later visited the hospital observed that: ‘The roof is covered with felt and sheet tin: windows are numerous and supplied with blinds, which do not exclude air.’ All the buildings were made of wood except the kitchens and...
laundries, which were constructed of iron and equipped with the latest machinery and appliances. Each set of buildings came with ‘a pumping apparatus, a small general reservoir, and a sufficient length of main, with all its branches, to supply water to every detached building’.\footnote{114}

Brunel put his assistant John Brunton in charge of the works and sent him to Turkey in March. He and Edmund Parkes, the medical superintendent of the hospital (and later professor of hygiene at the Army Medical School set up in 1860), travelled to Istanbul to seek a convenient place.\footnote{115} At the beginning of May, they decided on a spot on the east side of the Dardanelles near Renkioi (Renköyü in Turkish), an old Greek and Turkish village, probably because of its easy access to the sea, its good climate with relatively dry air, and the presence of fresh water springs.\footnote{116} The components of the buildings and stores were transported from Britain mostly by steamers in about two dozen shipments. By mid July a part of the complex was ready to receive patients. But patients began to arrive only in October. The medical staff included more than two dozen doctors and a mostly female nursing staff.\footnote{117} By January 1856, the complex was ready to serve 1,500 patients, and when the war ceased in March, the capacity was more than 2,200 (see figure 10).\footnote{118} In his official report, Parkes stated:

> Nothing could exceed the simplicity of the whole arrangement; it was a repetition of similar parts throughout; and experience enables me to say, that nothing could be better adapted for a hospital than this system of isolated buildings, between every one of which was a large body of moving air, rendering ventilation easy, and communication of disease from ward to ward impossible.\footnote{119}
In September 1855, *The Times* had reported that, ‘between the two little bays’, there ‘runs a wooden passage, or corridor, which will ultimately be half a mile long, and wide enough to constitute a carriage drive’. On each side was a line of wards. In the summer the corridor would be opened at the sides to allow a cool walk, while in the winter it was to provide a sheltered exercise area. An even more novel feature of this hospital (perhaps an expression of a well-known passion of Brunel) was its half-mile railway between the pier and the complex. In January 1856, *The Times* described it concisely:

It is but a single line, and the trucks are drawn by horses, but it is scarcely credible how it facilitates the transport of the sick, and diminishes the labour of the hospital attendants. As the caique runs alongside of the pier, the patients are raised, as they lie in their beds on stretchers, and deposited on the flat railway carriage, which, when full, starts at a rapid pace towards the hospital.

Weeks later, it reported that the little train ‘now runs from the pier to the corridor, where a turntable receives it, ready in a few weeks to direct the carriages upon branch lines, which will bring them to the very doors of the wards’, and then patients will be ‘galloped into the hospital along the smooth tramway in a few minutes.’

The war ended before the hospital reached its full capacity. It admitted a total of 1,408 patients before it was closed in July 1856, and only 50 of them died. This was an immense improvement, a tenfold decrease in mortality rate compared with other hospitals serving the Crimean War sick and wounded. After the war, the complex was dismantled, and most components were sold on the site, but some parts and apparatus were sent back to Britain. In its scale and design, Brunel’s hospital evoked Joseph Paxton’s Crystal Palace, the largest prefabricated building (of glass and cast iron) at the time and the home of the Great Exhibition of 1851, which had probably served as a model. As an innovation in engineering and hospital construction, it became part of medical and hospital architecture history, and a model hospital for the British army. Its design was also emulated in America during its Civil War (1861–65), and by the German army from 1870. As in the case of railway and telegraph promoters, responding to the deficiencies of the war with his ambitious project allowed Brunel to show his patriotism, while gaining prestige and respect, and also promoting future engineering schemes.

**CONCLUSION**

With the cessation of hostilities, and the promise of peace growing in early 1856, an observer in *The Times* expressed his delight at seeing people once again flocking to the Crystal Palace, museums and art galleries in London:

Invention and enterprise have lately been so occupied in the arts of destruction that we have almost forgotten their more peaceful uses. We shall now hear of other discoveries than the Minié rifle, and other devices than those useful for a Crimean winter out of doors.

This aptly noted the extent of public and private entrepreneurial engagement with the war, in Britain in particular and also in Europe in general, but it perhaps overestimated the extent to which the business and industrial patterns that the war had helped shape would shift back to
former ways. The patterns that had developed became models for future businesses and industrial and social enterprises.

Begun largely as a traditional conflict, the Crimean War soon turned into a stage for the display of technological novelty and enterprise, and brought on a rapid mobilization of new technologies, such as railways, steamships, electric telegraphy, photography and prefabricated hospitals. Britain’s War Office, for example, was inundated with proposals for improving guns and firepower.\textsuperscript{131} This interest in the war effort, often motivated by commercial expectations, embraced all fields of industry, technology and medicine.

The practical effect of these technologies on the outcome of the war is not easy to assess. Obviously they changed things, but most of the war was fought along traditional lines. In spite of the increasing use of steamers, most naval vessels were still of the sailing type. Once the Crimea was linked by the electric telegraph, British and French military commanders used it daily to communicate with and receive orders from their governments and to transmit military intelligence.\textsuperscript{132} But news and lengthy reports from the Crimea were still carried by steamers and railways, taking up to about two weeks to reach London and appear in the newspapers. Photographs could be viewed directly only by a limited number of people in galleries, exhibitions or private collections. The Crimean railway was still very much the work of ‘engines, men and horses’ together. Its smooth operation often depended on man and animal power. Brunel’s hospital was hardly finished in time to serve.

The practical results and the extent of applications of these technologies, then, were and still are being exaggerated. Their perceived and indirect influence via the newspapers on their distant audiences, their symbolic meaning, were much greater than their direct power. The electric telegraph, for example, created the impression that instant reporting was taking place or was imminent. Although technically this was possible, and the governments were able to receive brief news bulletins, as a practical matter the public received almost no telegraphic information from the seat of the war. The excitement about this new medium was at least partly driven by anticipation of the electric telegraph’s future applications, stimulated by newspapers and fast-growing telegraph companies.\textsuperscript{133}

Photography raised a similar expectation for unmediated images of the war. But photography was technically a difficult and costly undertaking. Besides, the few available photographs of the war were not free of manipulation. Yet the idea that the war was being experienced more directly was exciting. The photographic exhibitions and photographic engravings in illustrated magazines attracted great attention, and gave the war enormous publicity; in return, photography and photographers gained publicity too. War photographers such as Felice Beato and James Robertson went around the world to take pictures. Similarly, special artists such as Constantin Guys and William Simpson became publicly and internationally recognized, thanks to the rapid and copious reproductions of their drawings.

That the war and the death of soldiers were occurring in a distant, foreign and exotic place, with harsh winters and hot summers and overcrowded hospitals, stirred public interest in the conflict. Emotionally charged reporting then magnified the response. Another source of public interest in the war was these new technologies themselves and the enthusiasm and expectations they generated. They helped make the war a public spectacle and a media event via the flourishing newspapers. The newspapers themselves exploited the war and the appeal of novel technologies such as telegraphy and photography to increase their own appeal and expand readership.

A singular aspect of the war was the variety and multiplicity of its entrepreneurial initiatives, mostly private. In this respect, the war increasingly became a business
enterprise, an entrepreneurial undertaking. Many innovations were put on public display there for the first time on such a large scale. Inventors and entrepreneurs saw the war as an opportunity to advertise and market their businesses, and to gain prestige for themselves and their enterprises. The Crimean railway, for example, was mostly a private initiative by railway entrepreneurs. The electric telegraph in the Crimea was established and operated by the Electric Telegraph Company. Brunel willingly lent his services for the Renkioi hospital. It was the same for inventors and entrepreneurs such as William Fairbairn and William Armstrong.

The enthusiasm and public blessing that these businesses and their entrepreneurs received during the war helped them expand these enterprises nationally and internationally. Naval shipbuilders and railway, cable and armament companies in Britain and in France experienced a boom after the war, while governments across (and beyond) Europe, starting with Russia and the Ottoman Empire, began to embrace these new technologies more vigorously. The cable industry in Britain, for example, grew rapidly to make that nation the centre of cable manufacturing and laying. Hailing the British 'national spirit for engineering’ during the war, Scientific American urged ‘American telegraph engineers’ to act ‘faster’ so ‘that John Bull does not steal away our good name by the construction of the first Atlantic ocean telegraph line.’ The rise after the war of this submarine cable industry in Britain, and an almost immediate push for wiring the globe with undersea cables, including the Atlantic, the Red Sea and the Franco-Algerian cables, was not a coincidence. The Crimean War therefore publicized Britain’s position as a major technological power that the Crystal Palace Exhibition a few years before had demonstrated. It came at a time when Britain was becoming the world centre for iron shipbuilding, steamers (both civilian and naval), the cable industry, railroad enterprises and arms manufactures, with its entrepreneurs extending their trade initiatives and industrial projects across the world.

ACKNOWLEDGEMENTS

I owe Roger Sherman special thanks. His reading and discussion of the manuscript in various stages helped improve it greatly. Ben Marsden’s comments, suggestions and support were crucial. The comments of my two referees too were invaluable. I also thank Andrew Butrica for his suggestions on French telegraphy; l’Institut Français d’Études Anatolliennes Georges Dumézil (Istanbul) and Alexandre Toumarkine for encouragement; and Frank Wittendorfer of Siemens Archives (Munich); the Royal Signals Museum (Dorset); the websites of the Victorian Web and the Crimean War Research Society for sources and information; the Library of Congress; and the J. Paul Getty Museum for photographic images. My thanks are also due to librarians at the Tokyo Institute of Technology for their help with interlibrary loans.

NOTES

1 See for examples Alexis Troubetzkoy, A brief history of the Crimean War: history’s most unnecessary struggle (Running Press, New York, 2006); Trevor Royle, Crimea: the great Crimean War, 1854–56 (St. Martin’s Press, New York, 2000); Robert B. Edgerton, Death or Glory: the legacy of the Crimean War (Basic Books, Boulder, CO, 1999). Tennyson wrote his

2 Trust, display, experiment, trial and tourism of technology are explored in Ben Marsden and Crosbie Smith, Engineering empires: a cultural history of technology in nineteenth-century Britain (Palgrave, Basingstoke, 2005).

3 The classic work is Daniel Headrick, The tools of empire: technology and imperialism in the nineteenth century (Oxford University Press, 1981).

4 On the control of public opinion after the Crimean War, see John M. Mackenzie, Propaganda and empire: manipulation of British public opinion, 1880–1960 (Manchester University Press, 1988).


6 Headrick, op. cit. (note 3), p. 19, traces the use of specially built gunboats to the Opium War of 1839–42. He believes that they secured the British victory in that war.


9 They had to build the ship as rapidly as possible because ‘the contract was taken with a penalty of £1000 a day . . . The work was pushed on night and day, no fewer than 1200 men being employed on her construction’. James Napier, The life of Robert Napier of West Shandon (W. Blackwood, Edinburgh, 1904), pp. 197–199; see also Crosbie Smith and M. Norton Wise, Energy and empire: a biographical study of Lord Kelvin (Cambridge University Press, 1989), pp. 786–787.

10 The Times, 19 March 1855.

12 Frederick Robinson, Diary of the Crimean War (Richard Bentley, London, 1856), p. 281. Place names in the Crimea appear in variant forms of spelling in documents and sources: Sevastopol or Sebastopol, Balaklava or Balaclava, Kadikoi, Kadekoi or Kadikoy. I quote names as originally written, but in my own text use the variants that are now generally employed: Sevastopol, Balaklava and Kadikoi.


14 Brian Cooke, The Grand Crimean Central Railway, the railway that won a war: the story of the railway built by the British in the Crimea during the war of 1854–1856 (Cavalier House, Knutsford, 1990), pp. 143–149.

15 In Charles Dickens, Oliver Twist, or The parish boy’s progress (1838), the eponymous hero famously asks, ‘Please sir. I want some more.’
The Times, 17 May 1855. Samuel Morton Peto, Thomas Brassey and Edward Betts built the Crimean railway and other works, including the Victoria Bridge in Montreal.

See a letter by James Beatty, Engineer-in-Chief, to The Times, 21 September 1855.

Robinson, op. cit. (note 12), pp. 292–293. ‘Kade-koi’ is a variant of Kadikoi, a village to the north of the port town of Balaklava.

The daguerreotype, invented by Louis Daguerre, required an exposure time of about 15 minutes. It was popular until the late 1850s but was not used in the Crimean War. The second process was William Henry Fox Talbot’s chemically based paper photography. His calotype process used the chemical development of latent image or negative, which was then used to print multiple positive copies. But the exposure time was still long. John Herschel introduced the words ‘photography’, ‘negative’ and ‘positive’, while making technical contributions to photographic processing such as the cyanotype process or ‘blueprint’. Frederic Scott Archer’s wet collodion process or emulsion plates in 1851 reduced the exposure time to about a minute and made photography outside the studio possible, but it still needed a dark room for the preparation of the plate immediately before the exposure. Roger Fenton, a very skilled and experienced photographer, used the wet collodion process in the Crimea, creating a positive image on glass instead of a copper plate (as for the daguerreotype). A glass negative was then used to make positive prints on albumen or salted paper. On photographic history and methods, see William Henry Fox Talbot, *The pencil of nature* (Longman, Brown, Green & Longmans, London, 1844–46); Walter Gernsheim, *The rise of photography, 1850–1880: the age of collodion* (Thames & Hudson, London, 1989); *Photography: origins, 1839–1890* (ed. Walter Guadagnini) (Skira, Milan, 2011). On the war as a visual spectacle, see Ulrich Keller, *The ultimate spectacle: a visual history of the Crimean War* (Routledge, Amsterdam, 2001), pp. 42–44; P. Hodgson, *The war illustrators* (Osprey, London, 1977).


Flâneur is a French word meaning ‘stroller’, ‘lounger’ or ‘saunterer’. It became popular through Baudelaire’s poetry and writings: a dandy, a high-class observer and an investigator of the modern city (Paris) and its street life, while remaining aloof. It then became a subject of literary study. See Walter Benjamin, *The arcades project* (ed. Rolf Tiedemann, and trans. Howard Eiland and Kevin McLaughlin) (Belknap Press, New York, 2002).

‘Lorette’ was a term for an elegantly dressed young woman, a courtesan especially of the Second Empire period, working in the area around the Church of Notre Dame de Lorette in Paris.


Helmut Gernsheim and Alison Gernsheim, *Roger Fenton, the photographer of the Crimean War: his photographs and his letters from the Crimea (with an essay on his life and work)* (Secker & Warburg, London, 1954).


Keller, *op. cit.* (note 23), p. 123. But Fenton had a ‘letter from Prince Albert’ (in 1854 he photographed Queen Victoria and the Royal Family) and he presented it to the British Embassy in Istanbul and officers in the Crimea to gain their assistance. See his letter to his wife, Grace Fenton, 8 March 1855, Fenton Letter-book.

For difficulties with wet collodion photography and the story of Fenton’s van, see Gernsheim and Gernsheim, *op. cit.* (note 36), pp. 14–20.


In a report from the war front in the Crimea around 18 October 1854, a week before the charge of the Light Brigade, William Howard Russell referred to ‘a road so exposed to the enemy’s fire that it has been called “The Valley of Death”’. This report and others appeared in *The Times*, where it was probably read by Tennyson, along with Russell’s account of the Light Brigade a week or so later. ‘The Valley of Death’ was then popularized in Tennyson’s ‘The Charge of the Light Brigade’, which refers to ‘the Valley of Death’ three times, as well as to ‘the Jaws of Death’ and ‘the Mouth of Hell’ twice each, clearly a reference to ‘the Valley of the Shadow of Death’ in Psalm 23:4 of the Bible. In reality, the charge of the Light Brigade did not take place in this valley, but on the plain near there (shown in figure 1). See William Howard Russell, *Russell’s despatches from the Crimea 1854–1856* (ed. and with an introduction by Nicolas Bentley) (Andre Deutsch, London, 1966), p. 114 and n. 1 on the same page. We do not know for sure if Fenton had read Russell’s report or Tennyson’s poem, but when he was in the Crimea, he knew about ‘the Valley of Death’ (see the quote from Fenton’s letter to his wife on 4–5 April 1855). The Tennyson poem became an immediate sensation, with copies being distributed among soldiers in the Crimea. It must be that when Fenton was in the Crimea he sought out the place as he knew that a photograph of it would have great public appeal. However, it seems that it was not Fenton himself but his sponsor Thomas Agnew who assigned the name ‘The Valley of the Shadow of Death’, using the full Psalmic phrase. Agnew named this photograph together with others when he was preparing them for an exhibition in the autumn of the same year. See Jennifer Green-Lewis, *Framing the Victorians: photography and culture in realism* (Cornell University Press, Ithaca, 1996), pp. 126–127. We know from Fenton’s letters to William Agnew that he sent home his negatives, especially large ones, without printing them because of technical difficulties, together with an explanation for each. See Fenton to William Agnew, 9 April 1855, Fenton Letter-book. He was carrying with him ‘five cameras of different sizes and several lenses, a stock of about 700 glass plates’, ‘several chests of chemicals, a still for distilling water, three or four printing frames, gutta-percha baths and dishes’. Gernsheim and Gernsheim, *op. cit.* (note 36), p. 15.
It is possible that the place originally did not have so many cannonballs and that Fenton then brought them there and scattered them around or at least rearranged the existing ones to add to the effect. He probably kept private the version of the Valley of the Shadow of Death with the road clear of cannonballs. It appears for the first time in the selection of Fenton’s photographs included in Gernsheim and Gernsheim, op. cit. (note 36), no. 51. A few years earlier, the Gernsheims had acquired Fenton’s own set of 360 Crimean War photographs, together with his letters from the Crimea.

Roger Fenton to Grace Fenton, 4–5 April 1855, Fenton Letter-book.


The Times, 17 December 1855.

The Redan and the Malakhoff or Malakoff were two powerful Russian forts before the city of Sevastopol, the base of the Russian forces. The Minié was a rifled musket developed by the French army captain Claude-Étienne Minié in 1847. It allowed quick loading and accurate firing. It was widely used in the Crimean War by the French, British and Russian armies. See Orlando Figes, The Crimean War: a history (Metropolitan Books, New York, 2010), pp. 118–279.

The Times, 17 December 1855.

Ibid.


On Szathmari, see Adrian-Silvan Ionescu, ‘Szathmári, a great documentary artist’, RIHA Journal 79, 1–79 (10 January 2014).

Baudelaire, op. cit. (note 27), p. 298.

Gillian Cookson, The cable: the wire that changed the world (Tempus, Stroud, 2003), p. 50.

The phrase is used, for example, in Vicki Goldberg, ‘Indelible images: when the shooting started’, Smithsonian Magazine 35, 23–24 (October 2004), at p. 23, but she does not identify its origin.


Although Russia showed interest in Morse’s electric telegraph in the 1840s, it did not adopt it until about the time of the Crimean War. Yakup Bektas, ‘Displaying the American genius: the electromagnetic telegraph in the wider world’, Br. J. Hist. Sci. 34 (2), 199–231 (2001) at pp. 208–209.

Werner von Siemens, Recollections (ed. Wilfried Feldenkirchen; trans. William Chatterton Coupland) (Piper Verlag GmbH, Munich, 2008; first published 1892), pp. 161–194, suggests that Russia was in the process of building electric telegraph lines in the years before the Crimean War.
Siemens & Halske worked at full capacity to meet the large Russian orders to extend its electric telegraph network from the Baltic to the Black Sea. By the end of the war Russia had the network extended to Sevastopol, shortly before the town fell to the Allies, and overall it boasted a national telegraph system of about 10,000 km. Siemens grew into a large company. Beauchamp, op. cit. (note 60), p. 103.

For example, see leading article, *The Times*, 7 November 1854, p. 6.

See ‘Memorandum: Conversation with Frederic Cadogan respecting his proposal to carry out telegraphic communication between the Crimea and London, 4 December 1854’, Earl Clarendon, 9 December 1854; Cadogan to Edmond Hammond, 13 and 22 December 1854. F097-414, The National Archives (hereafter TNA); for more details see *The Times*, 15 January 1855.

War Department to Lord Raglan, 12 December 1854. WO1/385, TNA.

‘Convention between Her Majesty and the Emperor of France, relative to the establishment of a line of electric telegraph between Bucharest and Varna. Signed at London, 1 February 1855 (ratified, 28 February 1855)’. F097-414, TNA.

The Ottoman government also sanctioned its first telegraphic line at this time, from Istanbul to Edirne, the principal Ottoman city in Europe. Built by French engineers, it was completed in time to relay the news of the end of the war. See Bektas, op. cit. (note 58), pp. 675–676.


The cable across the Danube was often out of order owing to injury caused by ships. For an account of these lines, see M. A. Biddulph, *Report to the War Department on the telegraphic communication from Constantinople through Vienna to England, and generally on the submarine telegraph service in the East* (War Department, London, April 1856); also *The Times*, 11 May 1855.

For a brief description, see Shaffner, op. cit. (note 59), p. 618.


After the war, the Ottoman government purchased the lines and equipment. See Bektas, op. cit. (note 58), p. 675.

Founded in 1846 by William F. Cooke and John L. Ricardo, the Electric Telegraph Company was Britain’s (and the world’s) first electric telegraph company, which merged with the International Telegraph Company in 1855 and became the Electric and International Telegraph Company. See BT Archives, Holborn, London.

Pieces of equipment from this line, including a cable wagon, are on display in the Royal Signals Museum, Blandford, Dorset.

See patent assigned to Ezra Cornell for ‘a new and useful machine for cutting trenches and laying pipes’, 28 February 1844. Division of Rare and Manuscript Collections, Cornell University Library.

Beauchamp, op. cit. (note 60), p. 106.

*Ibid*, 4 September 1854.


For a detailed evaluation see *The Times*, 21 May 1855.

An effective telegraph censorship was to be practised during the American Civil War (1861–65). See Richard B. Kielbowicz, ‘The telegraph, censorship, and politics at the outset of the Civil War’, *Civil War Hist.* 40 (2), 95–118 (1994).


General Simpson to Lord Panmure, Crimea, 1 September 1855, Panmure Papers.

For example, see Lord Panmure to General Simpson, War Department, 2 July 1855, Panmure Papers.

Lord Palmerston to Lord Panmure, Crimea, 22 September 1855, Panmure Papers.

General Simpson to Lord Panmure, Crimea, 7 July 1855 (original italics), Panmure Papers.

The report was quoted and partly published in *The Times*, 25 October 1856.

Keller, *op. cit.* (note 23), p. 10 (on *Punch* quote); on ‘Special Artists’, see esp. pp. 73–91.

For a brief account of the issues and interest the war raised in Britain, see A. N. Wilson, *The Victorians* (W.W. Norton, New York, 2003), pp. 175–200.

See, for example, Jeremy Page, ‘Heroes marked with the stamp of history honoured by the Royal Mail’, *The Times*, 12 October 2004.

For example, see ‘Latest intelligence (by submarine and British telegraph)’, *The Times*, 6 November 1854, p. 6. It lists several brief news items ‘from our correspondents at Marseilles, Paris, and Vienna’. It also includes news that ‘appears in *The Moniteur* this morning [Sunday]’.


This supports Marsden and Smith’s assertion that the advocates of the telegraph used ‘manifestos of promise’ to create ‘stable roles’ for their businesses. See Smith and Marsden, *op. cit.* (note 2), esp. pp. 179–180.

The estimates of the death toll for the Crimean War vary widely. John Sweetman, *The Crimean War* (Osprey, Oxford, 2001), p. 89, gives the total death toll for Britain (21,097), France (more than 100,000), Turkey (casualties not clear), Sardinia (2,050) and Russia (a minimum 110,000).

*The Times* referred to her as the person who ‘invented female nurses at Scutari as one discoverer invented the steam engine and another the printing press’. *The Times*, 15 January 1855.


I give the name as rendered in all British documents of the time and so known by all scholarly studies of it: Renkioi. ‘Kioi’ is ‘köy’ or village in Turkish. In 1924 Renköy became Erenköy, and then in 1947 Intepe, but in 2006 it reverted to Erenköy. It is located near today’s city of Çanakkale and the site of the ancient city of Troy.
transportation to Renkioi of the necessary ‘30 tons of light contractors rails and a few trucks or trollies’. Brunel to B. Hawes, 7 September 1855. WO 43/991 folios 76–77, TNA.

The Times, 30 January 1856.

The reporter concluded: ‘Never was a more successful work undertaken, and it will remain a matter of history that the first railway ever laid down in Asia Minor was on the plain of the Renkioi Hospital, and used as a transport for sick and wounded soldiers during the campaign in the Crimea’. The Times, 19 February 1856.


Based on Parkes’s report. Ibid.

‘Sale of the British Hospital at Renkioi near the Dardanelles’. WO 43/991 folio 239, TNA.


The Times, 29 January 1856. As the army fought during the winter, there arose an urgent need for winter coats, warm boots, masks, caps or balaclava helmets (probably so named only later), warm beds, tents, wooden huts, heating stoves, Soyer stoves (a novel cooking device designed for the Crimea) and special foods. All were developed or redesigned for the Crimean winter, and in many cases later became part of clothing and food culture.


The extent to which government shared with the public and press telegraphic news of the war needs further study. Stephen M. Harris, British intelligence in the Crimean War, 1854–1856 (Frank Cass, London, 1999), says hardly anything on the role of the telegraph in intelligence gathering.


‘European Submarine Telegraph’, Scientific American 10 (19 May 1855).