James H. Morrison

Wave to Whisper: British Military Communications in Halifax and the Empire, 1780-1880

64 History and Archaeology

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Cover: York Redoubt signal mast, looking up the harbour, 1837. (Public Archives Canada, C 18781.) From Lieut. R. Petley, *Sketches in Nova Scotia and New Brunswick* (London, 1837), pt. 2.

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4 Preface
5 Abstract
6 Early Communication Systems to 1790
6 Introduction
7 Beginnings: Fire, Flag and Reflection
11 Shutters and Arm Waving - 1790-1828
11 Perspective: Beginnings of Semaphore
12 Great Britain: Popham, Pasley and the Cutbacks
19 British North America: From the Duke to Gustavus
39 Sound Replaces Sight - 1828-80
39 The Whole Wired World
44 Great Britain: Military Theory and Practise
49 Halifax: Flags and Wires
69 The Spoken Word
72 Appendix 1: Polybuis' Communication System
75 Appendix 2: Admiral Popham's Land and Sea Telegraph 1816
77 Appendix 3: Description and Use of the Telegraph, Quebec 1809
81 Appendix 4: Signals Made in Halifax 1799
83 Appendix 5: Plan of the Halifax Telegraph, 1817
89 Appendix 6: Explanation of Signals, 1867
91 Communications Chronology
97 Endnotes
103 Bibliography

PREFACE

The following report on communications and weather observations was written in response to the need for background information to be utilized in preparing an exhibit at the Halifax Defence Complex. Due to the short span of time allotted for this study, all observations are of a preliminary nature. As the exhibit reaches completion, it may be necessary to sharpen the focus on areas for which the information in this report is insufficient.

ABSTRACT

From earliest times, man has attempted to perfect an accurate and rapid communication system to assist long distance communication. The last two centuries have seen rapid changes in this field. The beginning, if such can be traced, was the invention of the semaphore system in France during the 1780s. Various experimental flag systems were attempted. Within the British Empire, Halifax played a prominent part in the development of the visual telegraph system in North America; a telegraph system was initiated by the Duke of Kent in the 1790s during his stay in Halifax.

With the defeat of Napoleon in 1815, military interest in communication systems declined. The electric telegraph, however, sparked renewed interest as Britain proceeded from the industrial to the electric age. The military, although hesitant in utilizing the various telegraph systems, eventually found them valuable. They were particularly useful in the coastal defence fortifications of the empire. In Halifax, an intricate military visual telegraph was in place to maintain constant communication with the outforts and the harbour mouth. Thus as the electric telegraph became widely accepted the army had one installed in the Halifax defence system by 1869. As a result the Citadel flags became merely a tradition and, almost a century after the visual telegraph had been introduced by the Duke of Kent, they were discarded. Yet, the Citadel remained the communication centre it had always been. By 1900 instead of a visual telegraph system, the Halifax Citadel controlled a web of telegraph and telephone wires to the outforts.

Submitted for publication 1979, by James Morrison, St. Mary's University, Halifax, N.S.

EARLY COMMUNICATION SYSTEMS TO 1790

Introduction

The most rapid means of communication known to man is speech. When used effectively, speech is the fastest way of merging thought and action, while at the same time conveying the necessary information in a concise and coherent form. Despite these obvious advantages, speech has one serious drawback; it is limited by the range of the human ear/voice. Once beyond the hail or shout of a speaker, the voice ceases to be the most efficient medium of communication. Thus, a gap of various dimensions is created between the two communicants which must be bridged by some other accurate and rapid means. The history of communication before 1900 can be summarized as man's search for a communication method that would duplicate as nearly as possible the voice/ear process called speech. The culmination of this quest was reached in 1876 when Alexander Graham Bell spoke to his assistant Watson with the aid of an amplifying device that reproduced his voice. The last century of man's electric virtuosity has seen the invention of wireless, television, radio and a world girded by communication satellites. This, in the long term, has simply been a refining of the voice/ear process which Bell developed and has led to an ever wider dispersal of electronic communication to other parts of our world and beyond. Our well-wired globe is in a golden age of instantaneous communication when thought, word, and deed are literally fused by an electric impulse.

Before the telephone brought this final refinement to communications, man had devised a whole series of systems - sound and sight - mechanical and electrical - to fill the vacuum between transmitter and receiver. Flare, fire, flag and reflection were all utilized as mediums to convey vital information to a visible relay station or terminus beyond the range of the human voice. The homing pigeon was occasionally used to send messages which could not be transmitted by audible or visible means. It was not, however, until the electric telegraph in 1835 that sound, albeit in some form of audible code, could be received the instant it was sent over long distances. It was of enormous immediate value to political and military strategy. The social and economic repercussions were to be felt later. The windows of the nations of the western world were thus opened to each other and this aroused in some the hope for a more peaceful world community. For many others, it brought dreams of a wider far-flung empire strengthened immeasurably by rapid communications. Ironically, as communication devices became more sophisticated, there occurred a rapid fragmentation within the various

empires and an eventual disintegration into nation states. This, however, has to do with the history of the 20th century and does not concern us here. Initially, what we now think of as communications was very simple and, as is typical for the human record, the development of communication up to the 20th century is marked by combat and war - that flourishing seed-ground of man's inventiveness. Let us turn then to the beginning of non-verbal, long-distance communication.

Beginnings: Fire, Flag and Reflection

The historical record of mankind is not replete with references to communication or communication systems and where references do exist they are usually concerned almost entirely with warfare. Even then, the historian is fortunate to discover them although they are usually nothing more than allusions. The use of communications as a device of military tactics or even in terms of overall strategy appears to have been very limited. What does appear to be certain is that the documented systems of communications were many and diverse. Around 2,000 B.C., the Chinese were using carrier pigeons to take messages to the provinces. Beacon fires were used in the 12th century B.C. by King Agamemnon during the Greek siege of Troy. The sun's reflection on a polished surface, the principle of the 19th century heliograph, is referred to in the writings of Pythagoras in the 6th century B.C. Two hundred years later, the random communication methods began to be systemized. The speed and amount of information that could be sent was increased by the development of a code system by Aeneas the Tactician in his book *Art of War*. Unfortunately there is very litte information available about Aeneas' system. Much more is known of the communication system devised by the Roman tutor Polybius in 170 B.C. He suggested a means of communicating visually using torches or symbols in a code that was visually understood by both the transmitter and the receiver (Appendix I). His system revolutionized signalling for it utilized alphabetic signalling thus creating an infinite number of messages. For the first time, the transmitter could send, albeit in a laborious and time-consuming way, a complete request literally spelled out. This meant that a greater number of different messages could be sent although these would take longer than the short pre-arranged codes already noted. The Polybius system could be adapted to be functional with sound and could be used for both day and night signalling. There was no signalling system of comparable complexity until the late 18th and early 19th century with the invention of the semaphore and electric telegraph. One unfortunate flaw in the Polybius system was its limited range, for it was dependent on the perception of the human eye and in many instances repetition was necessary. This novel invention by a Roman tutor was missing one key element to be a complete success - the telescope. This piece of technology would not be developed for another 1700 years. The complex code of sight and sound developed by Polybius passed into oblivion for almost 1000 years together with much of the wealth and knowledge that the Mediterranean civilizations possessed,

leaving Europeans of later generations to recover and rediscover what had been lost.

The use of flags and pennants as a signalling method reappeared in the documents in the 14th century A.D. in a setting which was and is the most advantageous for this method of cummunication - at sea.

> ...in England flag signalling had long been in vogue in a more or less plain and simple manner, the earliest codes being found in the "Black Book of the Admiralty," and dates from about 1340.[1]

By 1800, visual communications had reached a sophisticated level and the development of the flag and symbol hoist method used by the Royal Navy in England eventually had its affect on the armed forces of Britain. In the 14th century, however, it was at a very early stage and not utilized in either the complex coding or alphabetical system later developed. Certain flags when displayed on the various masts of the ship signified specific instructions. For example, there was a "banner of council" flown by the admiral if he wanted the captains to meet with him on his ship.[2] Merchant ships also displayed in a prominent place on their main mast the coat of arms of the town in which the ship's owner lived. This was known as the "port" flag. The rise of the nation states in the 16th and 17th centuries would complement and in some cases replace these flags with national flags. Coded flags and pennants eventually became an important part of the panoply of the merchant and naval fleets of the western world.

The invention of the telescope in the early 1600s by Lippershey and, a year later, Galileo, led to increased use of visual communication. It provided the receiver of a message with a much greater depth of vision which, in turn, allowed the signals to be sent a greater distance. Visual signalling, to be most effective, requires two simple conditions - clear weather and an unimpeded line of sight to the next signal station. The latter was the more difficult to obtain and a high tower had to be constructed if the terrain was wooded or had other obstructions. Many European towns constructed watch towers on the sea coast to warn villages of the approaching enemy. In the many coastal towns of Italy a watch tower or "torri di martello" was constructed in which a bell was struck with a hammer (martello) when the community was threatened.[3] Land communications, due to the above problems, were simple and did not reach much beyond the immediate village. There were, however, a number of more sophisticated methods developed which harkened back to previous communication systems.

In 1551, the Italian mathematician Gerolamo Cardano suggested that five torches on five towers could be used to spell out messages in an alphabetical code system similar to that of Polybius.[4] This rather complex innovation, however, found little favour. In Britain, at this time a much simpler system was adopted. This consisted of flashing solitary signals with fire and flag in case of attack. In 1569,a signal house was erected in Portsmouth, England. A system of beacon towers was established which served to warn England of the Spanish Armada in 1588.[5]

Despite these early efforts, the most rapid means of communication within and between European towns was as old as Mercury, the Roman messenger of the gods. For land communications, a man on horseback or on foot would have to suffice.

As the "age of discovery" became the age of European expansion, the oceans of the world became an enormously important means of reaching the new lands. Thus, control of the sea meant control of the colonies being planted wherever the Europeans had time to raise a flag before being driven out by the indigenous people. Each European nation became very dependent on its naval and merchant fleets to safeguard its imperial interests. Not surprisingly, much time and effort was expended on technology applicable to ships. One of the fittings that received considerable attention was the method of communication.

Before the development of the electric telegraph early in the 19th century, the greatest advances in visual communications were made on the sea. To quickly deliver an urgent message from one ship to another or from ship to shore involved a more complicated procedure than simply sending a messenger in a small boat. Other means were required. Fortunately the sea provided a much better setting for visual communication as it had a clearer atmosphere and the view to the horizon was not impeded by anything except the heaving sea. Thus a signal flashed from ship to ship by flag or fire could be relayed enormous distances very quickly. It would undoubtedly be faster on a clear day to send a message by ship along the coast than by way of the coastal signal stations. With so few encumbrances, sea signalling, although initially quite primitive, enjoyed some success and the invention of the telescope during the first decade of the 17th century increased its utility considerably. In the 150 years that followed, the use of signals by ships, both naval and merchant, became more frequent and more complex.

The European nations between 1600 and the last half of the 18th century, were being transformed by a period of expansion and then consolidation. They squabbled incessantly over the new lands claimed and conquered and the period is distinguished by the efforts to establish and maintain colonies by force of arms. Not surprisingly, the confrontation of European warships was constant during this period. The nation with the most efficient fleet would prove superior. As tactics became important and ships went from the simple process of ramming to coordinating their offensives, the accuracy and swiftness of communications became vital.[6] The first attempt at a regular code was made in 1665 and attributed to Sir William Penn.[7] Before this time only a few reports or stated orders could be transmitted by a signal system of lights, guns and flags. By 1715, the first unofficial attempt was made to introduce a regulation signal book into the English Royal Navy by Jonathan Greenwood. His proposal was not adopted generally. Some 60 years later, signalling was still being done as it had been for centuries before, that is specific flags were raised on various parts of the ship to signify a communication.[8] The only difference was the increasing number and variety of flags being raised.

The last half of the 18th century is a period of immense importance to the history of Canada and the British Empire. The final conquest of North America by the British and the subsequent loss of the American colonies some two decades later, together with the French revolution of the 1790s mark a turbulent 50-year span. Perhaps not coincidentally a revolutionary change took place in the communications

systems on both land and sea. Generally, war had become less defensive and victory usually went to the army or fleet that took quick and decisive action, and required rapid communication.

Between 1780 and 1783, a new plan of communications was devised which would eventually replace the positional flag system described above. The new system was attributed to a Mr. McArthur, secretary to Lord Hood who commanded the British fleet in the West Indies. It consisted of using more flags and showing them in various combinations.[9] The combination of flags (four at a time) would mean that a greater number of signals could be sent. It also led to a rather large version of the signal book which became in effect a detailed code book of numbers. As with so many other innovative ideas, it was some time before McArthur's signals were considered and utilized. Finally, a system emerged in the early 1790s that was a fusion of the codes devised by McArthur, Admiral Kempenfelt and Lord Howe.[10] This remained unchanged for over a decade when, just before Trafalgar in 1805, a code devised by Sir Home Popham was introduced. It became the basis of the present marine signal system used throughout the world.

It is important at this point to clarify precisely the type of system proposed in the 1780s. It evolved as a product of its immediate surroundings, that is a system that could be adapted to a ship with a heaving deck, swaying masts and confined space. It was found by McArthur that the most feasible method was a combination of four flags at a time for there was little space for more. When the combinations were limited to four flags per hoist, it was very awkward to signal rapidly any message using alphabetic signalling, for many times one word would require two or even three hoists. Thus a code book and number system was devised which would make the transmission quicker and easier. This marine code system was utilized throughout the 19th century and used extensively by the fleets and coastal stations within the British Empire.

Coincidental with the refinement of the marine signalling system was the development of a rapid and accurate land communication system. Flags, balls and mechanical arms were the mediums by which messages were transmitted using alphabetical or code signalling called semaphore. Revolutionary France of the 1790s was to give birth to a manual system of visual communication still being used today. This and other systems will be examined in some detail in the next chapter.

SHUTTERS AND ARM WAVING - 1790-1828
"He can be informed of any occurrence
in five minutes by telegraph ..."

Perspective: Beginnings of Semaphore

As the 18th century in Europe wound down to a rather violent end, there was awakened in both invididuals and governments a much greater interest in establishing a rapid and efficient means of communication. Sea signalling had been modified greatly during the 1780s and now the focus of attention shifted to an improved land communication system. The result was a multiplicity of similar systems, both manual and mechanical, that utilized the three basis principles of permanent visual transmitting devices. The first was a position of sufficient altitude to be seen clearly from great distances; the second a system of moving parts so that the signal could be varied and finally the establishment of a series of transmitters and receivers arranged in sequence in order that the message could be sent quickly to its destination. By the 1820s the navy had adopted a signalling system that would complement their flag waving, the army was experimenting with a navy system of balls and pennants, the first commercial semaphore network was in operation and, most importantly for the purposes of this study, the system instituted in Halifax in the mid-1790s by the Duke of Kent was still intact. The colonies in British North America during the first 25 years of this period fully realized the importance of a rapid communications system particularly with the Americans in 1812 only a flag wave away.

Invention begins in clumsiness. Land communication contraptions are no exception. With a primitive model to refine and given some ingenuity, a new device begins to take shape and, eventually, stripped of its awkwardness after many changes, it becomes an effective tool. Visual signalling despite its simplicity seems to have taken longer than most.

In 1684, the Royal Society in London was witness to the presentation of the first alphabetical land signal system. Robert Hooke, chemist, physicist and inventor had devised an optical telegraph system consisting of wooden letters and symbols. These were hung on a wooden frame in a pre-arranged order. The hieroglyphic-like letters were large enough to be read from a distance either with the naked eye or a telescope. The Royal Society was not impressed. The raising and lowering of the large letters hooked to the frame, was not one of the more rapid methods of sending a message over a short distance. The letters were heavy and the process slow. Thus, this early alphabetical system, which Hooke published on his own in 1726 after some

alterations, did not gain widespread acceptance. The use of letters for spelling out messages was considered impractical and by the first half of the 18th century symbols and codes appeared to be the quickest means of land communication; such a rationale had already been exhibited at sea.

The best communication system based on this precept came from France half a century later. It utilized a code system with an easily altered signal device. In 1793, a besieged French government commissioned Citizen Claude Chappe, Ingénieur-Télégraphiste to construct a rapid communication system between Paris and Lille, a distance of about 150 miles. France was surrounded by the armies of Prussia, Britain, Austria and Spain and the government required an efficient means of communicating with the provinces to coordinate their defence against the armies. Chappe and his brother Ignace were responsible for inventing a method. After initial failures with a device very similar to that of Robert Hooke, the Chappe brothers designed a tower with moveable wooden arms which when manipulated could send 196 possible signals (Fig. 1). This was the progenitor of what today is known as the semaphore, or "sign bearer." The first message sent on the Chappe device was transmitted 15 August 1794 announcing that the government forces had retaken LeQuemay. Needless to say this message by semaphore arrived somewhat more rapidly than if it had been sent by messenger. The transmitting time from Toulon on the Mediterranean Coast to Paris (425 miles) for one signal was 40 minutes or roughly an hour for a message of 50 signals. This represented a speed 90 times as fast as that of mounted couriers.

Semaphore lines were soon fanning out from Paris in all directions. Like a central switchboard, the Paris government was soon receiving orders from and sending orders to the war zones on its frontier. It is not known how much bearing this had on France's eventual victory but it must be surmised that such contact played a positive role.

By 1805, Claude Chappe, France's first "télégraphiste," was dead. However the communication system he invented was to last throughout the first half of the century and spread well beyond the borders of France. His semaphore stations were not finally closed down until 1859 when they were replaced by the electric telegraph. By then the semaphore of Chappe comprised a total of 556 stations and covered a distance of more than 2500 miles.

Great Britain: Popham, Pasley and the Cutbacks

By the fall of 1794, a few months after Chappe's system was successfully tested, England was expressing considerable interest in a telegraph system of its own. A clergyman, Lord George Murray, presented a variation on the Chappe semaphore to the admiralty. Based on a Scandanavian model, Murray's method consisted of a grid of wooden shutters that could be opened and closed in various patterns when a message was to be transmitted (Fig. 2). Six solid wooden shutters were

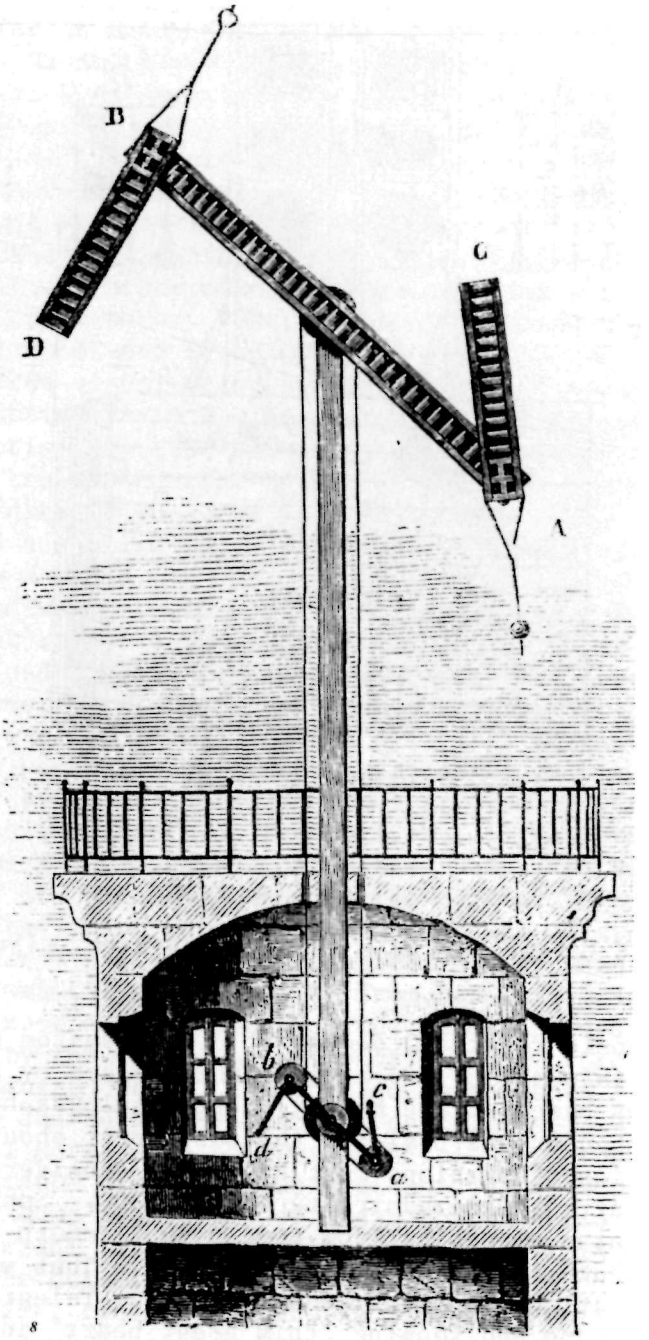


Figure 1. The Chappe brothers' telegraph structure. (Public Archives Canada.)

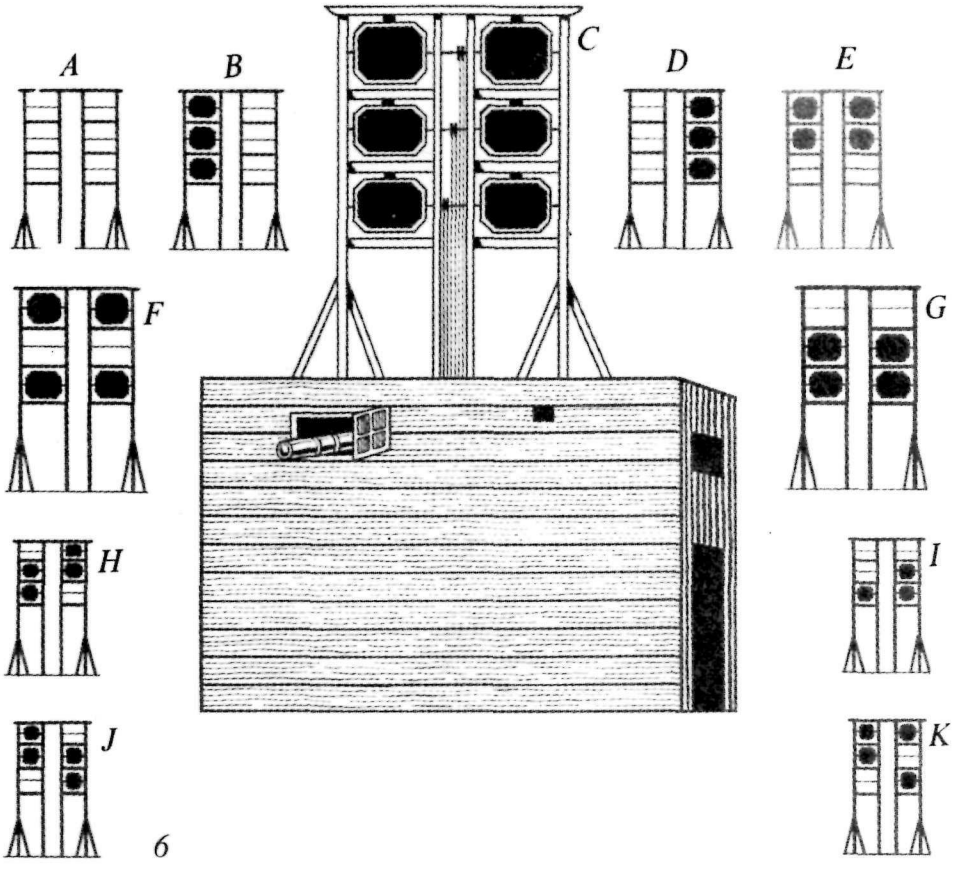


Figure 2. Lord George Murray's telegraph system. (Public Archives Canada.)

used and these could rotate 90 degrees. A code system was devised and London could be informed of any attack from the sea by telegraph. A chain of stations based on the Murray shutter telegraph was quickly erected between London and Deal, on the east coast about 70 miles from London. The series of stations must have been considered quite essential for they cost the admiralty over £4,000. Soon there were other shutter chains emanating from London to Yarmouth on the east coast and Portsmouth and Plymouth in the south. Thus was established a line of signal stations, on what became known as Telegraph Hills, radiating from London and keeping "this great heart" in touch with the events on the coast. The telegraph system was not only used for notification of the approach of enemy ships but also the arrival of friendly merchant vessels. Murray's idea spread to the United States and a number of towns set up an exact copy of his shutter telegraph. The merchants of the U.S. now had their own "Murray line." The one between New York and Philadelphia lasted until 1846. By mid-century the English lines were closing up as well, with the London-Portsmouth visual telegraph being shut down in 1847. In that year the electric audile telegraph replaced the manual optical telegraph as it had done elsewhere.

The commercial electric telegraph was a marvel to 19th century merchant masses for it meant that messages could be transmitted instantaneously. No doubt the visual telegraph in the early part of the century aroused even more awe. It should be remembered that early 19th century England had few paved roads, no mail service to speak of and the steam engine had yet to be applied to locomotion. Although the steam boilers were in industrial operation by the 1780s, the application to boat and carriage did not occur until the first and second decade of the 19th century. The speed of the visual telegraph when compared with any other means of communication was viewed with amazement. In a contemporary description it is noted that a single letter could be transmitted from London to Plymouth and back in three minutes which by the visual telegraph route was 500 miles. The rate of progress of the letter was 170 miles per minute or three miles per second. Not surprisingly, the author noted the message travelled "... with a rapidity, truly wonderful!"[1] Such speed for a single letter or symbol enhanced the value of a code as opposed to an alphabetical system. Why send a spelled-out message when a simple symbol could transmit the same message.

Such a system was not without its disadvantages. For example, a signal station was required every seven to nine miles and these had to be manned by trained personnel and provided with the necessary equipment. The numerous stations were obviously wasteful of manpower. Due to the expense of operating it, the system in England was not accessible to the general public. (Chappe, ahead of his time in financial matters as well, had solved this problem by linking his semaphore to a public lottery.) The English telegraph was used exclusively by the government for defensive needs. A third factor that mitigated against its value was the adverse weather in England. In many cases, the station on Putney Heath which communicated with Chelsea, was rendered useless by the easterly winds when the valley of the Thames River was filled with smoke from London.[2] Faced with these obstacles, most notably expense, the telegraph systems were invariably built by the state and only for the use of those agencies of the state that required them. Germany had established a state telegraph by 1833 and Russia by 1838. Ironically this was in the same decade that Samuel Morse developed his electric telegraph code which made the long-distance visual communications systems superfluous. By 1827 Britain, the most prosperous of the European nations, had developed a commercial line of visual telegraphs. This will be examined in greater detail in the next chapter.

During the first two decades of the 19th century countless plans of signal systems were being submitted to the British government, usually the admiralty for approval.[3] With its long sea tradition, the communication systems adapted in Britain were applied to both land and sea. It becomes very difficult to differentiate where one ended and the other began. Within a decade the land system invented by Chappe was adopted and altered with the hope that it would replace both Murray's land system of shutters and the flag hoist method used at sea. The instigator of such a change was of the sea himself - Rear Admiral Sir Home Riggs Popham.

Popham designed two systems, both flag- and arm-waving semaphore

which could be used on land and at sea. His systems are remarkable for their longevity in the service of the British Navy. The first edition of Popham's book, *Telegraphic Signals*, was produced in 1800.[4] His publications continued under his name and his system was first used during the Battle of Trafalgar (1805). By 1812, Popham had improved his vocabulary considerably by using alphabetical as well as numerical flags. This means that the vocabulary of a three- or four-flag hoist could be increased to 30,000 words. In 1816, the British Admiralty published Popham's manual under its auspices as an official publication and therefore applicable to all Royal Navy vessels. A year later Captain Frederick Marryat adopted the Popham system for the merchant marine. On land the Popham semaphore had begun to replace the shutters of Lord Murray. Popham died in 1820 but his communication systems continued well into the 20th century when they appeared still under government sponsorship in the book *Vocabulary Signal Book*.

Popham's mechanical system with a few simple alterations in structure and code could be used on land and sea (Appendix 2). Due to its height, the signal pole could not be rigged on a man-of-war and therefore two poles were used instead with a signal arm on each.[5] Nevertheless, this set-up was awkward for it meant that two men would be necessary to work it, one on each pole. The ultimate manual semaphore machine, most similar to what is used today, was finally produced by one of the Royal Engineers. He provided the Royal Navy with that which His Majesty's Army was not to have for another half century - an efficient, rapid and accurate signal system.

Charles William Pasley was born in 1780 and after an undistinguished childhood, joined the Royal Engineers in 1798. He had always, according to him, expressed an interest in signalling and throughout the first two decades of the 19th century laid claim ad nauseam to inventing the ultimate semaphore system with barely a mention of the Chappe system in France.[6] Pasley stated his discontent with the existing telegraph systems at an early age (24) and urged that they be replaced with his. He sent a number of his schemes to various personal acquaintances in the navy and army but elicited little response. Eventually in 1807, he was able to lay his scheme before the Admiralty Board. Again he was rebuffed and now rather desperate he approached the London Society of Arts. They were not enthused by his creation either. All of the above showed eminent good sense. If one examines the first Pasley system, bearing in mind what has been said about the difficulties with the manual telegraph, the rejection of Pasley's contraption may be better understood.

> The scheme was to have a row of no less than four machines of the type of to-day. The arms were to be 6 ft. long, so that when all were extended horizontally in the modern position R, the contrivance would occupy 40 ft. laterally. Very few telegraph stations were likely to have this amount of roof space, so Pasley laid down that the two outer posts might be erected on a kind of gantry.
>
> One operator was to work two machines, one with each hand, and there was presumably some system of remote control, otherwise a man would have to stretch across a

> span of 13 ft. between the posts. The arms were worked with a kind of wheel and ratchet arrangement, and when a sign was finished the ratchet could be disengaged, and the arm closed automatically of its own gravity. Another gadget prevented it from waggling when closed. Further, the arm was compensated by means of a counterpoise rod prolonged in the opposite direction, so as to give the operator the least exertion.[7]

The British government did not have the money, personnel or patience for such a contraption.

Pasley continued revising his "pleasing speculation" and reduced the number of signal posts from four to one. Utilizing the ideas of Popham and others, Pasley invented a single communication post on a pivot with only two arms, one on each side. Such a device needed only one man to operate it. Finally in 1827 the Pasley system due to innovation and persistence was accepted by an admiralty committee, which had been established a year previously to review the signal methods of the Royal Navy. Their findings were conclusive.

> Instead of the present Sea Semaphore, we propose the semaphore of Colonel Pasley, recommended by Vice-Admiral Harvey. We think his plan of working the arms on one pivot preferable to having two separate posts. The single post with the arms on the same pivot can be worked by the same man, and the mistakes which arise from the use of two posts, by the ship changing her position during the communication of the message, are avoided by his indicator.[8]

The Pasley system became a permanent part of the British Navy. However, the army took much longer to be convinced of the latest Pasley device, which was semaphore at its simplist. One can only wonder why it took so long for a contrivance to evolve which in the end resembled a man waving his arms in a predetermined pattern. Perhaps it was all too simple!

Despite the introduction of this semaphore system, other means of communication were still of value. At sea during this period (1800-25), the most important mode of exchanging information was still a series of coded flags raised on the most prominent part of the ship - the main mast, and read with the aid of a detailed code book. This system of efficient signalling provided the British navy with a capability it had not previously possessed for it enabled fleet commanders to disregard the antiquated pre-set and rigid battle formations of the past and undertake elaborate, flexible yet controlled naval tactics.[9] A good example of this is provided by the tactics of Lord Howe who engaged and defeated the French fleet in 1794. As accurate flag signals became more significant during the Napoleonic Wars, some one had to assume responsibility for the various signalling duties. By 1816, a "Yeoman of Signals" was appointed and a group of men were organized under him for signal duty.[10] This does not mean by implication that there were no signalmen previous to 1816, nor that communication was a haphazard operation. In fact the naval communication methods were held in such repute that one system was adopted by the Duke of Wellington for land use in another of Britain's interminable struggles with France - this time the Peninsular War.

In order to defend Lisbon in 1810, and stabilize the British retreat in Spain the Duke of Wellington erected a string of defensive positions which became known as the Torres Vedras. To coordinate the activities in these positions, rapid communication was vital and a semaphore system was set up which allowed messages to be "flagged" from the Atlantic Ocean to the Tagus River (25-30 miles) in seven minutes.[11] To man this system Wellington called on the Royal Navy to supply a party of seamen specializing in communications and their necessary accoutrements. It is with this innovation that one sees a melding of land and sea communications fused by the necessities of war.

By October, 1810, the lines of Torres Vedras were reported as complete.[12] A vital component of these lines was also completed: the signal system, which was noted as being rapid and precise.

> The position and working of the signal station were also perfected, and a party of seamen, supplied by the navy, now passed and received intelligence from one extremity of the line to the other in seven minutes, with undeviating accuracy....[13]

An auxiliary system, using Popham's principle of arm telegraphs, was constructed in Lisbon and placed at each port in case the masts or yards of the main telegraph were damaged. Wellington had directed that the main signal posts should be erected on the hills of the front line from seven to eight miles apart. Thus there were five principal stations each manned by a party of Royal Navy seamen. Flags and pennants which would shift in the wind were not used. Instead black balls, probably of canvas, were hoisted and suspended from the yard-arm of the mast. The vocabulary used was that of the Royal Navy although some sentences and expressions from the land service had been added.[14] This was probably due to the need for expeditious sea-land communication between fleet and army and the fact that the land communication systems were not as developed as those of the navy.

Wellington's communication system on the Torres Vedras was all very well in theory and definitely very necessary but there were problems - problems with material and personnel common to almost all early signal systems. The seamen claimed that the distance between stations was too great, the range of telescopes insufficient and the yards too heavy for the masts.[15] In fact, two masts sprung not too long after they were erected. The most serious difficulty arose concerning personnel. In September of 1810, the Admiral of the Fleet decided to withdraw the seamen from their signal posts. Wellington thus had to find some alternative means of communication. Soldiers were considered, with two privates and a non-commissioned officer for each post. It was not anticipated that they would become very expert in the short training period available. Even retired Portuguese seamen were contemplated but a Portuguese telegraph system with a Portuguese language code could be disastrous. What eventually transpired with the communication lines along Torres Vedras is not clear. Many expressed some doubt about the whole idea, which may partially explain its rather rapid disappearance.[16]

The signal system used by Wellington and the Royal Navy seamen is of some significance for the purposes of this study and therefore

should be examined in greater detail. This would appear to be the first time the ball hoist system was used for such a purpose in time of war that far inland. The ball hoist method was common at sea or along the coast. The army did not possess an efficient communications system of its own in 1810 and had to rely upon and adapt to a system provided by the navy. The use of this ball hoist operation implies a number code much like that outlined by James Kempt in British North America in 1808 (Appendix 3). Such a system entails a far simpler method of operation than using a mechanical arm telegraph or raising a large number of coloured flags. Because of this, it was undoubtedly the quickest way to proceed for all one needed was a black object of sufficient size to be seen at a distance in order to transmit a signal.

When and how the ball hoist system and its accompanying code book evolved is not known. It was very different from the arm and flag waving methods and the other more exotic attempts at communication[17] that had gone on in the late 18th and early 19th centuries. As with the above-mentioned systems it was used at sea as well as on land. Sutcliffe notes that the Martello towers on the south coast of England functioned as signal stations commencing in 1812.

> Naval and military messages were transmitted from Seaford in Sussex to Lympne in Kent by means of a union jack and three black canvas balls hoisted on a flagstaff mounted on the roof above the door.[18]

Within a decade the ball hoist method in Sussex had been replaced by the mechanical semaphore. The Sussex to Kent line appears to have been rather less complicated than the systems employed at sea but it was nevertheless very representative of coastal stations. This line and others like it illustrate the coastal signal systems which existed in Britain and throughout the British Empire during the Napoleonic war. Commander H.P. Mead in his article "The Story of the Semaphore" notes almost as an aside the existence of coastal signal stations established before 1805. These stations built throughout Great Britain and Ireland utilized a system of balls and flags to communicate with the men-of-war at sea. By 1810, the changeover to the three-armed and later two-armed mechanical semaphore device was beginning to take place.[19] The ball hoist method which had been a much touted part of Wellington's defences soon became obsolete, at least in Great Britain. Elsewhere in the Empire the ball hoist method had found favour as early as the 1790s.

British North America: From the Duke to Gustavus

In 1795 the citizens of the busy and increasingly important port of Halifax, Nova Scotia were entertaining royalty. Although not yet a half century old nor able to boast a population of more than 4,000 souls the settlement was about to become the most important military and naval base in British North America. Prince Edward, Duke of Kent would see to that. He was preparing plans to rapidly modernize the

Halifax defences and no effort or expense was to be spared. Edward was quite prepared to supply the energy, prestige and ideas to build the most modern defence complex the British taxpayer's money could buy. This by definition would have to include an efficient communications system.

The Halifax of the 1790s had already been deeply involved in two long wars in its brief, 40 plus, years of existence. The Seven Years War (1756-63) and the recently ended American Revolution (1776-83) had aroused a flurry of concern for the city's defence. This, however, quickly subsided due to a lack of sustained financial outlay from Britain. There was a profound difference, however, when the maelstrom of the French Revolution brushed this placid and isolated corner of the Empire. Having just recovered from an influx of Loyalists in the 1780s, Halifax now had to survive the ambitions of a very royal and very military personnage whose intent was to move heaven and earth (in this case the top of Citadel Hill) in order to transform the settlement into the most modern of military bastions. Throughout the French revolutionary wars and much of the Napoleonic wars that followed, Halifax was never in any real danger of being attacked. This may be due to Prince Edward's exertions or perhaps it may be judged as a commentary on Halifax's lack of strategic importance[20] within the Empire. However, there was always the new military danger from the south, for the United States made threatening noises throughout this period until they finally made good their threats in 1812. The Duke of Kent's responsibility was to reinforce the Halifax defences and his efforts at communications systems are of interest in this regard. His life while in Halifax has been adequately dealt with elsewhere.[21]

In any approach to the topic of communications in Halifax, the geography of the settlement cannot be overemphasized. Edward Cornwallis decided on this site due to its sheltered and excellent harbour. Such a location could be defended more easily in case of any attack by land or what was more likely, by sea. Once the peninsula of Halifax was sealed by a line of blockhouses, the only way to reach an unguarded access point was from the sea. Thus any attack would most probably be a combined land-sea venture with the vital factor being the control of the harbour by a hostile naval force. In order to defend the city successfully the objective was to safeguard the harbour as extensively as possible against an enemy from the sea.[22] It was also essential to establish an adequate communication system to inform the defenders of any threat from beyond the harbour mouth. Although the evidence is scanty, it is likely that Halifax had a communication system of sorts established not too long after the city was founded. After all, St. John's, Newfoundland had a signal code, albeit a simple one, as early as 1705.

> When the lookout (Signal Hill) from either of the hills discovers any sails, they shall give notice by firing a Small Cannon or Paterero and hoisting the colours, if weather permit, and discharging as many musketts as sails shall be discovered, which shall be observed at the fort by hoisting the colours, and returning as many small shot.[23]

Some similar system was no doubt in operation in the planted settlement

of Halifax but what precisely it was is not known. It was most probably connected with the lighthouse built on Sambro Island at the mouth of the harbour in 1758. Surely a communication system would have been essential due to the threats from first the French and later the Americans and French during the Revolutionary War. Thus when Prince Edward, Duke of Kent arrived in 1794, a signal system was already in existence and connected quite closely to harbour activities. It was no doubt a simple symbol system much like that described in 1799, (Appendix 4) which utilized flags, balls and pennants. No numerical code was used nor was a complicated code book really necessary for the entirety of what was sent by this system dealt only with the size, origin and nationality of incoming ships. The Halifax Citadel in the 1780s had a single flagstaff and it would appear to have been used for elementary signalling of sorts (Fig. 3). By 1790 a second staff had been built (Fig. 4) but it is not clear what this was used for unless one wishes to speculate on the system of 1799 described above. It was left to the Duke of Kent to introduce a more intricate system that could be used well beyond the coast - one that could transmit much more complex messages. By 1801, the Citadel had yet another staff, making three in all (Fig. 5).

Prince Edward, fourth son of George III and later Duke of Kent (Fig. 6) arrived in Halifax in May of 1794 for a second stint in British North America; his first duties had taken him to Quebec.[24]

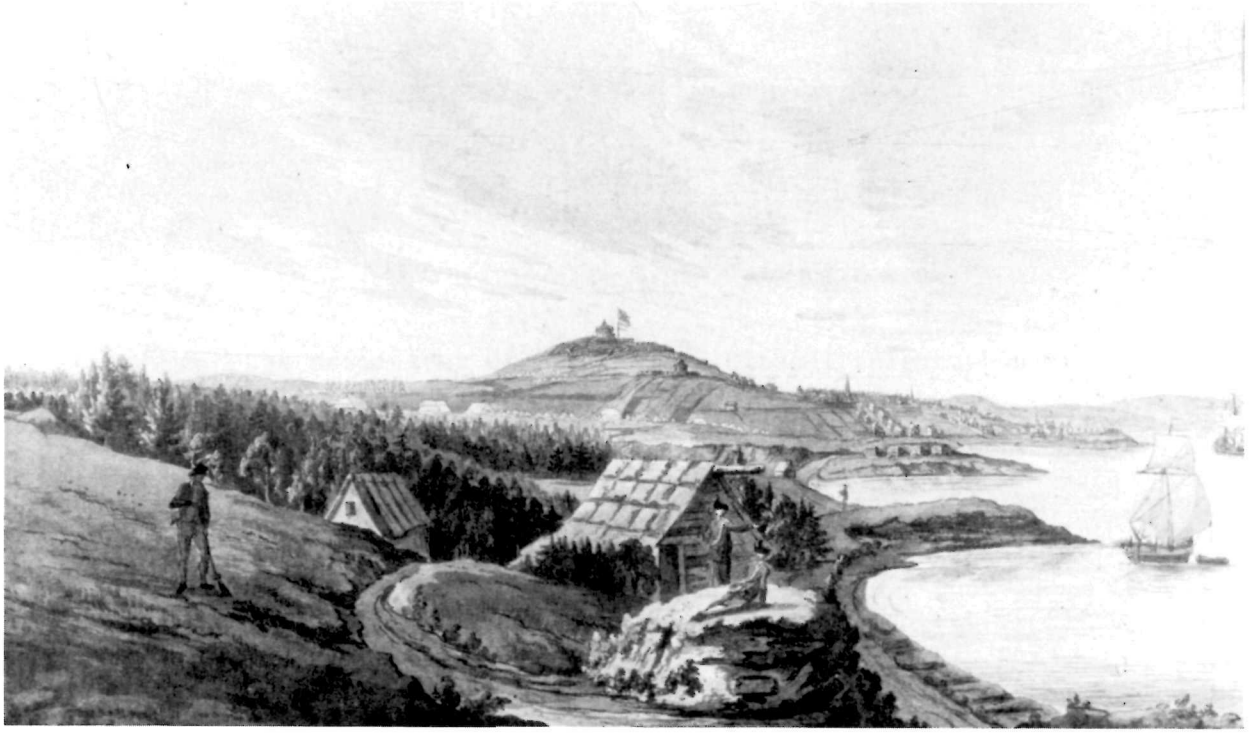


Figure 3. The Halifax Citadel viewed from the south ca. 1780. The ensign staff seems to be flying other signal flags as well. (Public Archives Canada.)

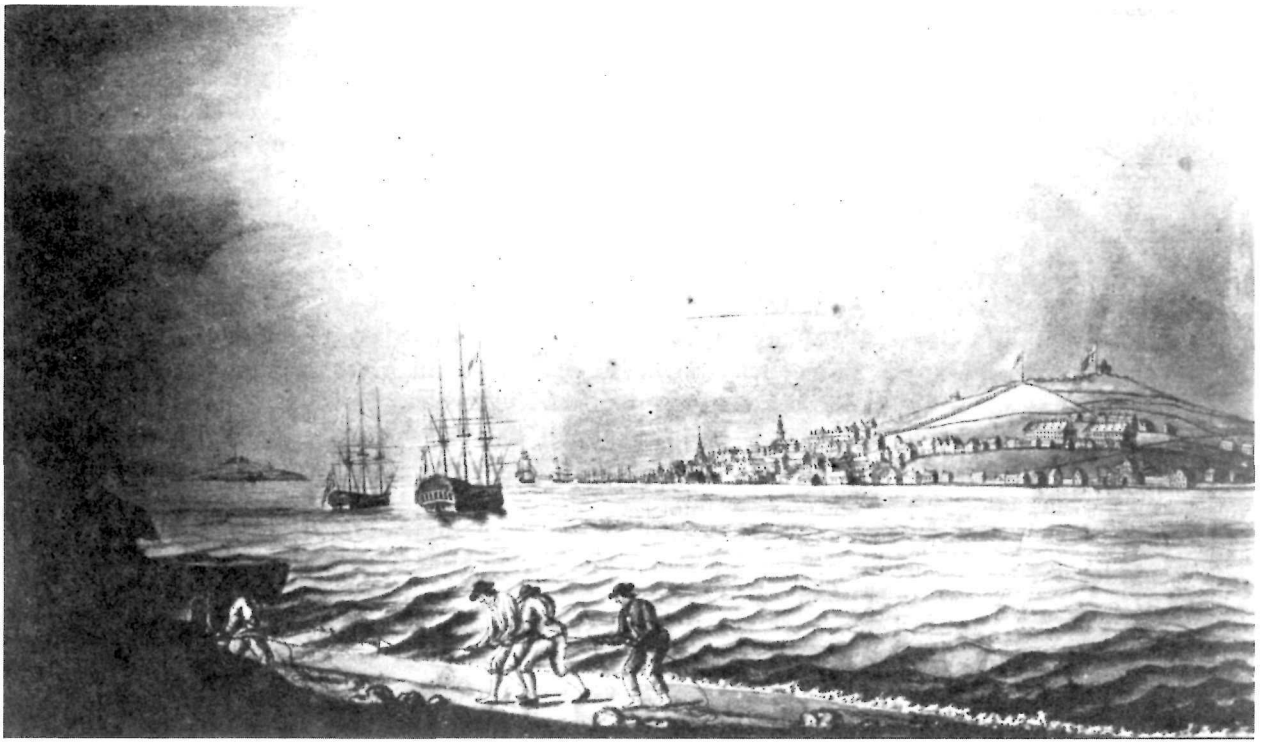


Figure 4. The Halifax Citadel viewed from the Dartmouth shore in 1791. Note the two flagstaffs. (Nova Scotia Museum.)

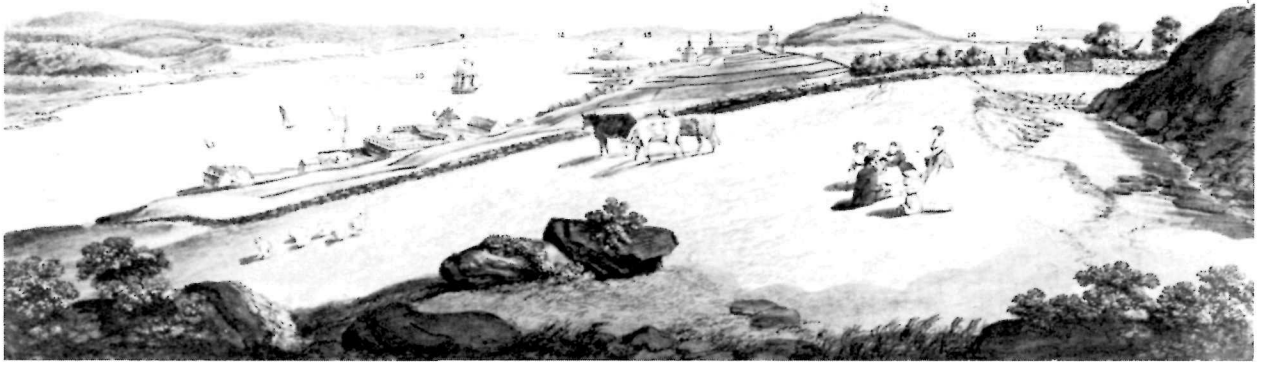


Figure 5. The Halifax Citadel ca. 1800. Note that three masts are shown. (Metropolitan Toronto Library Board, JR 2149.)

His Royal Highness
EDWARD DUKE of KENT, K.G. & K.ST.P.
Commander IN Chief
of HIS MAJESTY'S FORCES in NORTH AMERICA, &c. &c. &c.

Figure 6. The originator of the Halifax Citadel telegraph system, Edward, Duke of Kent.

Now, after a brief visit to the West Indies, Edward had arrived in Halifax to assume command of His Majesty's forces in Halifax. A year previous, the French revolutionary war had begun and Halifax was perceived as being quite vulnerable to any French fleet that chose to attack. Its fortifications, untended for a decade, had deteriorated rather dramatically. In 1795 Edward, with his considerable royal prestige, set himself and his troops the task of restoring and restructuring the defences of Halifax and thus making impregnable the only British Dockyard in North America. During his stay work was begun on the Prince of Wales Tower, Fort Clarence, Fort Charlotte and York Redoubt. Halifax soon had a completely revised defence system with the linchpin being the third Citadel built where the present one stands.

Named Fort George, for obvious reasons, the Citadel, by its very location, was a remarkable defensive structure. It commanded a view of the harbour and the sea approaches as well as the immediate land area and was the nerve centre of Edward's defensive system. Such a centre was of little use without the capability to communicate with the outposts. Edward's most important innovation for our purposes was the telegraph system he introduced centred at Fort George. Halifax now had two complementary signalling systems, one to regulate the harbour traffic and the other to direct the troops and the outposts. The former has been noted above and was a common system in the ports of British North America (Fig. 7). The latter will be examined next.

As noted previously, two manual telegraph systems for land had been devised in Europe in 1794. Prince Edward was probably famliar with their existence and had some knowledge of their mechanics. The system he introduced consisted of a code of flags and balls raised on the yard-arms of a flagstaff. These visual signals were not an innovation of Prince Edward's, although it is the first time they were brought to Halifax. Harry Piers, in his study, *The Evolution of the Halifax Fortress 1749-1928*, states that what Edward had introduced was a system of ball signals which the British had adopted in 1795.[25] He gives no justification for making such a statement. It would seem, however, given the enormous activity in the field of communications that the introduction of the ball signal system can be safely bracketed between 1785 and 1795 for it would appear to be a derivative of one of the systems already mentioned in Chapter 1. Who manipulated the system, what symbols they used and where the various telegraph posts were located have all been documented and will be detailed below. What has not come to light is precisely what the code was that Prince Edward introduced. Perhaps, taking the other systems of the early 19th century, one could extrapolate to the Kent system. For now, however, we will concentrate on operations not code systems.

Edward, Duke of Kent was a bureaucratic meddler but, to be fair let him tell it.

> ...I never consider anything that happens within my command and that is connected with the King's service, as below my notice or attention.[26]

One can imagine the implications of such a statement when Edward became Commander-in-Chief of British North American forces. He did not spare his energy when some task of importance was to be done. It was soon obvious to Edward that what was of primary importance was the defence of Halifax Harbour. Thus, a visual telegraph system[27] was introduced to connect the Halifax Citadel with the outposts and it complemented the flag-ball system already in existence. Initially, the Kent system began at the Citadel, then to York Redoubt and on to Chebucto Head replaced by Camperdown in 1798.[28] Probably the system's termination point was the Sambro Island lighthouse. This was the primary route and as the energetic Edward added each new fortification, adaptations and additions were made in the signal system. It no doubt communicated to the Prince of Wales Martello Tower in Point Pleasant Park and by 1800 to Melville Island where the prisoners were kept. Due to its geographic position, the most likely receiver station of all was at Fort Charlotte on George's Island

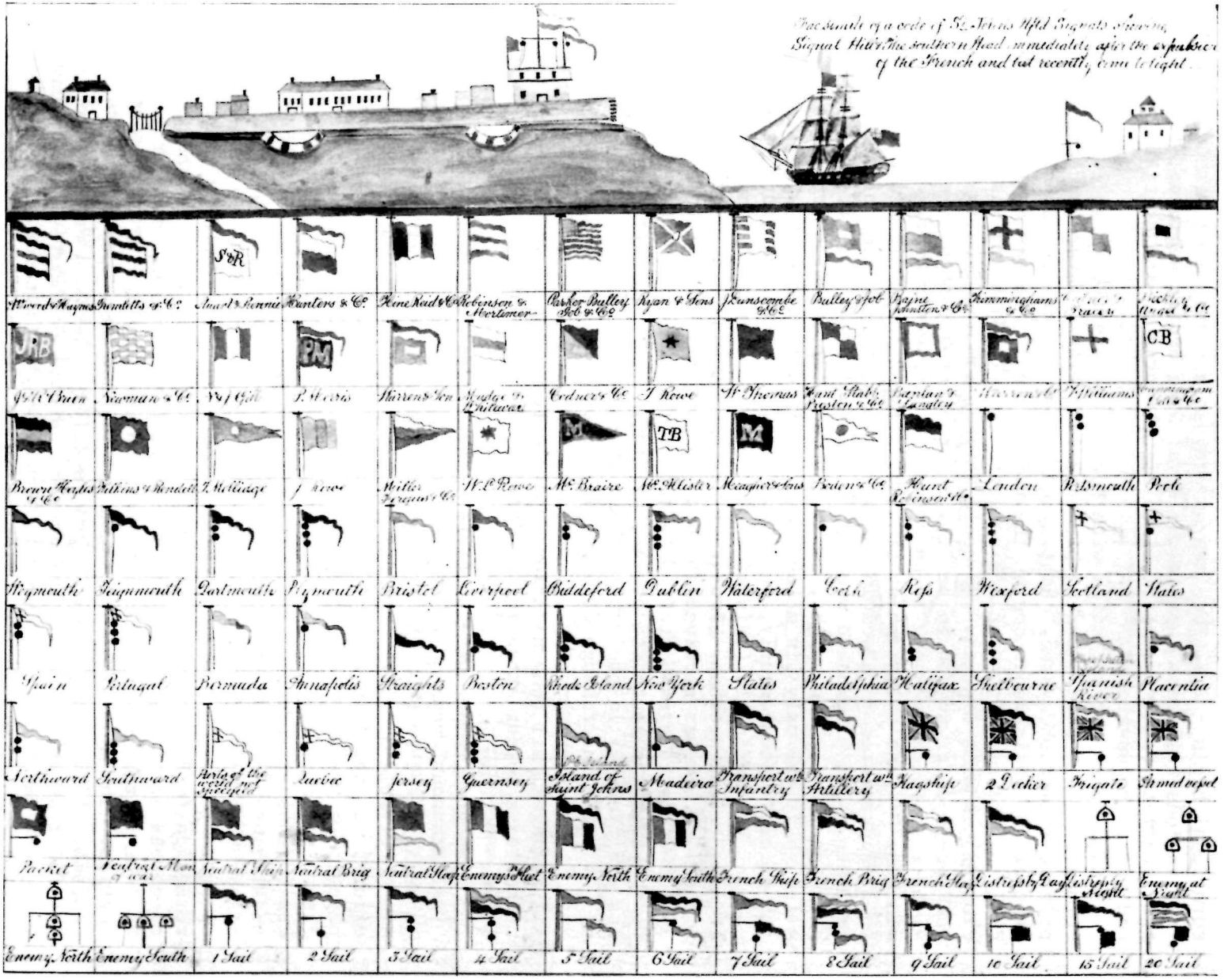


Figure 7. The ship signals used in St. John's, Newfoundland ca. 1800. (Metropolitan Toronto Library Board, Jr 133.)

although this cannot be confirmed as yet. These outposts were manned by at least six men at a time who performed their duties on a rotational basis - i.e. four men on duty at a time. They were drawn from various regiments such as the Royal Nova Scotia Regiment, for in the late 18th century a specialized signal corps in the British army had yet to be developed.

Edward was not satisfied with Fort George as the only communication centre. During his stay in Halifax, Edward added his own private telegraph system. Happily ensconced in Governor John Wentworth's retirement home on the Bedford Basin, he was kept informed daily of the activities of his subjects by telegraph and was kept in close touch with his men. He could in fact command from that site. It was possible for Edward to be "... informed of any occurence in five minutes by telegraph and, if necessary be in town in fifty minutes."[29] The telegraph station was located in an old blockhouse which had existed in a commanding position since the time of the early settlers. The blockhouse was repaired and altered. It consisted of a structure 20 feet in height, supporting a flagstaff with yard-arms. Although it was only six miles from the Citadel, a direct view was impossible. Consequently, there were two relay stations, one at the neck of the peninsula (this side of present-day Fairview) and the second at Fort Needham. From Fort Needham it was relayed to the Citadel.[30] It was received at Fort George (Fig. 8) by the men who operated the telegraph staff situated on the roof of the Cavalier barracks at the south end of the building. There is little doubt of its efficiency. In the words of one observer,

> ... The interchange of words was as correct though slow as it is at the present day under the electric system.[31]

All messages, all communications came to Fort George, which now resembled a spider attending an intricate web of invisible signal lines.

The good Prince was not content however to restrict his "instantaneous" command to Halifax and its environs. He was intent on extending it throughout Nova Scotia and New Brunswick as well. After all a reliable and swift communications system was essential to the war effort. In the summer of 1797, the coast of British North America was being threatened by French privateers and unverified rumours of a French invasion could cause as much panic as the actual attempt. Edward thus arranged for telegraph stations to be erected from Halifax to Windsor. By 1798, such stations stretched to Annapolis. The dispatch of a fast boat allowed the telegraph connection to be picked up again in St. John and the message was then transmitted by visual telegraph to Fredericton. At times the connection would be short-circuited as it was in September 1799 when the Duke of Kent arrived in Halifax to take up his position as commander-in-chief of British North America. The ship *H.M.S. Arethusa* was sighted on Friday 6 September 1799 by the Sambro signal station. The word was sent to the Citadel that Prince Edward was aboard. Within 20 minutes, the visual telegraph had relayed the news to Windsor. From Windsor, it was taken by boat to St. John.[32] Thus the public of the two provinces was informed of the Royal party's arrival within 48 hours. All this occurred at a time when a letter would have taken some three or four

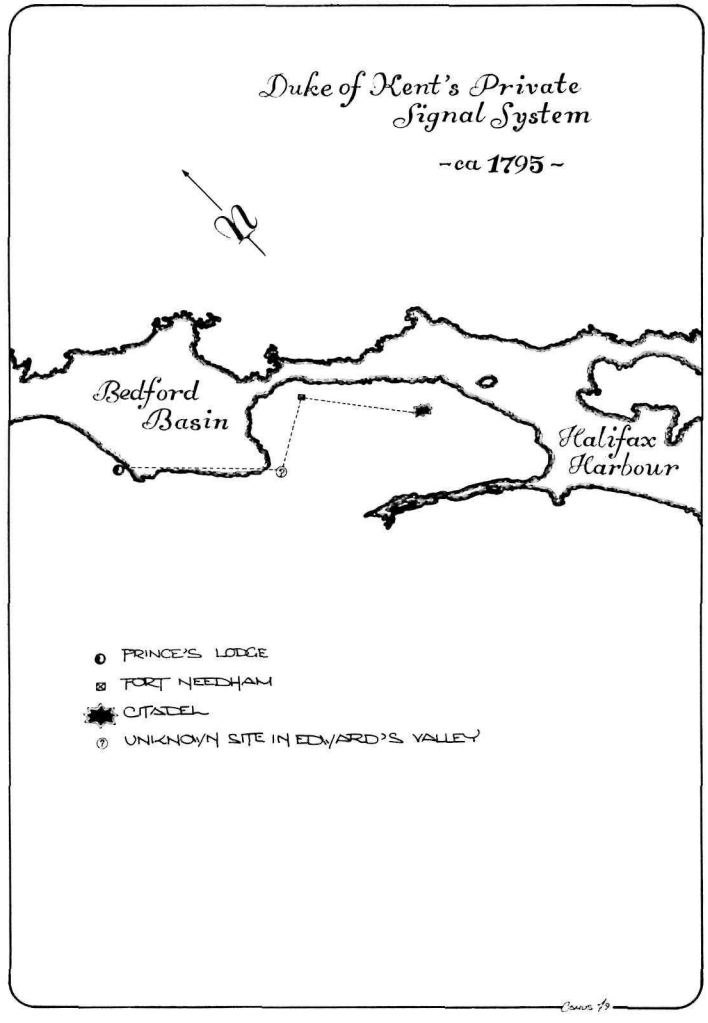


Figure 8. The Duke of Kent's private telegraph line from Prince's Lodge to the Halifax Citadel. (Parks Canada drawing by J.P. Camus.)

weeks to cover the same distance.

Two months after the above message was conveyed an even more joyous communication was passed between the telegraph stations. Simeon Perkins, in his diary entry of 25 November 1799, noted its arrival and even more importantly, its rapid dispersal to other areas of Nova Scotia.

> ... they have news at Shelburne of Cessation of Hostilities, which came in the pacquet, and was sent to Annapolis by Telegruagh [sic] in six hours, and came to Shelburne by a vessel from Argyle.[33]

Unfortunately, despite all the effort at dispersal, the message was inaccurate: not the first time that the medium has shown a greater concern for the rapid dissemination of a message than for its accuracy. As this was a military communication system, it was not used by the civilian population at all. News of war and peace and princely arrivals and departures were only a fraction of the volume of messages.

After all, Edward had established the system in order to keep his hand firmly on his command and thus he sent messages on all matters even the most picayune. Captain Lyman in February of 1800 wrote from his office in Halifax commenting to Edward Winslow in Fredericton on the Prince's attention to detail.

> The Duke returned on Saturday, what he has been about so much longer than he had proposed I have not heard, but I am told they have established telegraphs all the way to Annapolis, so that there was a continual communication kept up of ordering and counter orders while he was away even to the approval of courts martial and ordering the men to be flogged. I was at Barracks on Saturday to pay a visit to Col. Burrows when on looking out the window I saw preparations making that I did not understand, on asking what it meant the Col. told me it was a punishment going on. Expressing my surprise at it during the Duke's absence, I was told the men were to be flogged by Telegraph. So though an hundred miles off, the Duke was acquainted with what was going on, and giving orders the same as usual.[34]

The Duke also used the telegraph for his travel arrangements. In July of 1800, a month before he returned to England, Edward directed the Commission in Halifax to charter a vessel in Windsor in order that Major H.W. Hailes could return to St. John. Arrangements were made to the efect that when a ship was available in Windsor, a telegraph message would be sent to Hailes in Halifax to proceed.[35] The flagstaff at the Citadel was also performing some of the signalling functions it had in the pre-1790 period. For example, in the Garrison Orders of 1803 it was noted that patrols would return to their quarters when three perpendicular lights were hoisted on Citadel Hill.[36]

Prince Edward's communication system worked admirably and for this reason consideration was given to extending it well beyond the two Atlantic provinces. Edward, with the able assistance of Dugald Campbell, had planned a route from St. John to Fredericton. They now wished to extend this northward around the Bay of Chaleur and up the St. Lawrence in order to connect with the telegraph system in Quebec (Fig. 9). This route was chosen to avoid the possibility of it being cut by a surprise attack by the Americans. It is conceivable that if an efficient telegraph system had been erected between Halifax and Quebec and a message sent to Quebec in ideal conditions it would have taken about 24 hours. This would have represented no mean accomplishment for 1800. However, the operative phrase is ideal conditions - such rarely if ever existed. In fact even imperfect conditions were difficult to maintain.

If not for the fact that the British Empire and therefore Halifax was at war, Edward's communication system would undoubtedly not have been built. By all accounts it was expensive in material and men and impractical at a number of stations due to the weather. The route of the system has been outlined above but not the components of the system (Fig. 9).

The telegraph stations were built on high ground with the surrounding area cleared of any undergrowth that might obscure the view

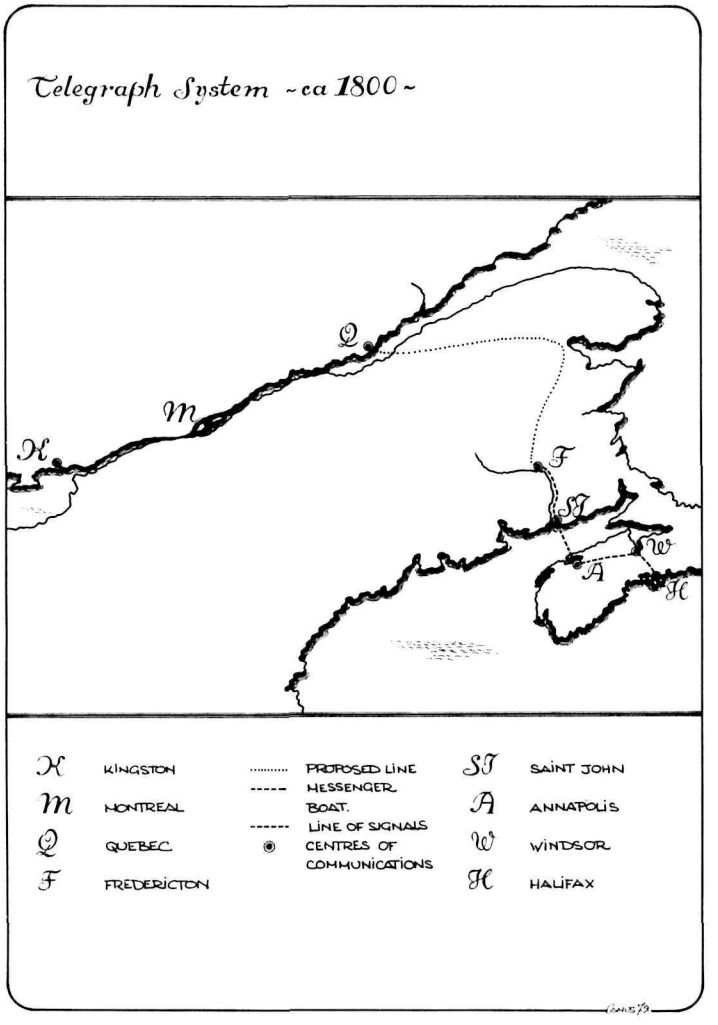


Figure 9. The Duke of Kent's proposed telegraph system from Halifax to Quebec City, ca. 1800. (Parks Canada drawing by J.P. Camus.)

of the flagstaff. The telegraph operations also had to maintain a clear vista to receive and transmit their signals. The distance between stations varied, being dependent upon whether the terrain was high or not. On average, however, the land stations were seven to eight miles apart. Over water they might be over 15 miles[37] - a distance which a good telescope could cover. For example the Saint John communication system had two signal stations, Point Lepreau and Wolf, 17 miles apart across Maces Bay in southern New Brunswick. This was greater than the normal distance. There were nine stations up the St. John River to Fredericton. Although there is no evidence of specific distances, nine stations following the river for 80 miles averages about nine miles between stations. This is a rough calculation and there were no doubt some stations closer to each other and others farther apart. Of more interest at this point are the distances between stations in the area around Halifax. The Halifax

telegraph crossed a land and water stretch and the distance varied greatly: Citadel to York Redoubt, four miles; York Redoubt to Camperdown seven miles, and Camperdown to Sambro four miles. It was thus that a chain of structures topped by a masted flagstaff wound its way from Halifax to Fredericton and well beyond that point if Edward had had his way. Each wooden structure was manned by six service men usually billeted in the area. The building itself was a single storey and measured 14 feet by 16 feet. It had a ladder and perch on the roof for viewing. Judging by the estimates, there was also a large window, or more likely two smaller ones, as the estimate included 12 squares 8" x 10" glass. The cost of building the station on Partridge Island, New Brunswick was £13.30 for the labour and £12.66 for the material.

Edward's vision in 1799 was of an unbroken and uninterrupted communication system with Canada for this was "so obviously essential to the safety and prosperity of this Province."[38] A simple exercise in addition and subtraction points out the disadvantages of Edward's telegraph. His vision was too expensive. With signal stations six to eight miles apart and requiring six men to man them, the line of small wooden stations could hardly be justified at £25 each to construct and a long-term operating expenditure. Thus after Fredericton the stations began to peter out. Aside from the expense there were other considerations. Governor Carleton in Fredericton expressed them best.

> A hundred men (at least) would be required to attend such a chain of telegraphs as was contemplated, and as the General had no other troops under his command but the New Brunswick Regiment, which then consisted of about 290 effective men, he could not have furnished the complement for the Telegraphs without abandoning some of the most important posts in the province, and changing the whole distribution of the troops.[39]

Aside from the operational expenses, there was also the clearing and maintenance of a clear view between stations, the possibility of a high rate of desertion among the signal men to the American side, and the necessity of compensation to the landholders in the path of the line - a problem that occurred quite frequently in the Canadas.[40] There were also the difficulties with fog in the Bay of Fundy which could close down any of the coastal systems. In this matter, Carleton's comments are noteworthy. He writes in a letter dated 10 July, 1801 to Edward as follows:

> The uncommon and impenetrable fogs which have prevailed here during the whole of this season and which still continue without abatement will prevent my attempting to erect the Telegraph on the Wolves [islands south of St. John] agreeable to the recommendation of Your Royal Highness....[41]

Given the problems, it should not be surprising that Edward's communication system faltered not too long after he left British North America and it soon was limited to Halifax and St. John. Edward departed in 1800 and in 1802 peace with France meant the military importance of the signal stations was inconsequential. Cuts were made, a small guard maintained, the forts and the expensive toy of visual

telegraph fell into disrepair. Raddall noted that after 1802 "... a cloud of mystery as impenetrable as the Fundy fog obscured Edward's system."[42] Beyond Bedford Basin and into the hinterland towards Windsor it was not used. The Halifax harbour military communication from Sambro was maintained by the army and, as will be detailed later, was used into the 20th century. The St. John system of signals also seems to have been kept up.[43]

Despite the renewal of hostilities in Europe in 1803, there was little interest in the telegraph system until the War of 1812. With the threat of an attack on the province by the American privateers the Legislative Assembly in Nova Scotia was moved to vote £8,000 for blockhouses, temporary work, arming boats and the telegraph operation.[44] The defences of Halifax and St. John were once more co-ordinated by a telegraph system and the province steeled itself for an American land and sea attack which never came. Although troubled by privateers at times the Atlantic provinces were never in any real danger of assault. Flags on flagstaffs elsewhere carried this message to Nova Scotia. Murdoch notes in his *History of Nova Scotia* that the war with Britain was so unpopular in the eastern United States that

> when the declaration of war reached Boston, all the vessels in the harbour immediately hoisted their colours half mast high, three excepted. The populace compelled the three vessels to follow the general example.[45]

The closest Halifax came to combat was the sea struggle between the *U.S.S. Chesapeake* and the *H.M.S. Shannon*. Aside from the surge of enthusiasm and patriotism it gave Haligonians when the *Shannon* won, it also allowed the capture of the private signal code of Commander James Lawrence "... the Chesapeake having been boarded too suddenly to admit of the document being destroyed."[46] Even then, it was of some importance to break the enemy's signal code for the copy of the code and private signals was sent to the frigate *Nymph* which was cruising off Cape Breton looking for stray Yankee privateers.

By 1815, the Empire was at peace with both the French and the Americans and the most frequently used signal systems returned to reporting shippage to the military and the town merchants. However, a telegraph system was maintained for the private use of the military. No doubt it was similar to the one published in Quebec in 1809[47] (Appendix 3) and related to the earlier system of Prince Edward Duke of Kent. This system allowed for both day and night signalling between the two most important terminals, the Halifax Citadel, the headquarters, and York Redoubt, the chief relay station (Fig. 10). The latter was important for the defence of the main entrance of the harbour and was used as a telegraphic post between the Citadel and Camperdown. As noted this private military system communicated with Melville Island,[48] Fort Charlotte and H.M. Dockyard as well. Communication by signal and telegraph, of public and private interest remained a vital part of the third Halifax Citadel until it was built in the late 1820s. The Duke of Kent in his passion for building had erected a system that remained a permanent part of the Halifax defences long after he had departed.

During the first quarter of the 19th century, two communication

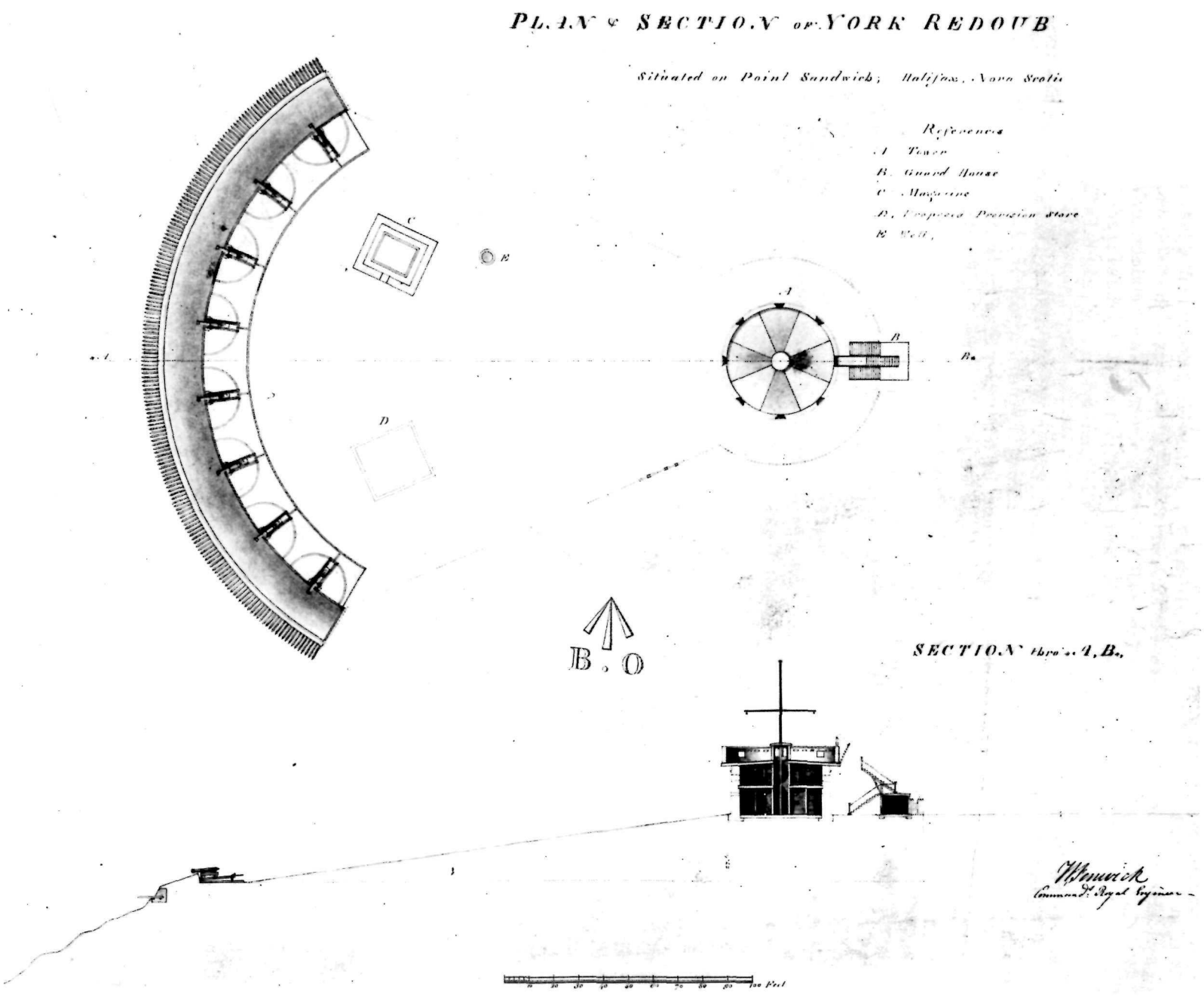


Figure 10. The York Redoubt signal mast mounted on the Martello Tower in 1803. (Public Record Office.)

systems were established, centred on the Halifax Citadel in plain view of the public. Each served a rather different purpose but both were essential for the defence of British North America.

The first system was the military telegraph system already described. It is reported to be the first real telegraph system in America.[49] It was used for military and governmental operations only. Few if any of the citizenry had any knowledge of its manipulation. The codes were military secrets and the balls and pendants going up the flagstaff to the yard-arm were likely noted but not interpreted. At times the navy attempted to utilize the convenience of this ball and flag hoist contraption. During Lord Dalhousie's term in Nova Scotia, he noted in his diary the persistent attempts of an admiral to recall his ship. In this entry for 18 January 1820, he wrote

> .... Yesterday Cyrene, Capt. Tozer, sailed for Bermuda, after many delays & recalls by Admiral Griffith, the most undecided man I ever yet met with. None of the Captains of the Squadron think themselves sure of his orders until they have lost sight of his flag, & the cant phrase is, that the wind is very changeable at the Admiralty House. Tozer has been going every day these 10 days. At last he did sail at daybreak yesterday. At noon the weather began to lower & threaten a southerly gale. At 2 P.M. the admiral sent an order to Citadel Hill Telegraph, to recall Cyrene; fortunately the military posts have not the naval signals, otherwise Tozer must have returned from beyond the Light House. Such want of decision in an Admiral is lamentable.[50]

Besides pointing out the indecisive nature of the admiral, this excerpt reveals something of even greater importance. The military and navy did not share signals or signal code books at the outposts. It appears that the army telegraph system was used specifically for its own purposes and the Royal Navy practiced a separate and very different code. It would seem that there were in existence in Halifax three systems of communications in the port of Halifax. The one used by the Royal Navy, the military telegraph (Appendix 5) and the signal flags shared by both.

This last mentioned was of public interest for it made note of all the ships entering the harbour. The signal flashed from Sambro was soon displayed on the Citadel and the meaning of the flags utilized was known to all. One of the early Nova Scotian almanacs printed in Halifax in 1800, records the signals relayed to the Citadel when vessels were coming into the Halifax Harbour, the enemy signals and finally the signal of distress.[51] By 1817 "The Nova Scotia Almanack" was being published and it was markedly different from the earlier edition. The Almanack included the private signals of Halifax merchants; these flags were of various colours. They were hoisted on the telegraph staff or at the yard-arm of the signal staff at Fort George. In addition to this were signal flags raised on the ensign staff at Fort George to denote the origin of the vessel, e.g. red flag from Europe, blue flag from the West Indies, etc. A copy of the merchant signals and other signals has survived and individual signals

can be traced (Fig. 11). *Belcher's Almanac* continued publishing descriptions of the signals flashed from the various forts, throughout the 19th century, in the public interest although there was some discussion as to whether this should be an army responsibility or not. More will be said of this in the ensuing chapter. For its part, the Halifax Citadel maintained its three flagstaffs, the ensign, the telegraph staff and the signal mast[52] throughout the military cutback period, described below. Obviously the Halifax communication system was of great importance to survive this. When the new Citadel was begun in 1828 the staffs were to be transferred to new sites.

The preceding detailed description may have created the impression that only the east coast of British North America maintained a signal system of any intricacy. This was certainly not the case. It would appear, however, that the military signalling system elsewhere was not as sophisticated as that introduced by Prince Edward. The signals between stations in Quebec made use of direction poles and signal fires. Inevitably, there were problems with such a primitive method. In 1797, there was a complaint of a false fire; the difficulty was a lack of equipment. The letter begins:

> I beg leave to inform you that a signal fire was made at L'Islette on the 18th instant taken from a false one below; but was not repeated by the men at Isle aux Gan, who say that having referred to their direction poles found it not in line which may very probably be the case as the distance is so great in this and several other situations, that it is impossible to set poles in a true line without the assistance of a glass. Could one be allowed, every error of this kind might be corrected.[53]

In 1809, the Quartermaster General in Quebec, James Kempt, released a telegraph code using the ball hoist method. This was the first evidence that a system similar to that of Edward's was used in Canada.[54] A telegraph station was estalished at L'Islette near Quebec a year previously.[55] When the War of 1812 began, the war to "liberate" Canada, the settlements strung along the St. Lawrence and the Great Lakes were in a vulnerable position. With neither the full strength of the British army nor the British Navy to protect them, new defensive methods had to be devised for self-preservation. Rapid communication between the limited forces scattered along a far-flung frontier were paramount.

War had been declared by President James Madison in June 1812, but the worsening relations between Great Britain and the United States had caused the Canadas to begin their preparation for invasion before this. Drills and military evolutions were held in Kingston and of no lesser importance, the telegraph stations were being victualled in Quebec in readiness for an expected attack.[56] The details as to what type of signal system was used in the Canadas are conflicting. The official system was probably that of Kempt, already described, with some local adaptations. In 1813 a telegraph post was placed on the Point Henry blockhouse. It was not unconnected with an army innovation in Kingston. Here, in 1813, a telegraph and signal system between the army and navy was compiled by Captain Sabine R.A., Quartermaster

General and his chief clerk Daniel Daverne. Fortunately Daverne kept a record of this system.[57] In the summer of 1814, approval was granted to allow the army and navy to communicate by signal. The system was similar to others developed elsewhere utilizing the ball and flag hoist on a flagstaff and yard-arm and a numbered code to decipher message. Coastal fortifications near Fort Henry at Point Frederick made use of the signal system in order to warn of invading ships. The system, commonly used in the lakes area, was not unlike that used in Halifax although not as sophisticated.

> ... transmitting a few signals to be established at my different posts on the Lake, in order to enable Sir J. Yeo to distinguish our positions from those that might be occupied by the Enemy. These signals have been communicated to the respective officers in command of Posts.[58]

The war ended in 1814 due more to combat weariness than to decisive victories by either side. There was, however, still considerable interest in maintaining a signal system. The chain of signals around Quebec and Kingston were still very necessary. James Watt, a veteran in the signal service, applied for a permanent position as superintendent of the telegraph operations in Quebec and suggested that it be made a civil establishment used by both military and civilians. Watt was given his appointment and continued with the optical telegraph system until 1845.

By the early 1820s many of the telegraph stations had become superfluous. As in Halifax, the military saw little necessity for these structures that required personnel and financial expenditures to maintain. The military proposed to abandon them but the mercantile interests of Quebec had other plans. The Committee of Trade sent a delegation to the Governor, Lord Dalhousie, to request that the station be maintained if the mercantile interests consented to charge this expense to local revenues.[59] This was agreed upon for the stations were becoming a burden to the military government. It was noted by the deputy quartermaster general that in 1819 the year's provisions for the telegraph station in Quebec came to just over £1,000.[60] In a period of peace this represented a large sum to pay simply to report the passage of ships up the St. Lawrence River. This system, when compared to the Halifax communication complex, is of little further concern to this study.

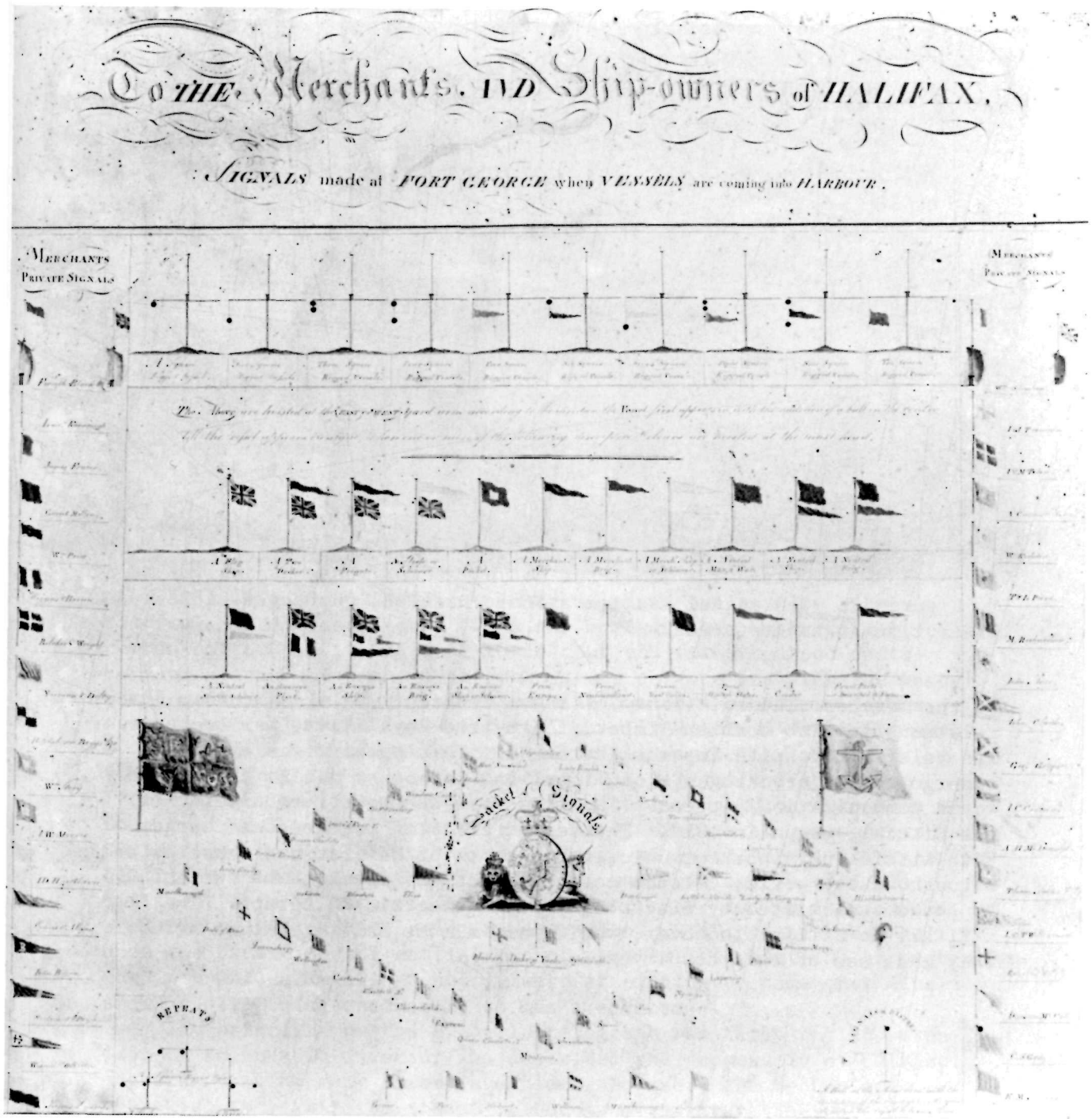
By 1828, it would seem that many of the various telegraph systems had closed down in British North America and, for that matter, throughout the British Empire. Many of the telegraph buildings in Quebec were given over to the proprietors of the land upon which they stood. Even in St. John, a coastal centre, it became difficult to obtain money for the repair of a signal house. In a letter dated 11 May 1825 both the Master General and the Board of Ordnance were quoted as stating that "Telegraph and Signal Stations have been put down since the peace [1815] in all parts of the Empire ..." as they were no longer needed.[61] Despite this Imperial pruning, the visual telegraph operations remained in Quebec (Fig. 12), St. John, and Halifax as a real, if rather peripheral part of military life, and in all three instances were connected quite closely with the signal system required

Figure 11. Signals made at Fort George ca. 1820. The flags down the right and left margins are those of various private merchants, with red, white and blue colours prevailing, e.g. the white over red flag in the bottom left hand corner indicated a vessel belonging to James Lyons.

The configuration of balls and flags on the top line indicated the number of ships; one square-rigged vessel is indicated on the left while ten square-rigged vessels are indicated on the right.

The next two lines were used initially to indicate the ownership of the vessel entering the harbour and the place of origin - a British flag-ship was indicated by the Union Jack (top left), an enemy fleet by the Union Jack over the French tri-colour (bottom, second from left), a ship from the United States by a red pennant (bottom third from right).

The flags shown in the diamond shape were used for specific mail packet ships. Four alternating red and white squares (top, middle) were used as a flag of the *Colchester*. (Public Archives of Nova Scotia.)


To THE Merchants, AND Ship-owners of HALIFAX,
SIGNALS made at FORT GEORGE when VESSELS are coming into HARBOUR.
Merchants Private Signals
Pocket Signals
REPEATS

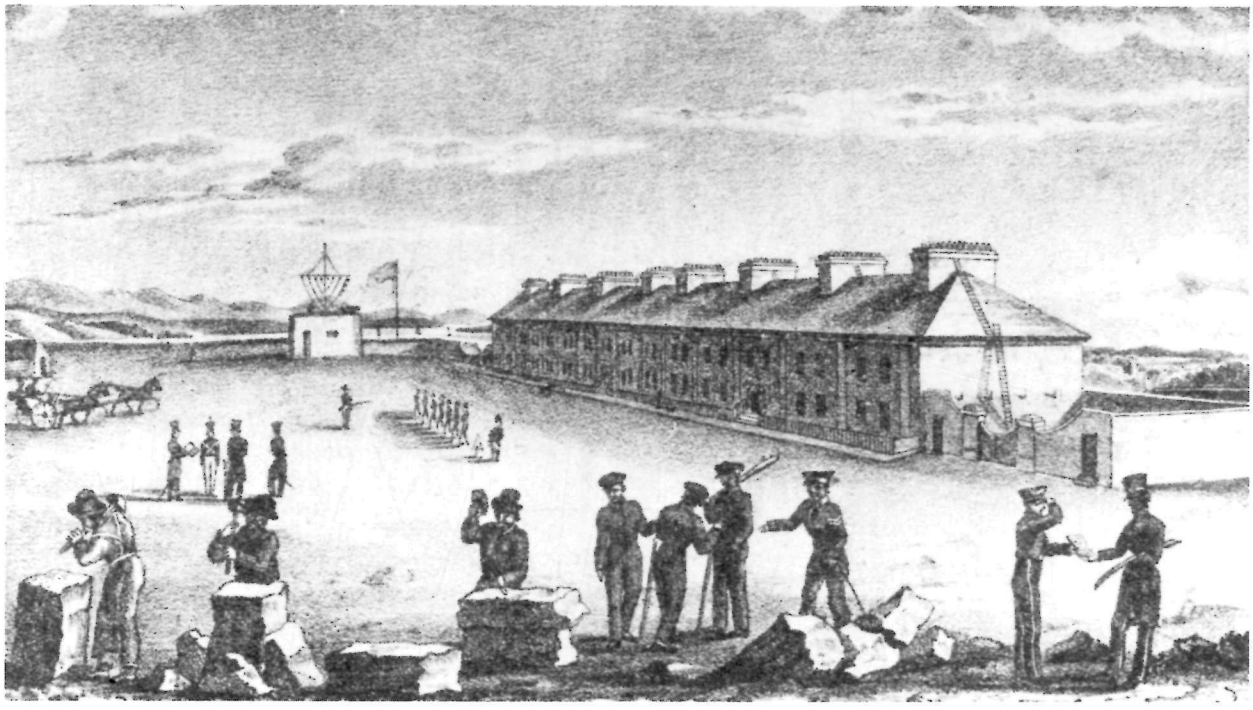


Figure 12. The signal station at Cape Diamond, Quebec ca. 1825. (Public Archives Canada.)

by the merchants and citizenry of these centres. Halifax, due to its relationship with both the Imperial Army and Royal Navy, was to keep its telegraph despite Imperial cutbacks. This network was about to undergo two major changes - one local and the other due to changes in world communication pattens. The first was due to the rebuilding of the Citadel, begun in 1828. The second effected far greater changes both within the minor communication network of Halifax and those extant throughout the world. Visual communication was about to be surpassed by sound transmitted by electricity - the electric telegraph. The military in Halifax, however, would wait almost half a century before they made use of this new invention.

SOUND REPLACES SIGHT - 1828-80

"Their line is gone out through all the world
And their words to the end of the world."
Psalms XIX: 4

The Whole Wired World

Long distance communication in the old and new world in 1830 was an almost mysterious process. The message to be sent was formulated, gears, ropes and pulleys were manipulated and the slow, silent motion of a flag, wooden board or some other object began. In the distance watching eyes strained, hands scribbled and a similar contraption motioned in reply. The silent message had been transmitted and became verbal once again. In this fashion a silent language of coded words was sent in measured rhythm across nations and continents. This was as near to instantaneous communication as visual signalling would allow. As fast as light the signals were transmitted but as slow as man when translated and transcribed. With the mediums then known to man, visual communication, as it had done for centuries, far surpassed audile communications. But the 19th century was not one in which the western world would remain content with such an outmoded process. Almost every aspect of the European traditional life pattern was being upset by what has become known as the Industrial Revolution. Business, transport, industry and social customs had all shifted to a more frenetic pace and the methods of communication would have to keep up. Some technical process beyond flags, arms, pigeons and messengers had to be found to complement the rapid world of steam energy. The answer came from an American, Samuel B. Morse, who utilized an entirely different form of harnessed energy, electricity, and in the 1830s produced truly instantaneous communication. His inventiveness built upon the inventions of earlier men of a scientific bent who throughout the 18th and early 19th century, were attempting to tame that elusive spark of lightning and use it to man's advantage.

The principle of the electric telegraph was first put in words in 1753 by an unknown inventor who described the process in a Scottish magazine.[1] Like many later inventions, however, the technology did not exist to permit the scheme to become a reality. The work of Volta and Galvani had just begun and by 1787 static electricity was used to send messages between Madrid and Aranjuez.[2] But the process needed a constant source of electrical power. The electro-chemical telegraph of S.T. Von Soemmerring in Munich in 1809 gave promise of such a source, although it did not become widely practical until the 1830s. Meanwhile static electricity would have to suffice. In England one curious system using this power source was developed by Sir Francis Ronalds in 1816. His was a multi-wire scheme with very different

terminals. The current and therefore the message shocked the operator. Ronalds did make up for this rather crude method by devising a pith ball system to spell out a message. He submitted his later idea to the admiralty but they were no doubt still trying to sort out the Pasley and Popham systems for they replied:

> telegraphs of any kind are now wholly unnecessary and no other than the one now in use will be adopted.[3]

Thus, aside from the difficulties with primitive technology, a coterie of hidebound officials also slowed down the adoption of new techniques. But industrialization brought to Europe a great liberalization of capital. That is to say, innovators did not have to rely on government largesse to finance their ventures. Two men in England found that the ever-expanding railway interests could provide capital as well. William F. Cooke and Professor Charles Wheatstone devised a five-needle electric telegraph (Fig. 13) and put it on display in 1838. The apparatus could be interpreted visually and was simple to install and operate. The Great Western Railway immediately bought the plans and by 1839 a five-needle telegraph system was in operation between Paddington and West Drayton, a distance of 15 miles. This was the first practical use of the electrical telegraph and significantly it occurred just as the first trunk line was being completed and the first ocean steamer was being built. Both of these means of transport would eventually rely heavily on the electric telegraph system.

The English public only fully appreciated the speed of the electric telegraph when the murderer John Tausell was captured in 1845 due to a telegraph message. Tausell had committed a murder in Slough and quickly boarded a train, the fastest known means of transportation. The police having been alerted by a telegraph meesage, were waiting for him when he stepped off in Paddington. Much to the amazement of the public and Mr. Tausell the telegraph had outstripped the train. In 1846, the Electric Telegraph Company founded by Cooke and Wheatstone came into existence and six years later there were over 4000 miles of telegraph line in England all using the, by now, single needle deflecting system. From the 1850s on this visual electric telegraph was used extensively. Soon newspapers were transmitting items of public interest over it and, like the Daily Telegraph, naming themselves after it. Eventually it was adopted by the Post Office in 1870. Thus it became the standard metropolitan means of communication for the Post Office had established the exclusive right to transmit telegrams in the United Kingdom. The needle system remained a common part of railways and post offices well into the 20th century. Elsewhere the audile electric telegraph of Samuel Morse was favoured.

At the same time as the railway in England was installing the Cook-Wheatstone system, Samuel Morse, described by many American taxpayers as a broken-down artist, was requesting funds, $30,000 *in toto*, to demonstrate his invention which sent messages "by lightning." His request was granted grudgingly and by 1 January 1845 messages using the mysterious "tappings of the Morse code" were flashing between Baltimore and Washington.[4] At a normal operational speed of 25 words per minute, the Morse system could transmit faster than the slower needle system used in Britain. The former required more highly trained operators while the latter demanded

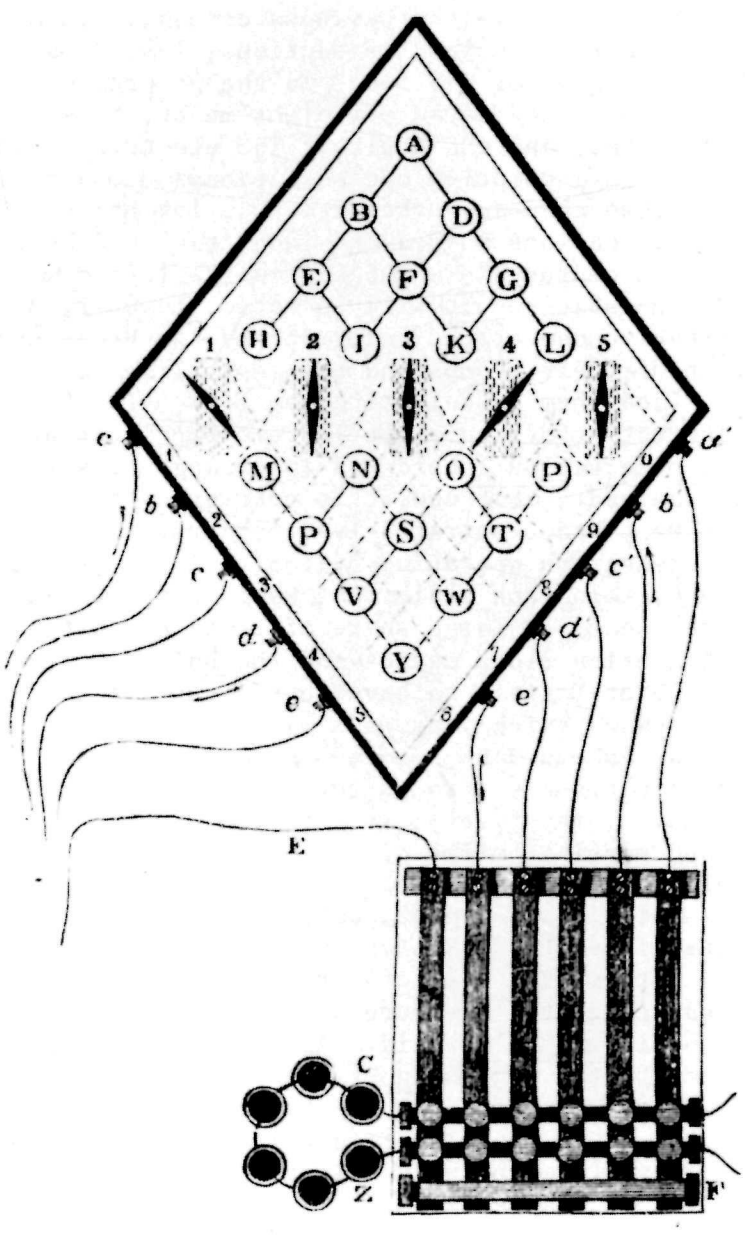


Figure 13. The Cooke and Wheatstone five-needle electric telegraph adopted by the English railway in 1839. (Public Archives Canada.)

only literacy. Rapidity was of the essence in the mid-19th century and so most industrialized countries adopted the Morse system. The optical telegraph outlined in the second chapter was outdated and was eventually removed. The Morse telegraph spread quickly throughout the world. By 1845 it was being used in France, in Belgium 1846, Italy 1847, Germany 1849 and by 1853 Russia had constructed electric

telegraph lines. The system satisfied the two sectors of society that could afford such a device. To the business community it meant faster communications, accurate financial transactions, less delay and spoilage and therefore greater profits. To the government, the electric telegraph was viewed as an efficient means of establishing more control of the state and the Empire. The electric telegraph together with the steam locomotive opened national boundaries to outside influences more than any other previous invention. The extent to which rapid communications shaped the industrialized Europe of the last half of the 19th century is a subject in itself and will not be pursued here. One notable result will be noted, however, in military affairs. The effective use of the telegraph by the Prussians in the swift mobilization of their troops and the centralized direction of their operations aided them in defeating the French in 1871. This served as adequate notice of the electric telegraph's great value as a military tool, an observation considered in greater detail when the British army is examined.[5] For now it is noteworthy that by 1860 the electric telegraph had penetrated land borders. The United States had a continental telegraph operating by 1861. A far greater challenge was ahead - to lay a telegraph cable that would connect nations and colonies across the seas. A large share of British capital was being invested in North America (both Canada and the United States) and it was to the advantage of Britain to have the distance between the old and new world bridged as quickly as possible.

In 1813, an Englishman John Robert Sharpe succeeded in transmitting electric signals through seven miles of insulated wire submerged in a pond. Forty-five years later an electric signal sparked across almost 2,000 nautical miles of Atlantic ocean 1400 fathoms beneath the ocean's surface in almost exactly the same time. In between were years of discouragement, persistence, minor successes and a great outpouring of capital. Everything had to be researched and experiments were costly. The type of wire, the outer coating, the effect of the ocean currents, pressure and brine and most importantly the question of how it was to be laid. All these difficulties were eventually overcome by the unceasing efforts of one man, an American financier named Cyrus W. Field. He ably tapped the financial and technological resources of Great Britain and on 5 August 1858 an electric cable was completed between Valentia, Ireland, and Trinity Bay, Newfoundland. "The cable is laid" Field wired. This was an enormous achievement and its significance is best summarized by William Cullen Bryant who wrote on that day in the *New York Evening Post* "... all other events that may happen through the world on this day will be trifles."[6] The cable connection lasted barely a month then went dead. Field began to gather financial assistance for yet another attempt. By 1861, however, all his plans were postponed with the outbreak of the Civil War in the United States. It was not until after the war that renewed efforts were made to link the continents once more. In 1865, two efforts failed but finally in July 1866 the lines were joined again between Britain and North America never to be broken. Five years later France laid a line from Brest to St. Pierre. The number of cables increased (Fig. 14) by 1900, 13 cables crossed the North Atlantic. Thus when Cyrus Field died in 1893, his obituary

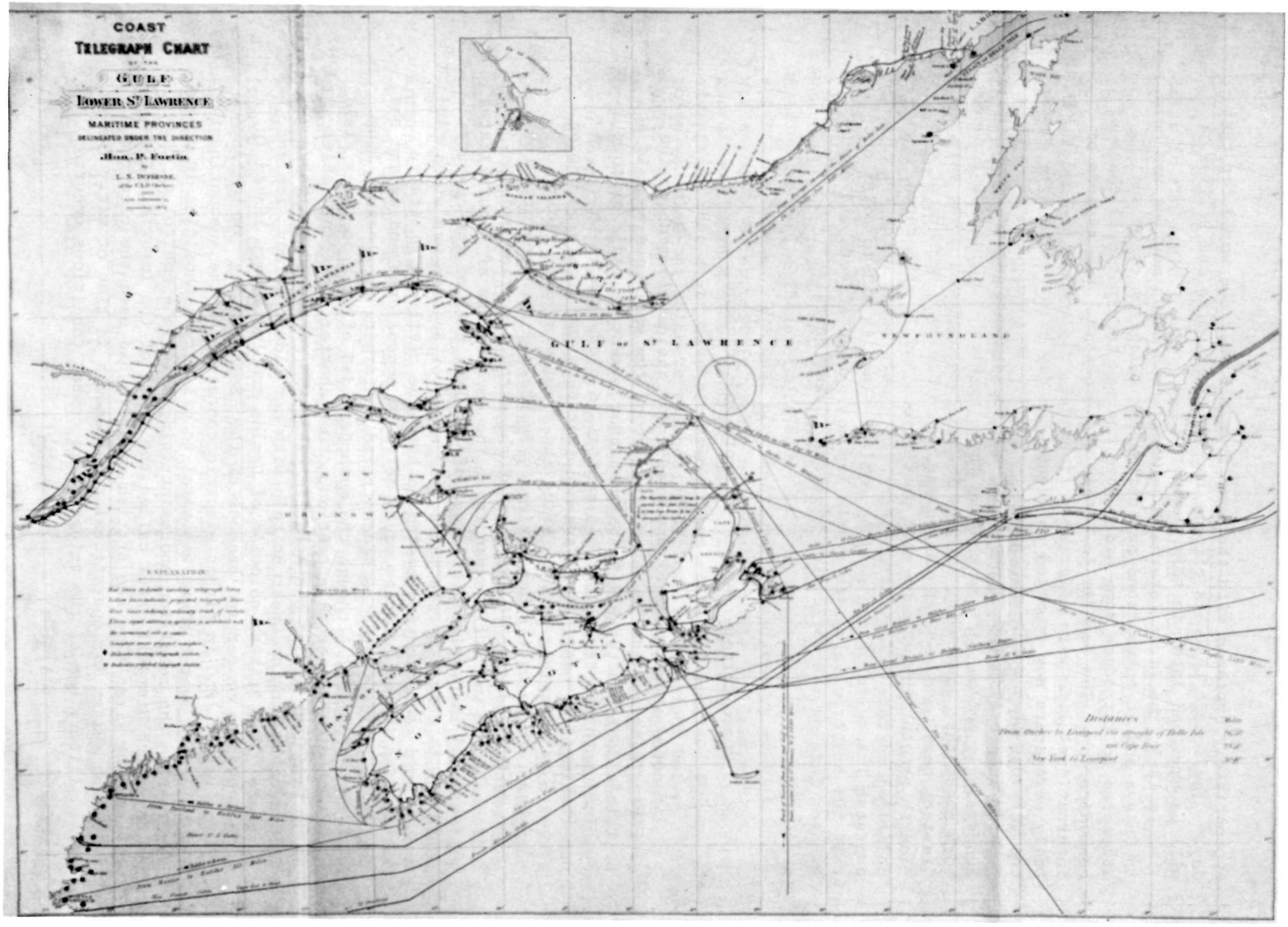


Figure 14. Map showing the cables laid from Europe to Canada's east coast by 1876. (Canada, Department of Marine and Fisheries.)

appropriately appeared with the news from all over the world for that day.[7] The impact that his efforts had on Nova Scotia and Halifax will be examined later in this chapter.

In 1865, the first International Telegraph Union meeting was held in Geneva and it established priorities for telegraph costs and attempted to introduce some order into the new international chaos of communication. The benefit to Europe was enormous. All aspects of international life were affected - financial, diplomatic and political. Daily newspapers now reported on events the day after or in some cases the very day they occurred. An increasingly literate public showed a greater interest in news from around the world and began to play an increasingly active part in shaping these events. Politicians became more aware that government actions in the international scene were "instant news" and must be manipulated accordingly. Members of the "fourth estate" thus became more prestigious and in some cases political careers like Winston Churchill's were begun using the overseas interests of the reading public.[8] This is all to point out that the electric telegraph system had world-wide effects and none greater than on the world-wide Empire of Great Britain.

Great Britain: Military Theory and Practise

As noted above, much of the credit for the development of the electric telegraph and its extension around the world can be laid at Britain's door. After all Britain at that moment in man's history combined both the technology and capital to pioneer such an undertaking. It must not be assumed that this was simply an act of altruism on Britain's part to bring the "family of man" closer together. There were other motives. By the mid-19th century, the Union Jack waved over 20 per cent of the earth's surface and the British Empire was still expanding. The development of sophisticated military and industrial technology of the last half of the century would see to that. By the 1850s, the aegis of Britain was widespread and a rapid communication system to both the civil and military authorities in the colonies would serve to consolidate and expand the Empire. Britain therefore concentrated on forging an electric link with the colonies. Although the much-heralded efforts of Cyrus Field have been given deserved attention, other shorter submarine cables were being laid long before the Atlantic cable was completed in 1866. In 1852 a cable linking Great Britain with her oldest colony, Ireland, was in place. The British colonies of Ceylon and India were linked in 1856. Despite or perhaps because of the "Sepoy Mutiny" in Indian, London was by 1860 in direct electric contact with the subcontinent. The telegraph system there was vital to military authorities in suppressing the rebellion and maintaining Britain's control of the colony which Disraeli later called the jewel of the Imperial Crown. It was not the first time the British military had used the electric telegraph system for operational requirements in time of war. The first military use of the telegraph in combat conditions occurred

during the Crimean War (1854-56) when the allied army erected lines in 1854 to connect Command Headquarters at Varna, Bulgaria with troop units in the field. A year later a submarine cable was laid across the Black Sea. Such communication techniques, however, did not mitigate the enormous confusion of strategy and tactics for which the struggle in the Crimea is most remembered. It is one thing to place a new tool or weapon, like the telegraph or tank in the hands of the military, but it is quite another thing to assure that it will be wielded effectively.

By late in the decade, the telegraph was being applied to logistical matters in the colonial outposts with great profit. In the brief period during which the Atlantic telegraph was operable in 1858, over 400 messages were sent over this cable. Among those messages two were sent which probably cost the military authorities £10 but saved them £60,000. Both were the result of the successful suppression of the Indian Mutiny. The first wire was to General Trollope in Halifax directing him to keep the 62nd Regiment in Halifax and not to allow it to return to England. The second was to the officer in command at Montreal and stated that the 39th Regiment was to stay in British North America as well. These orders cancelled the previous commands mailed a short time before. The cost of transporting these troops unnecessarily was saved.[9] Unfortunately within a month the cable was dead and so was direct communication with the new world. Aside from the economic advantages that might have occurred if the cable had remained intact, there was also the delicate balance of diplomatic relations between a country in the throes of suppressing a rebellion and an empire whose support wavered between the two sides. No doubt Britain's relations with the U.S. especially after the "Trent" incident, could not have been worsened by more rapid communications. For the remainder of the century the electric telegraph played its part in the "small wars" of the Empire. In Ghana, Afghanistan, South Africa, and Egypt the thin wire was laid with the advancing troops and became as much an integral part of the Imperial military baggage as the water canteen and the Maxim.

By the 1860s, military strategists were beginning to awaken to its importance as a defensive weapon as well and this was of especial interest to "coastal conscious" Britain. The 1860s saw the first salvoes of an incessant verbal clash between army and navy over the appropriate strategy for the defence of the Empire. Each claimed its importance and therefore the larger share of the government's defence budget. It is well beyond the scope of this work to detail the various arguments proposed over this 30-year shouting match but as communications are involved and as the various theories were of direct import to Halifax, the highlights are briefly discussed here.

"Steam has bridged the channel!," Robert Peel proclaimed with some foreboding[10] and the repercussions of this statement to the defence of the island and the Empire were enormous. Where once the vagaries of fog, current and wind could delay or disrupt an invasion and give the Royal Navy time to concentrate its forces, the power of the steam engine changed this. Unaided by wind, vessels could steam across the 21-mile ditch in a couple of hours. Steam had transformed the Age of Sail and Britain would have to adapt. Where Napoleon's armies had

stopped on the French coast that location was now a mere spring-board to an enemy force if it possessed enough steam vessels. The steam railroad had changed the face of the countryside and altered the value of communications. The use of steam for vessels would have the same impact on sea communications. If attacked, the alarm had to be sent more rapidly, decisive action taken more quickly and a force launched immediately to repulse the enemy. Weaponry soon became more and more sophisticated. With steam-driven armoured ships, came accurate and powerful guns as the smooth bore was replaced by the rifled guns. Then the ships became more heavily armoured leading to even more powerful guns.[11] With such speed and improved armaments, a surprise attack on England's coast or her empire became a distinct possibility. Such an attack could be defeated only with the aid of an early warning system. Thus to maintain their military might in relation to the growing European strength, England had to improve its coastal defences. To fortify the coasts of England would be expensive; to fortify the coasts of the Empire would be enormously expensive.

One outgrowth of the discussion of the defence of the Empire was the argument put forward in the 1860s that the Empire was unnecessary and ought to be discarded. This was easier said than done and was never considered seriously by any politician of note. There also came into being what was known as the "Blue Water School" consisting of military and civilian strategists who felt that the navy was paramount in the defence of the Empire. Therefore the bulk of government defence expenditure should go to the Royal Navy. In any case, the British government wished to reduce all defence spending. In 1865 the Colonial Defence Act was passed which encouraged the development of local defences: revenues and coastal defences to be paid for by the colonies concerned. The colonies were to pay their own way. At the same time Britain began to withdraw her army garrisons from the self-governing colonies. By 1871, the British army had abandoned Canada, with the exception of the garrison at Halifax. The troops in Halifax guarded the Imperial naval dockyard which served the Royal Navy's North American and West Indies squadron. There was also an Imperial naval dockyard for the Pacific Squadron at Esquimault, B.C., but its military defence was partially left to the Canadian militia, and was to be a source of political contention between the Dominion and Imperial governments until 1905-6.

It was not until the 1880s that the government's purse strings were unknotted in reply to the incessant demands of blue water strategists for naval expansion. With the ambitious warship construction of the 1890s, the work on overseas coastal forts came to a halt and "... no more permanent defences of land forts were constructed in any part of the Empire."[12] During this 20-year span (1860-80) the coastal fortifications of the Empire were receiving a great deal of attention from strategists. New communication techniques were being devised for both ship and shore and the new toy of electric telegraphy was a great contribution in the latter instance. One writer believed that no trouble or expense should be spared in maintaining a totally satisfactory communication system.[13] One strategist who exerted a profound influence on British military thought for almost a century (1860-1940) fully appreciated the new position in which the British

Empire had been placed by the shift from the Age of Sail to the Age of Steam. Due to swiftness now afforded to a striking force, Captain John Colomb, the father of the Blue Water School, put forward the belief that the Empire could only be defended by adhering to two major principles. The first was that the safety of the Imperial communications must be secured and the second that sufficient military strength must be created to defend to all parts of the Empire.[14] Such a policy seems expensive at first glace but Colomb felt it could be effected if only strategic points within the Empire were equipped, most particularly the harbours necessary for the operations of the navy. These points would be well fortified and defended by a coordination of army and navy strength. In his calculations the navy was to furnish the first line of defence, to engage the enemy before it reached British territory, while the army would secure the navy's bases against attackers who got past the warships. Colomb clearly saw the interdependence of naval and military defence, and emphasized the need of the army and navy to cooperate closely.

> If, therefore, we trust the protection of our lines exclusively to a purely naval force, by imposing on our fleets the defence of the points which command them, we risk nay we court a general attack, not on England, not on the Channel, but on our vast colonial empire, our extended commerce and interests in every quarter of the globe.[15]

The reason for the maintenance of such a coastal force was the security of the Imperial communications for in Colomb's view, if these communication centres were not protected, "our enemy could make it physically impossible for the several parts to afford mutual assistance when attacked."[16] Colomb closed his brief with a plea for a Royal Commission on the defence of Imperial communication. The writings of John Colomb together with his brother Philip (of whom more will be said later), undoubtedly had some impact. In 1879 a commission was set up to enquire into the naval and military means provided for the defence of important sea ports within the colonial empire. Marked out for special notice were those stations established for coaling, refitting and repairing ships of the Royal Navy.[17] Thus, by the 1880s, the coastal defences of a vital station like Halifax were receiving considerable attention.

With this very sketchy glance at the theoretical aspects of communication with coastal defences, we now turn again to the practical matters of signalling. Before examining Halifax specifically a brief examination of the activities of the innovations in the field of military and naval communication would be in order. The first half of the century had been dominated by Pasley and Popham; for the last half credit must be extended to the work of Philip Colomb, a naval officer and historian. Colomb's work of a theoretical nature has been examined in D.M. Schurman's book *The Education of a Navy* and therefore will not be analysed here.[18] His contribution was probably greatest, however, when one considers his invention of a flashing system of signalling, a system eventually adopted by both the Royal Navy and the British Army in the late 1860s.

As previously noted, the invention of the electric telegraph did

have its impact on the British army overseas in 1858. In national terms, however, it was still a fragile device in the 1850s that could only be installed in relatively stable circumstances. It was of little value for the frontier skirmishes and quickly coordinated efforts of battle. These required an efficient and more adaptable type of communication. By the 1870s the Field Telegraph played a significant role in British Imperial expansion. It was used in Afghanistan, 1878-80, and South Africa, 1877-81. Due to its tactical operation in Egypt in the early 1880s, the Royal Engineer Field Telegraph Battalion was formed in April 1884.[19] This established telegraph communication as an integral part of army manoeuvres.

The Royal Navy, for obvious reasons, could not use the electric cable at all despite the fact that the technological changes had made obvious to the naval strategists the necessity of even more rapid communication than the old flag, pendant and ball system of the past. Coastal defences found electric cables most useful in keeping in close touch with each outpost - the first such telegraph being established in Halifax in 1869. Before this, however, the telegraph was being adapted as an offensive weapon as well. In 1865, the Royal Artillery Institution in England was informed of the use of the electric telegraph to measure the distances of ships from coast batteries.[20] In this way a more accurate fire from recently installed RML's could be concentrated on enemy ships. The author Captain R.W. Haig also noted that the course and speed of the ship could also be measured - a situation which would prove invaluable if the coastal station was armed with long range guns and torpedoes. The implementation of the electric telegraph in Halifax for such a purpose was still a decade or two away. Nevertheless the technology and the concern were there.

Given the above, the communication systems of the armed forces were still rather archaic. This was especially true of the ship to ship and ship to coastal station signalling system. In 1859, there was a slight modification of the *General Signal Book* but this was relatively insignificant. Signals had to be fast, short and unambiguous for ships were now swift, quick-turning vessels independent of wind. The flag system was too slow and the electric telegraph was impossible. The answer was forthcoming when in 1863 Lt. Philip Colomb presented a paper on a new type of signal system to the Royal United Services Institution or what one writer calls "the university of the services."[21] The admiralty took such an interest in Colomb's work that in 1867 it was adopted by the Royal Navy and published editions were distributed. Henceforth it became known as the "Colomb Flashing Signals." Colomb's idea was simple in the extreme. He merely took the audile signals of the Morse code and applied the principle to a visual communication method that could be manipulated easily and rapidly. Flags were tested and found too awkward although they could be used in some cases. Lights were ideal and a shutter or screen was used to accomplish the flashing. The code could also be used with "hooters" as well. Of greatest import, this system could be used at night.[22] This in one stroke did away with the cumbersome Pasley semaphore with lights. The navy, depending on the conditions, could utilize three visual signals - flags and pendants, semaphore, and flashing.[23]

The British army which had always trailed the Royal Navy in

signalling initiatives exhibited a great interest in the Colomb flashing device. The pressing question of army signalling was seriously considered by military authorities and Colomb himself was briefly attached to the Royal Engineers in order to advise them on signalling matters. It had been finally realized that some corps within the army would have to take responsibility for communications. The Royal Engineers thus made official what they had been doing in practice all along.[24] A school of signalling was set up at Chatham and virtually all units were required to furnish men to be trained as signallers. The signallers were instructed in the semaphore system of the Royal Navy, lamps for night work, the heliograph for long distance work and the electric telegraphy.[25] In the case of the last mentioned, after 1879 four officers and 160 men were prepared to take over the Post Office telegraph system if an emergency situation arose.

By the late 1870s, the Royal Engineers had a highly trained telegraph troop consisting of six officers and 245 NCO's and men.

> The troop is so organized that it can be broken up into three sections, each complete in itself. A certain proportion of the men are trained to act as signallers, and all the materials for visual signalling flags for use by day rockets and lime light for flashing signals by night - are carried with the troops.[26]

The troop also carried wagons of insulated wire, telegraph poles and four wagons fitted as offices with Morse recording instruments. The experience for such an efficient corps of men was provided by the activities of the Empire. The heliograph, for example, was used extensively in Wazeri Egypt in 1881 and in the Sudan in 1897; a heliograph signal station sent almost 1000 messages in a period covering 18 days.

The British army and Royal Navy in the 1860s, due to the innovations taking place , had either to adapt to the new methods of communication or be left behind and, worse still, fall victim to more adaptable enemies. Colomb's concept of flashing signals can be seen as the beginning of modern communication in both services, although the senior service, the navy, had shown a marked interest in any type of communication for a considerable period before this as shown above. The army, although innovative at times, as in 1810 during the Peninsular War, was much slower to realize the value of instantaneous communication. By 1880, as ever-increasing number of different visual and audile signals were being transmitted as the western world accustomed itself to the flashing lights and dot-dash clatter of telegraphy.

Halifax: Flags and Wires

In 1829, Gustavus Nicolls began his reconstruction of the Halifax Citadel. This fourth and last Citadel was to defend not only the provinces of the east coast but also the British military might that was garrisoned in Halifax and most importantly the Imperial Naval

Station. When Nicolls began his work, he little realized that the Halifax Citadel would be three decades in the making, cost some quarter of a million pounds and be outdated when it was completed in 1860. In 1829, Nicolls had other worries, both major and minor, and one of his minor concerns was where to put the flag staves which the Duke of Kent had erected in the Citadel. Before this, however, he had to decide what system he wished to use.

Despite the fact that Lieutenant-Colonel Pasley's semaphore had been adopted by the Admiralty the British Army appears to have been more reticent in utilizing the Pasley system. In 1827, while still at Chatham, Pasley was asked to provide information on his semaphore by the Board of Ordnance. He replied enthusiastically describing his device in some detail and urging that it could be used to great advantage in the colonies as the clearer atmosphere of the colonies would allow for greater visibility. The signal stations could then be separated by a greater distance.[27] The Board of Ordnance had requested this information as it would be required to provide equipment and furnishings for the new Citadel being erected in Halifax. The almost yearly expense of flags and bunting for the naval yards had led Ordnance to believe that the semaphore would be cheaper. As it was very difficult to make a cost comparison of the Pasley semaphore and flag and bunting system already in operation,[28] the commanding officer in Halifax was asked to assess the value of each method.

Nicolls, with his penchant for circumlocution, eventually got around to saying "no," although he ensured that the Lieutenant-Governor concurred first.[29] This was not difficult as James Kempt had played a prominent part in the telegraph system in use in Halifax at that time as noted in the second chapter. Nevertheless, Nicolls had sound arguments for maintaining the present system. It was simpler and more economical to operate than the Pasley device. Flags and pendants were not inordinately expensive and by their use they supplied the desired information to navy, army and inhabitants of Halifax. Nicolls argued that the present telegraph made over 700 questions and answers and could make more if required. The Pasley semaphore would not increase the signalling vocabulary.[30] He also pointed out that all four stations - Fort George, York Redoubt, Camperdown and Sambro would have to be re-equipped which might mean entirely new buildings. Nicolls thus found it most expedient to maintain the present system. Surprisingly, Nicolls did not use the severe climate of British North America as an excuse for not adopting Pasley's semaphore. Perhaps he was not familiar with the experiments carried out by Lieutenant-General J. Sherbrooke some years earlier. These experiments showed that the machinery would be impeded by cold weather and that the balls could be more easily seen through the haze of Nova Scotia than the arms of a semaphore.[31] In fact the only advantage that occurred to Nicolls was that the men working the Pasley semaphore could work under shelter whereas with the existing system they had to go outside the hut to operate the ropes. But "... no complaints have been made in this head [and therefore] it does not appear to be advisable that any unnecessary expence should be incurred on this account." Nicolls did mention one expense of the present telegraph system that would be queried in the years to come by the Ordnance Board. He noted that the major expense

for flags and pendants in Halifax was to keep them in repair. This, however, was not for the telegraphy but for signals made on the signal staff to denote vessels coming into the harbour and on the ensign staff to denote the port from which these vessels had come. In addition, a great part of the work was for naval purposes for the various admirals at different times used this station. These expenses were defrayed to a certain extent by the government. The Citadel then in 1828 was well established as the centre of Halifax communications and for this reason, Nicolls positioned them in a prominent place on the new Citadel.

As the rebuilding of the Citadel proceeded, it was plain that the positions that the three staffs occupied in the third Citadel were unacceptable (Fig. 15). They were all to be moved from the centre of the fort to the south front. The flagstaff was to be placed on the southwest demi-bastion and both the telegraph and signal staff were to occupy the right rampart of the southeastern front. This location allowed all three flagstaffs to be seen clearly by the signal station, the ships in the harbour (Fig. 16) and the inhabitants of Halifax (Fig. 17). The question as to when the staves were moved cannot be answered with any certainty. As early as 1828, before Nicolls had even started construction, the signal post at Fort George had deteriorated to such an extent that it was considered dangerous to maintain.[32] The signal staff eventually erected in the southeast salient was therefore new and would in the normal course of events have been erected as soon as possible. Whether the ensign staff and the telegraph staff were replaced is not known. In the case of the latter, it had been proposed by Rice Jones that the telegraph would be of better service if erected on the Cavalier building. Nicolls, however, believed that the movement of the large mast by the elements would adversely affect the masonry of the building.[33] Somewhat surprisingly, the signal director was housed on the top floor of the Cavalier building until the 1850s when he and his assistants moved to the southeast salient. The staves were not erected until the mid-1830s but by 1836 they appear to have been raised in their appropriate positions (Fig. 18) outlined by Nicolls.[34]

Although the Citadel signal posts were altered, no action was taken on the outposts. York Redoubt still maintained its telegraph post (Fig. 19) which could be seen clearly from Halifax without the aid of a telescope (Fig. 20). It was not only an important link between Camperdown and the Citadel but it also served the harbour by firing fog signals, a duty also carried out by Sambro Lighthouse.[35] Camperdown was also busy in the 1830s as a vital link in the telegraphic chain. The four men in the detachment were constantly required on duty and despite a request by the Lieutenant-General for assistance in digging a well, their absence from the post could not be granted for it would cause great inconvenience to the signalling service.

The only record of signals sent during the 1830s is a framed sketch in the possession of the Public Archives of Nova Scotia entitled "Signals made at the Signal Hill, Halifax when vessels were coming into Harbour" (Fig. 21). It included merchant, naval and packet signals and in it is the first mention of the use of wooden crosses as distress

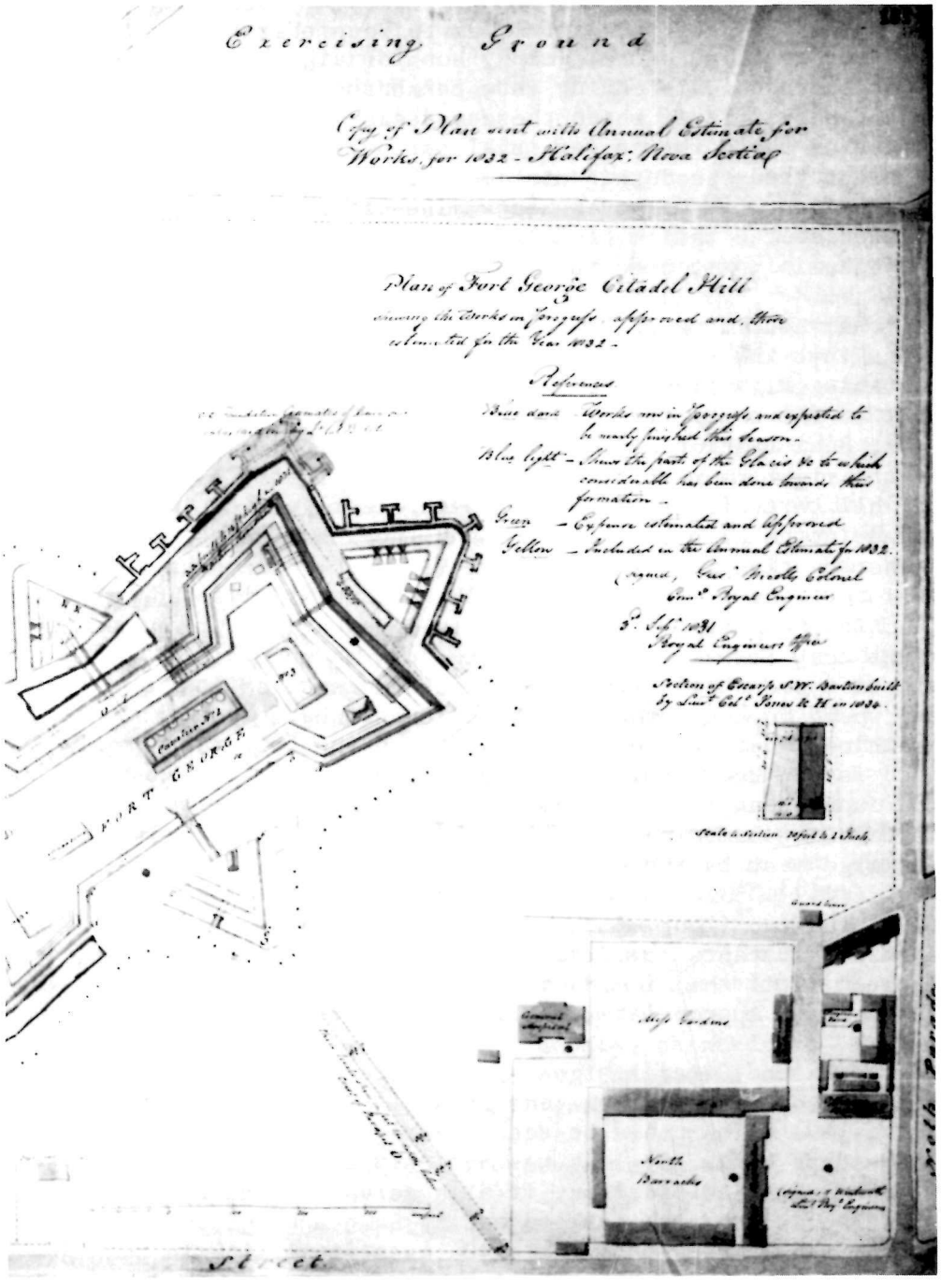


Figure 15. Plan indicating the location of the old staffs of the third Citadel on an 1831 plan of the fourth Citadel. The flagstaff (l) was on the west front, the telegraph staff (m) in the middle of the word George on the parade and the signal staff (n) nearly on the proposed east front. (Public Record Office.)

Figure 16. A view of Halifax and the Citadel from Dartmouth in 1837, showing two signalling staffs. (Public Archives Canada.)

signals. There was no doubt a proliferation of such sketches in the offices of the Halifax business community in 1840.

The 1840s brought renewed questions concerning the expense of the signal stations in Halifax and once more their upkeep had to be justified by the military. C.E. Trevelyan of the Treasury set forth to the Secretary of Ordnance the principle that only those signal stations in the Empire which were required for any military or naval object would be maintained by the home government. The expenses for any of the men employed in such a service were to be met by the Ordnance estimates instead of the quartermaster stores.[36] Such strictures were applied to the various signal stations in the Empire and led to the closure of several of them. In the colony of New Brunswick, the signal house near Carleton Martello Tower had closed,[37] a likely result of Treasury action. Other stations were successfully transferred to the Ordnance Department and these included Bermuda, Jamaica, Gibraltar, Sierra Leone and Nova Scotia. In the case of Nova Scotia only Halifax harbour, as the sole signal station in the province, was affected by a relocation within the financial structure

Figure 17. A view of the Halifax Citadel from the Commons showing two signal staffs and the ensign staff. (Public Archives Canada.)

and the presentation for its continued maintenance was forcefully put. In a letter dated 25 March 1844, Major Matson stated that the CRE Halifax must

> ... make the distinction between such Signal Stations as appertain to Commercial and Police purposes - and those which are required for any Military and Naval object.... This distinction is to be critically adhered to, both in Peace and War:- and the charge of the Military Signal Station will be under the Quarter Master General; the Signal men, paid on his Certificate, the Buildings and Signal Posts repaired by the Engineer Department... and the Gear supplied on his Requisition upon the Ordnance Storekeeper.[38]

The Halifax station was soon fully justified. In May, 1844 Viscount Falkland, Lieutenant-Governor of Nova Scotia, wrote to Lord Stanley on the necessity of maintaining the signal stations for military purposes and included enclosures by J. Dickson Major-General commanding, and the officers of Ordnance, including P.D. Calder Lt.-Col., R.E., all of whom were favourable to such action. The correspondents noted that the signal station was vital to army, navy and the shipping interest and was not used for any public service. As to the shipping interests, the expense of their flags was met by themselves, viz. the merchants, and was not considered an inconvenience by the military authorities.

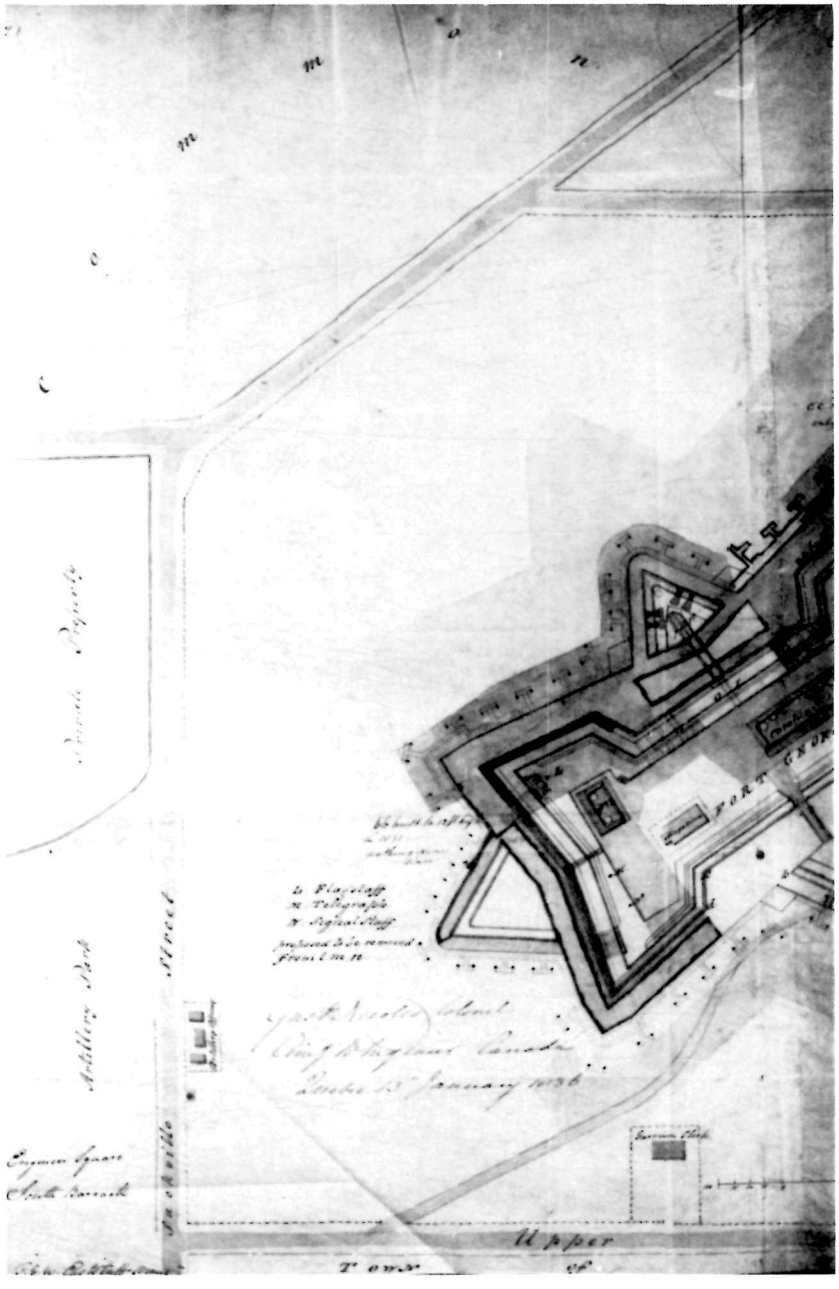


Figure 18. This 1831 plan shows the proposed new locations of the staffs. As mounted ca. 1835 the flagstaff (L) was in the southwest demi-bastion and the telegraph (M) and signal (N) staffs in the southeast salient. (Public Record Office.)

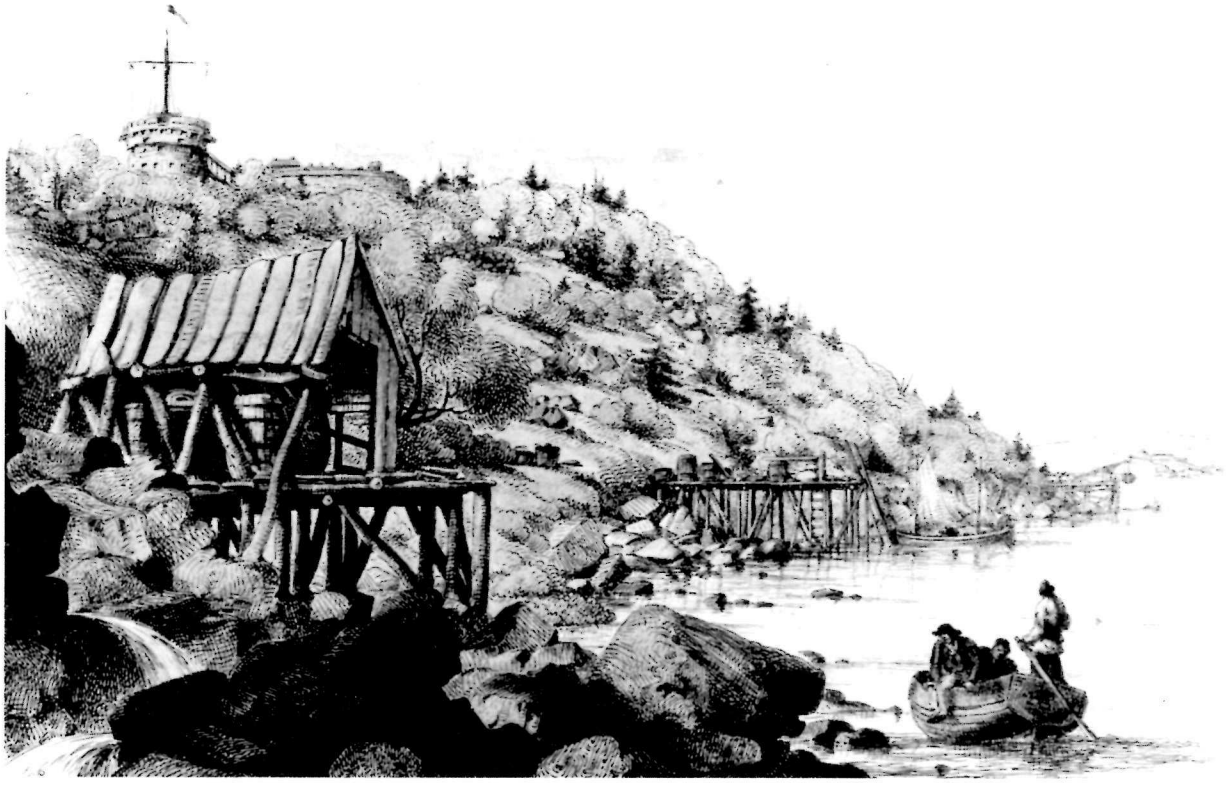


Figure 19. York Redoubt signal mast looking up the harbour, 1837. (Public Archives Canada.)

Figure 20. The York Redoubt signal mast as seen from Point Pleasant ca. 1840. (Public Archives Canada.)

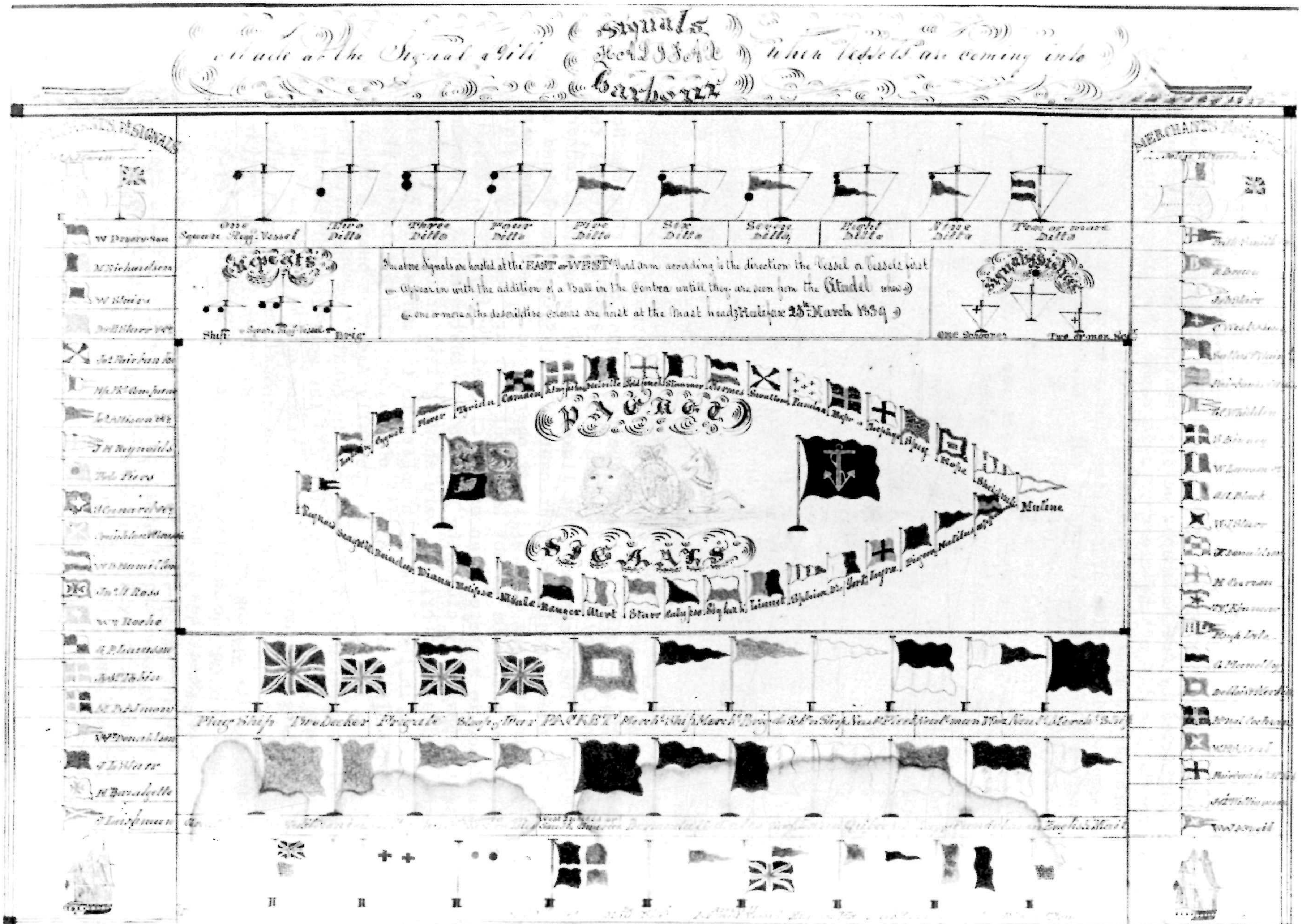
It would appear from the correspondence that the situation in Halifax was left as it was. An increase in sea traffic in the 1840s and 1850s would change this accommodating attitude as will be seen later. What is not clear from the correspondence is how the "public" telegraphs were used if indeed they were. Halifax was listed as one of the "Foreign Semaphore Stations" all within the British Empire. All were links in the Watson Telegraph System set up on an international basis in 1842.[39] Perhaps Watson's dream far outreached reality and he never succeeded in finalizing his system in the colonies. As noted earlier the electric telegraph was rapidly establishing itself and by 1847, five years after Watson had advertised his system as international, the electric telegraph had replaced the government's optical telegraph system.

By the late 1840s, some concepts about the use of the electric telegraph were entering the province from two sources, England and the United States, and this new invention would eventually, although not without a struggle, displace the flag and ball system of the Halifax harbour. That, however, would take another three decades.

In 1850, a letter appeared in a St. John's newspaper from John T. Mullock, Roman Catholic Bishop of Newfoundland. He suggested in his letter to readers what many others had already considered a possibility. This was a telegraph line across the island, connected to Nova Scotia by a cable across the strait. This would shorten the transmission of messages by 48 hours. No action was taken until 1852 when a New Yorker named Frederick N. Gisborne organized a company that was granted exclusive rights to erect telegraph lines across Newfoundland and then the messages received were passed on to Nova Scotia by carrier pigeon or steamer.[40] He consulted the American financier Cyrus Field whose career has already been examined and in 1854 the New York-Newfoundland-London Telegraph Company was formed. The interest in such a venture was quickly taken up elsewhere; in 1855 the Nova Scotia Legislature Assembly passed a private act to incorporate the Transatlantic Submarine Telegraph Company.[41] Obviously it was not intending to limit itself to the Newfoundland-Nova Scotia cable which would have been financially unviable. The Nova Scotia-Newfoundland submarine cable was completed by 1856 before the adventure of the Atlantic cable was begun. Within 12 years Cyrus Field, almost bankrupt, had completed his task which would permanently revolutionize worldwide communications.

From the above it should not be imputed that the eastern colonies of British North America were waiting on an American financier before beginning a telegraph line. Within two years of Morse's line being erected between Baltimore and Washington, a report was presented to the Lieutenant-Governor of New Brunswick, Sir William M.G. Colebrooke, by two doctors, J.Robb and J.B. Toldervy, which estimated the cost of an electro-magnetic telegraph between Fredericton and St. John which would follow much the same route suggested by Prince Edward almost 50 years earlier.[42] The two men advised the adoption of the Morse system as it was not only cheaper but also registered on the paper any telegraphic dispatch. It is probable that shortly after this time Nova Scotia also had its own telegraph system, the Nova Scotia Telegraph Line, which supplied information not only to government but also to the

Figure 21. A sketch of the signals made from the Halifax Citadel in 1839. To indicate that a ship belonging to Samuel Cunard and Company was entering the harbour a blue flag with a four-pointed white star was hoisted (left margin, 11 from top), while horizontal bands of red over white were used for the mail packet *Starr*. The warning that the enemy's fleet was entering the harbour was the French national flag in reverse (bottom row second from right). (Public Archives of Nova Scotia.)


Signals
Made at the Signal Hill Halifax when Vessels are coming into Harbour
MERCHANTS SIGNALS
One Square Rigg'd Vessel
Two Ditto
Three Ditto
Four Ditto
Five Ditto
Six Ditto
Seven Ditto
Eight Ditto
Nine Ditto
Ten or more Ditto
Repeats
Ship
Brig
The above Signals are hoisted at the EAST or WEST Yard arm according to the direction the Vessel or Vessels first
Appear in with the addition of a Ball in the Centre untill they are seen from the Citadel
Halifax 25th March 1839
One Schooner
Two or more Do
PACKET
SIGNALS
Flag Ship
Two Decker
Frigate
PACKET

popular press as well. It served provincial and international interests equally. In the 17 February 1851 issue of the *Novascotian*, the winner of the Colchester County election was being proclaimed by the newspaper before the votes had all been counted, due to the "magic" of the electric telegraph. The transcription of the information received is a strange mixture of the most modern communication device of the time transmitting the very traditional and predictable voting patterns of rural Nova Scotia.

> Creelman's Election is secured. Majority yet uncertain. No certain word from Tatamagouche and New Annon. Creelman's majority, there last year was 126. Munroe's majority exclusive of these places is 37, we may calculate on a majority of 75.[43]

In May of 1851, the *Novascotian* carried news of stock market quotations, steamer arrival and British and European news under the heading "Via Telegraph from New York."[44] By 1858, Halifax was in direct communication with Montreal and Boston for the first time and by the late summer of that year the Atlantic cable was completed and Halifax was receiving the most recent of international news.

The army in Halifax, however, was not quite in tune with the times. In the same paper that reported on the New York business community there was a story concerning the Nova Scotian inventor Dr. A. Gesner, who was experimenting with his kerosene gas light on the flag-staff of the Halifax Citadel. The hope was expressed that this light, which reflected "a very brilliant light," could be adapted for telegraphic purposes.[45] It is not clear when the electric telegraph connection to the Citadel was established. The military was certainly not enthralled with the telegraph posts that the Nova Scotia Telegraph Company had erected on the glacis of the Citadel in the early 1850s.[46] The posts were not linked to any telegraphic connections within the Citadel for Lieutenant-Colonel Savage complained of the posts interfering with military operations. Whether they were still there in the 1860s is not known but they are certainly still in evidence in a photo taken of the Citadel in 1899 (Fig. 22). Although still apparently clutching a rapidly outdated means of communication, the military authorities were showing less enthusiasm than they had exhibited in the 1840s with regard to the mercantile communications. In 1855, 1410 British vessels of 207,044 tons entered Halifax harbour. Including foreign vessels, especially American ones, a rough estimate would suggest over 2,000 vessels in total. As the harbour traffic increased in the 1850s, so too did the work-load of the military signalling coimmunity. The importance of the flags on the southeast salient to the city cannot be overemphasised. As each ship entered the harbour, its coming was flashed to the Citadel which initiated a flurry of activity on the Halifax waterfront. An *Acadian Recorder* columnist describes it best:

> How eagerly the merchants of the city would watch from day to day, the signal staff to see if their private signals were floating in the wind. And what a scurrying there would be of the employees on the wharves to be on hand when vessels arrived. All hands on deck - from merchant to the laborer - at six o'clock in the morning, with an

Figure 22. Looking towards the city from the southeast salient, 1899. (Nova Scotia Museum.)

> intermission from 8 to 9 o'clock for breakfast. Those were lively times on the waterfront.[47]

With such time-consuming responsibilities to the city and perhaps a suspicion that the electric telegraph would soon replace the military telegraph, the decision was made in 1857 to shift the expense of the mercantile signals elsewhere by closing down the signal staff. This included the military signals as well, for Lord Panmure commented in a letter dated 22 September 1857 that the signal establishment in Nova Scotia no longer needed to be maintained during peace time for any military purposes whatsoever.[48] The mercantile community quickly requested that the signal station be maintained as a boon but Panmure felt such action would entail a boon too expensive for any funds to manage. While the merchants and War Office dickered, the flagstaffs and yard-arms of the signal station were lowered on 1 January 1858 as threatened by the army. New estimates of the cost of keeping the signal posts were formulated. The press had other ideas. The *Acadian Recorder* suggested that the people of Halifax lay a submarine electric cable line to Sambro which would involve nominal cost and swifter communications. This system could be used day and night and, ending on a patriotic note, the paper commented that such action would leave the masts and flagstaffs on Citadel Hill to be used

only to display the British flag and holiday bunting.[49] The issue was resolved in 1858 when the Nova Scotia government agreed to defray the expense of the signal station at Halifax. The costs would be met by charging all vessels and steamers entering the port of Halifax from out of the province an entry fee of five shillings to be paid to the collector of colonial duties.[50] The signaller would remain military personnel and be paid at set rates. Presumably before the end of 1858 the signal staff and telegraph staff once more dominated the Citadel skyline. However the next decade would see a long-anticipated change in signalling practices and long-awaited adoption of the electric telegraph for the Halifax defences.

The 1860s gave rise to a long dormant threat to the security of British North America. In the spring of 1861, the American Civil War began and a series of incidents between Britain and the northern states almost led to hostilities which would certainly have affected British North America. Halifax was, after all, an important refuge for British squadrons and an excellent flanking position if any American force attempted an invasion. As the war drew to a close in 1865 there was also the fear that the Union army of a million would, by simply marching, fulfill the much espoused prophesy of "Manifest Destiny" from the young republic and create a continental nation from the Atlantic to the Pacific, from the Arctic to the Caribbean. This obviously did not occur but during 1866-67 the male inhabitants of Upper and Lower Canada and the Maritime Provinces of militia age were on alert to prepare for possible Fenian attacks. Generally then the 1860s was a period of tension in Halifax. It should not be surprising that during this decade over £170,000 were expended on the Halifax fortifications.[51] This was in keeping with the new Imperial policies as regards coastal defence and was also due to the shadow of American power. An accurate and rapid communication system was vitally important to such defences. With this in mind it is surprising that the establishment of an electric telegraph connection to one of the outlying forts was postponed until the end of the decade.

The visual military communication utilized in Halifax was as modern as was possible. Several of those involved in signalling were in touch with Colomb's latest innovation in the field of signal flashing. Thus Halifax probably knew of any army or navy signal changes before they actually went into practice. Captain Bolton even contributed to the deliberations of the Royal United Services Institution in London and is credited with effecting several important improvements in the art of telegraphy.[52] His efforts were probably responsible for the lanterns hoisted on the yard-arm beginning in May 1863 to note the direction from which a ship was approaching. The old signal route was still in place in 1861 (Fig. 23). The military communications system was constantly evolving while the merchant signal staff played a constant role in city affairs (Appendix 6). There was, however, an interruption of the mercantile service in February of 1866 when the signal staff was shifted to allow for a change in armaments on the Citadel. The signal staff erected on the south front was removed and replaced by a taller staff which included 16 additional feet. The additional length was due to the flagstaff's new position on the re-entrant angle of the southeast salient. The work was completed by

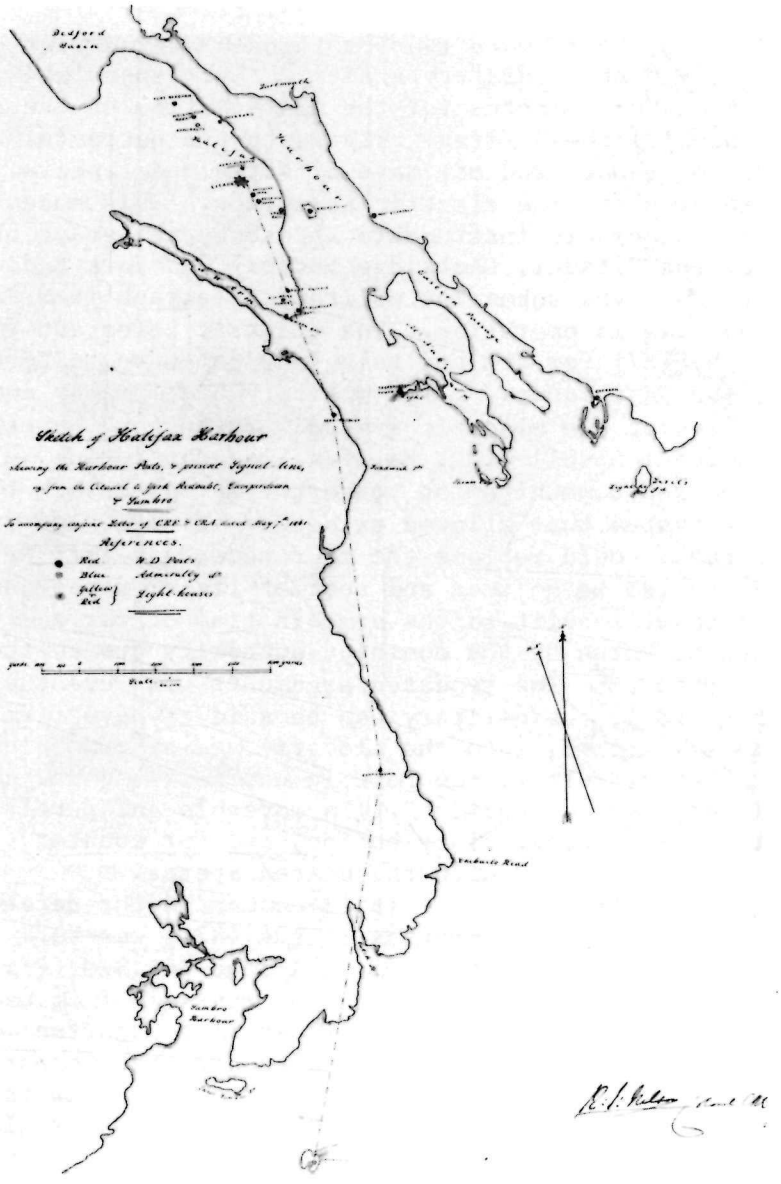


Figure 23. The signal line from the Citadel to Sambro in 1861. (Public Archives Canada.)

the naval artificers as they were considered to have more practical experience in this work than the military workmen.[53]

The electric telegraph was certainly proving its military value elsewhere. In New Brunswick during April of 1866, a series of telegraph communications from the southern border of New Brunswick to the commander-in-chief in Fredericton warned of possible Fenian raids on St. John and Fredericton.[54] Men were quickly mobilized at the borders and along the Bay of Fundy and, although the invasion was of

little consequence, there were rumours throughout the rest of the decade that the Fenians would try again.[55] Such speculations provided the necessary impetus for the installation of the electric telegraph connecting the Halifax fortress to the outposts.

In 1869, the report and estimate of works and repairs included a sum of £223 to complete the electric telegraph. This amount would provide for the necessary instruments and three telegraph officers to be situated at the Citadel, Cambridge Battery and York Redoubt.[56] By October of 1869, the submarine military telegraph from Fort George to York Redoubt was in operation. The electric telegraph was extended to Camperdown by 1871 for trained telegraphists were being sent to both York Redoubt and Camperdown.[57] The military had finally awakened to the advantages of the electric system. Colonel R. Burnaby C.R.E. in a letter to Colonel Ansell C.O., Halifax, was unstinting in his espousal of the new communication network. He was struck by the advantage of a system that allowed exchanges at night and in fog. One telegraph operator could replace the four necessary for the old method and there would also be no wear and tear of flags, ropes and spars. It would also be of benefit to the army in time of war and yet he noted the cost could be borne by the dominion authority due to the fact that Canada was at peace.[58] The repeated arguments were eventually accepted and by 1871, the military can be said to have firmly stepped, or should one say sidled, into the electric age of communications. Now Halifax could better fulfill the role in which Colomb had cast her as the Imperial fortress to provide "... a moveable and purely military force for strategical coast distribution, and for counter attack,"[59] in case of a war with the United States.

Although the Halifax Citadel still commanded the defence of the harbour, the most important fortress in the 1870s was York Redoubt. Although the optical signal staff was still up in 1870 (Fig. 24) as a backup system and also for transference of messages from Camperdown, the electrical telegraph to the Citadel was more important. Invasion by land was no longer feared and thus to counter the threat from the armoured steamers, Halifax's defences began to move outward. Ordnance in the various outposts of the harbour were changed as rifled muzzle loaders replaced the old smooth bores.[60]

For a change, Halifax's strength was all out of proportion to the likely dangers to it in the 1870s and 1880s.[61] Due to this increased fire power and its commanding position on the high bluff at the harbour mouth, York Redoubt became the keystone in the Halifax defence system. Flags and pendants between the Citadel and York Redoubt were still used although the bulk of the communications was by telegraph. Then in November 1873 a fire completely destroyed the signal hut at York Redoubt and only the electric telegraph was used after that. Whether a new signal staff was seriously contemplated is not known at present. It does not appear to have been built, for a sketch done in 1880 shows only a flagstaff (Fig. 25). Thus was broken the first link in a visual communication system that had lasted almost a century. The final disruption came even more rapidly. In 1879 an electric telegraph was installed in other batteries at Fort Charlotte, Ives Point and Camperdown.[62] The message of a ship's arrival would no longer be sent by a flash of bunting but by a spark of electricity.

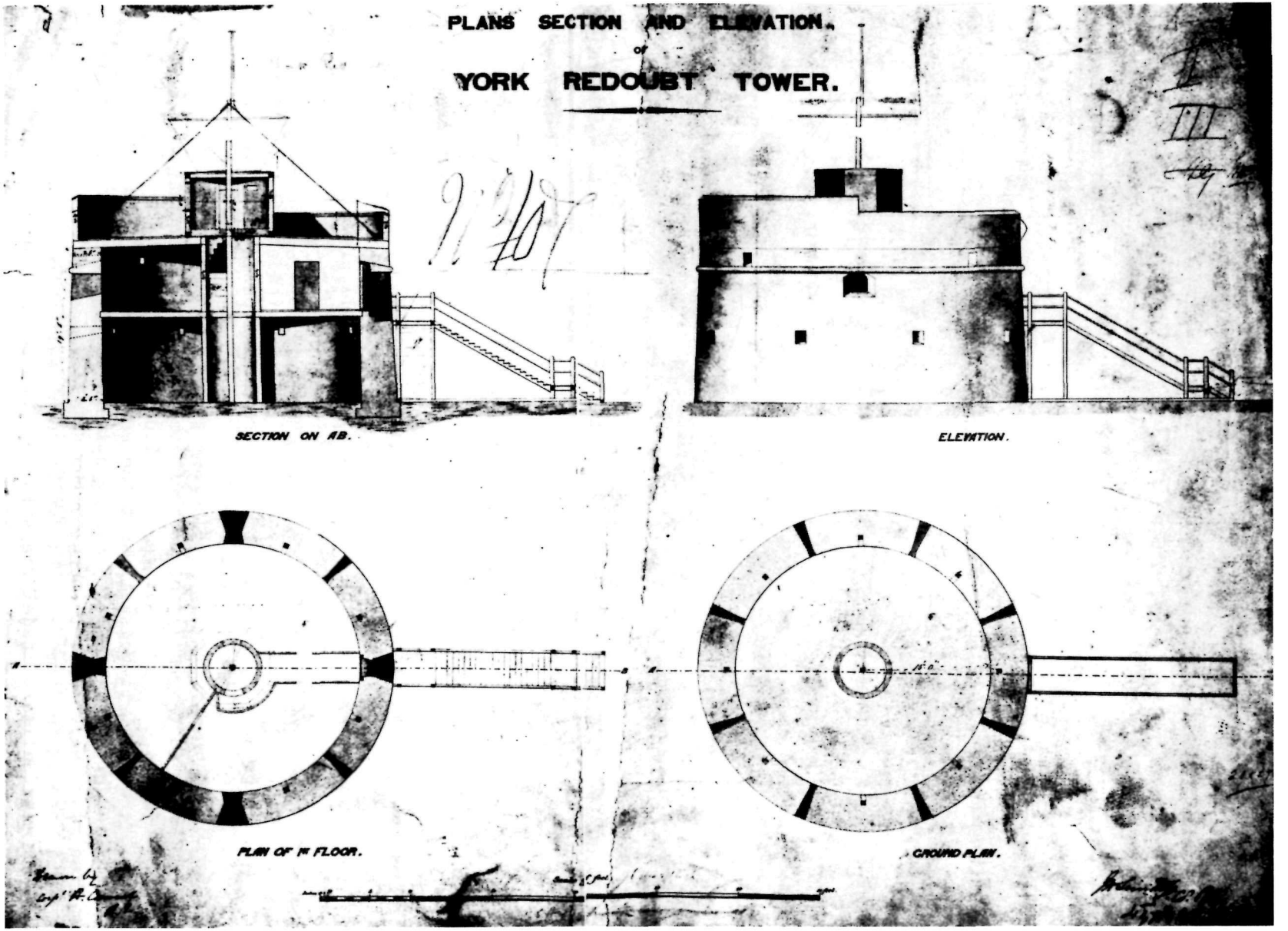


Figure 24. An 1870 plan of York Redoubt tower and signal staff. (Halifax Defence Complex.)

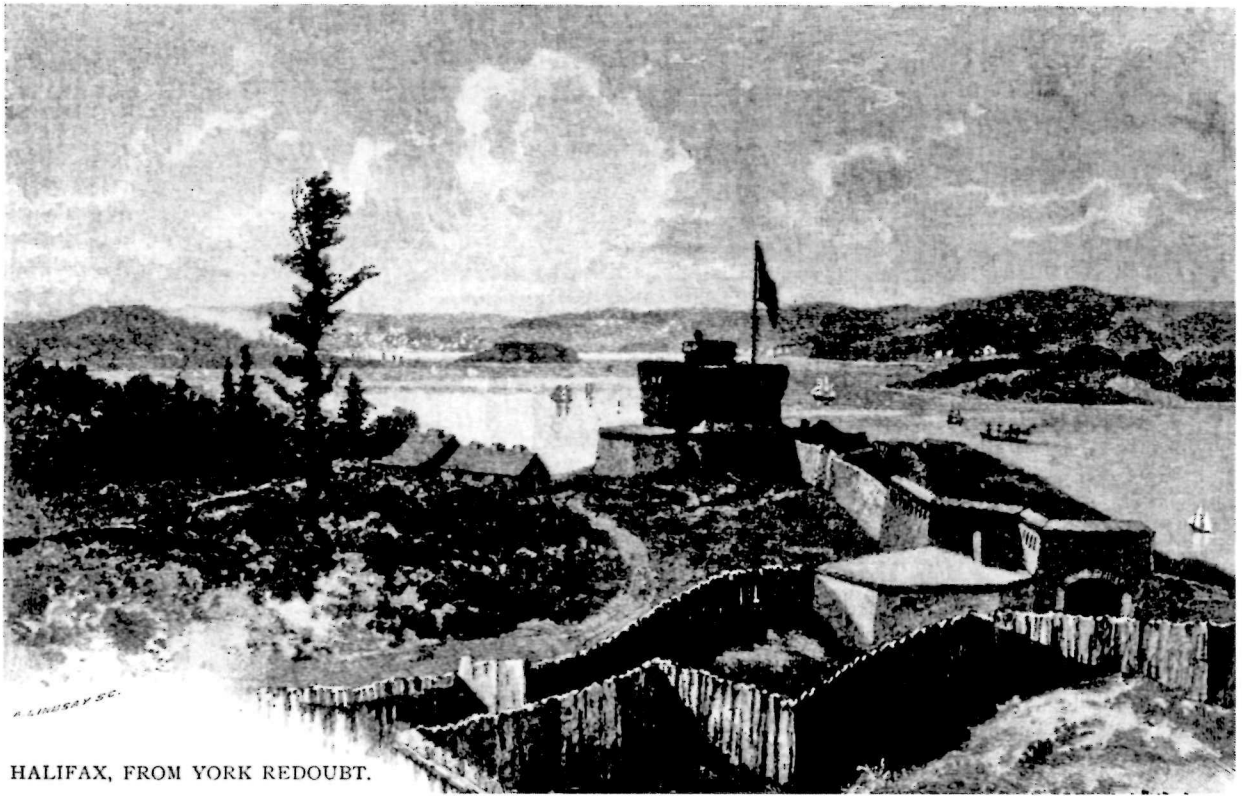


Figure 25. Looking towards Halifax from York Redoubt in 1880. Note the absence of a signal staff. (Public Archives Canada.)

The harbour and its coastal batteries were now completely wired for defence. Only the flags and bunting waved at the Citadel as the commercial code was still flashed (Fig. 26).

The introduction of the new devices did not lead to the lowering of the bunting. Messages were still flashed to the city by the signal staffs. In fact a staff had been added. In 1873 a storm mast was erected on the southeast salient to give the city and harbour due warning of an approaching storm. The flags still played their part in celebrations. It was noted by the *Morning Chronicle* on 25 May 1870 that Queen Victoria's birthday was observed in the "usual manner."

> Early in the day the signal staff at the citadel, the ships of war, and many of the merchant ships in port, were decorated with flags....[63]

Despite the very noticeable displays that the staffs on the southeast front put on (Fig. 27) the work of communication was being done by other means. The noonday gun was fired only after the Halifax timekeeper Robert Cogswell sent the correct time by private telegraph to Citadel Hill. The city had even installed a fire alarm telegraph and plans were afoot to connect the Halifax Imperial station with its counterpart in Bermuda. This would be a reality in the 1880s.

The Halifax Citadel flags had by 1880 become more a tradition than a necessity. True the mercantile signals were of some importance

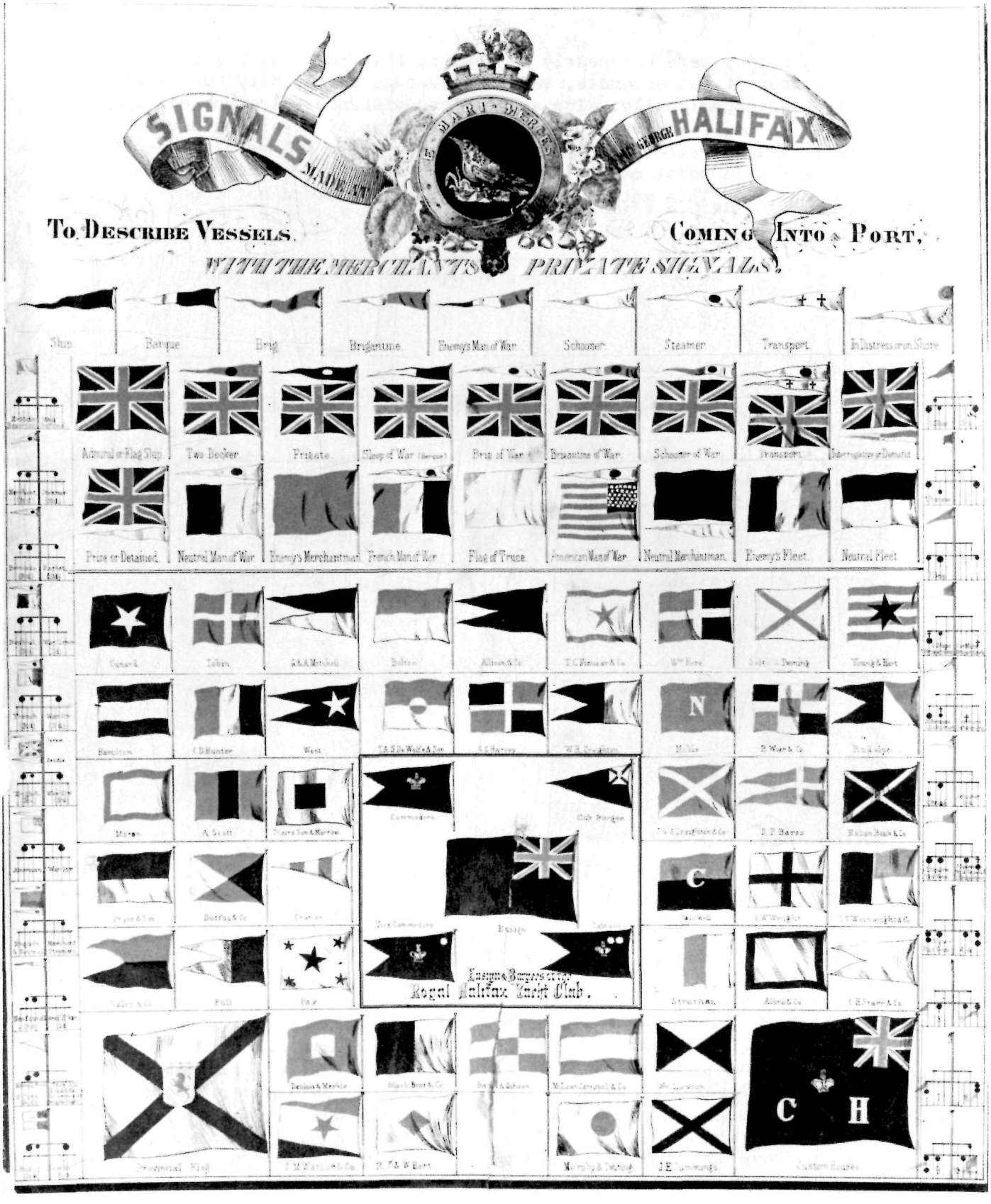


Figure 26. Signals made at Fort George, Halifax for all vessels ca. 1880. The predominating colours for the flags are red, white and blue. The symbols on the two margins indicate that a ball system was still in use to indicate the number of ships and the port of origin for mail packets. (Public Archives of Nova Scotia.)

although they were not nearly as important as they had been. The storm mast, when it was accurate, was an advantage to the city but it was only used occasionally. The army's long distance telegraph had long ceased to be of any value. The special corps of Royal Engineers had their various methods of communication but these did not include the flag and ball hoist method introduced to the Citadel many decades previously. This method had finally been discarded for sound.

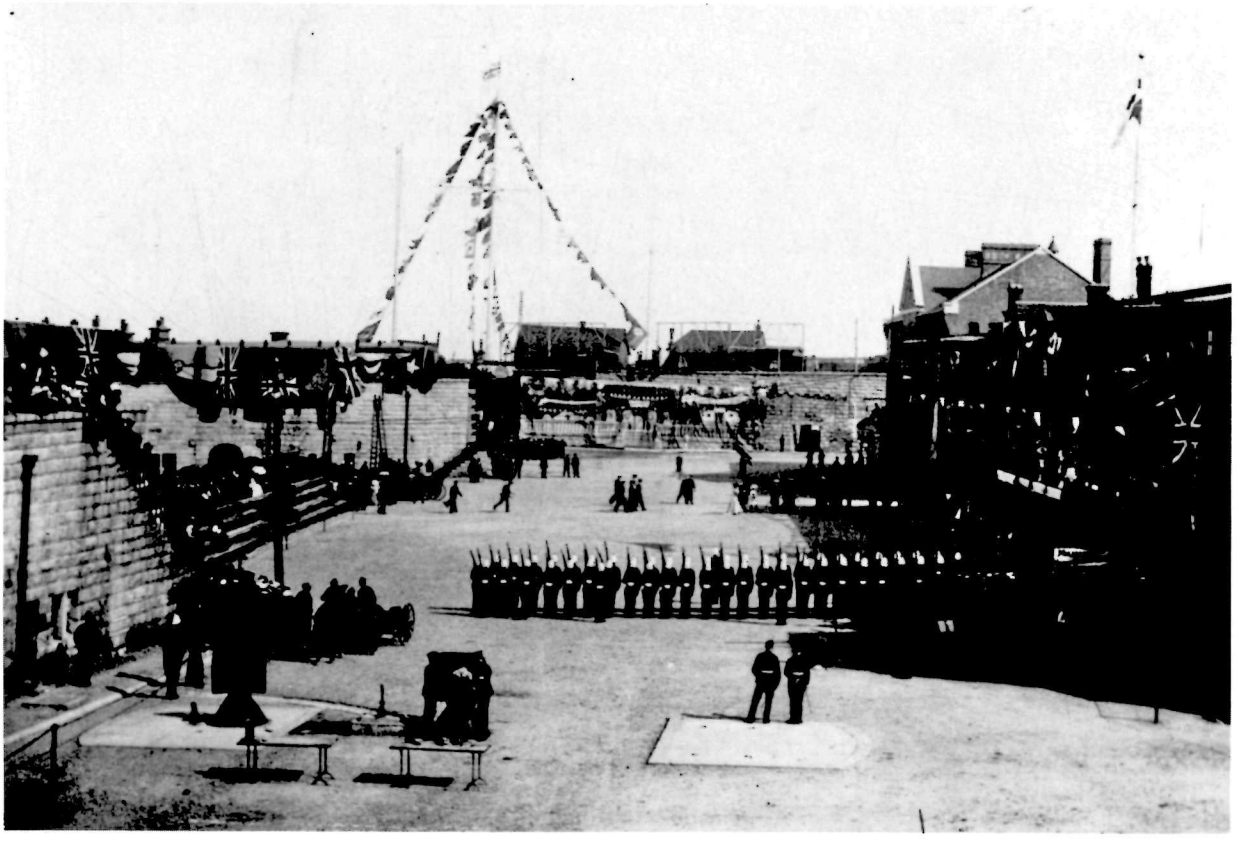


Figure 27. The signal staff of the Halifax Citadel in full array in 1903. (Public Archives Canada.)

THE SPOKEN WORD

> Tis not impossible to hear a whisper a furlong's distance (200 meters), it having already been done; and perhaps the nature of the thing would not make it more impossible though that furlong should be ten times multiplied.[1]
>
> - Robert Hooke
> (17th Century inventor)

In the 1870s, man was on the verge of accomplishing what Robert Hooke had casually remarked upon almost two centuries before - voiced long distance communications. Hooke was referring in the above quotation to speaking tubes and the voice being transmitted within a confined air space. By 1870, however, western technology was able to provide a contraption infinitely more sophisticated and far-reaching in its impact. Electricity, which had been harnessed to send a code of dots and dashes, was about to be employed in transmitting the voice. After its invention in 1876 by Alexander Graham Bell, the telephone spread throughout the world even more rapidly than the telegraph had before it. Obviously, man was becoming more and more receptive of new inventions. A year after Bell had first spoken into his transmitter, the telephone became commercially viable. In 1878, the first telephone and switchboard for commercial service was installed in New Haven, Connecticut and by 1880, there were 138 exchanges in operation in the United States with 30,000 subscribers. The pattern soon spread to Canada and Europe and in 1887 there were 12,000 subscribers in Canada, 26,000 in Great Britain and 22,000 in Germany. The last 30 years of the 19th century did not experience the foot-dragging and the conservatism of the earlier years of the century in matters of technology. New devices were no longer considered toys and were soon gobbled up by consumers and put to some functional and commercial use by some entrepreneur. The pace of inventiveness picked up as new discoveries spawned innovations and modifications which would have been considered with some awe and suspicion two decades previously and the cry went up for more.

The changes in communication devices will not be chronicled in detail here save to mention that the wireless and later radio would usher in a whole new era in the 20th century. In the first year of this new century, 1901, the wireless had spanned the Atlantic.[2] When Marconi transmitted the letter "s" from Cornwall to Newfoundland in that year, he made the efforts of Cyrus Field and his Atlantic cable between continents seem as ancient as the Duke of Kent's visual telegraph system between Nova Scotia and New Brunswick. Of greater interest to this study and its sea-bound tradition is the impact that the wireless had on ship communications. No longer would the flag and light manipulations of Popham, Pasley and Colomb be the sole means of

sea communications. Now ships could transmit night or day and, more importantly, when separated by hundreds of miles. The impact this would have on warfare was barely hinted at during the Russo-Japanese War (1904-5). A thorough examination is beyond the confines of this study. Suffice to say that man had finally discovered the means of instantaneous communication to any spot on the globe and it now remained to erect the necessary receivers for its use. The ether had become even more glutted with "sound." Order, commands, requests and market quotations were utilizing the telegraph, telephone and wireless to cross oceans, continents and empires. The empires in particular found the new inventions useful and their armed forces were becoming less likely to leave these new technological marvels for "lesser breeds" to adopt first.

The British military strategists were still in the depths of their debate over the defence of the Empire and by the late 1880s the British Royal Navy would once more receive the attention that it requested to defend the homeland and the colonies. The Empire was still expanding and its best defence was still due to the maritime quadrilateral outlined by the Duke of Cambridge in 1869. The four points on this figure were Malta, Gibraltar, Bermuda and Halifax.[3] All were coastal Imperial stations which contained both military and naval forces and received whatever military expenditure was necessary to maintain modernity in weaponry and communications. One, Halifax, had been improved and fortified well beyond its defensive requirements.

The defences of Halifax in 1880 have been detailed in the previous chapter. Large sums of money had been spent for new construction, the latest in heavy armament and a communication system to ensure the impregnability of the defence system. The telegraph lines and cables had been laid to link the various forts in the complex in 1879. A telephone connection was still in the future. The city of Halifax, however, was not far from telephone communications for in 1883 the Bell Telephone Company of Canada was about to begin the construction of a switchboard system.[4] A telephone connection between the Citadel and military property was no doubt in place by 1890. The *Proceedings of the Royal Artillery Institution* noted in 1893 that a farewell dinner was held in the mess for General Sir John Ross. As he was absent from the party, his *bon voyage* was communicated to him by telephone.[5] Further research will no doubt provide a fuller account of the telephone exchange installed by the military in Halifax.

The defence of the Imperial station in Halifax from 1880 to 1900 was as efficient and modern as a former colony could expect. Aside from the introduction of the telegraph and telephone, there were also the breech-loading guns that had replaced the rifled muzzle loaders in 1878, the electric searchlights at Point Pleasant in 1886 and the quick fire guns at Fort Charlotte in 1887. The problem during this period appears to have been not so much the means of communication but how to coordinate all the various systems being used. Where once a flag could be waved as a signal, there was now a whole plethora of ways to transmit a message. Training in all the various forms of signalling or communication was being given and specialists were developing. Communication in all its forms was no longer the sole responsibility of

the Royal Engineers although they undertook much of the training. The Royal Artillery now had a very competent signalling program which included telephone, the naval system, electric signal lamps and the ordinary signal flag.[6] In the latter instance the army had not yet caught up with the naval semaphore system. Those stationed in coastal batteries like Halifax had taken a more active interest in flag waving and the system was widely known. It was noted by Sherbrooke in an article written in 1904,

> In many batteries, practically every man can now read semaphore signalling.[7]

By 1900 the Halifax Citadel, from all outward appearances, still waved the flag and showed the bunting on Royal birthdays and accession days. But the previous decades had seen the continual decline of the Citadel to a much less formidable stature as a fortification. In the dim beginning of the settlement, the outstations were there to support the heart of the Halifax defences on Citadel Hill. The 19th century witnessed a dramatic shift in society brought about by increased industrialization. The corresponding changes in military technology had their own particular effect on strategy and tactics and in turn the military base of Halifax was affected. The Halifax Defence Complex in a brief 50-year period (1850-1900) underwent a great transition. Rapidly the firepower of Halifax's defence moved outward towards the mouth of the harbour. At the same time communications between the Citadel and the outstations transformed from visual flag waving to direct communication by voice. The military had been swept up in a worldwide revolution in communications and the Halifax Citadel, so near completion in 1850 as the most modern of forts would soon be outmoded in weaponry and of less than primary concern as a bulwark of defence. But it still had a part to play besides being a rather uncomfortable barracks. Utilizing the new electronic links to the outstations, the Citadel's new role was well established by the end of the century. It would be the collector, coordinator and disseminator within the new communication systems - the nerve centre of the Halifax Defence Complex. It was just as it had been a century before when Prince Edward raised the first flags of his telegraph system over the ramparts of Fort George.

APPENDIX 1: POLYBIUS' COMMUNICATION SYSTEM

About 170 B.C. while a tutor in the house of Aemillus Paulus in Rome (charged with the education of his two sons, Fabius and Scipio), Polybius apparently found time to develop his improved signalling method. In Chapter 46 of his 10th book of history, Polybius writes:

> The last method which I shall mention, was invented either by Cleoxenes or Democritus, but perfected by myself. This method is precise, and capable of signifying everything that happens with the greatest accuracy. A very exact attention, however, is required in using it.
>
> ...
>
> Take the alphabet and divide it into five parts, with five letters in each. In the last part, indeed, a letter will be wanting, but this is of no importance. Then let those who are to give and to receive the signals, write upon five tablets the five portions of the letters in their proper order, and concert together the following plan: That he, on one side, who is to make the signal, shall first raise two lighted torches, and hold them erect until they are answered by torches from the other side. This only serves to show that they are on both sides ready and prepared. Then afterwards, he again who gives the signal shall raise first some torches upon the left hand, in order to make known to those on the other side which of the tablets is to be inspected, - if the first, for example, a single torch; if the second, two; and so of the rest. That then he shall raise other torches also upon the right, to mark in the same manner to those who receive the signal, which of the letters upon the tablet is to be observed and written. When they have thus regulated their plan and taken their respective posts, it will be necessary first to have a dioptical instrument formed with two holes or tubes - one for discovering the right, and the other the left hand of the person who is to raise the torches on the opposite side. The tablets must be placed erect and in their proper order near the instrument; and upon the right and left there should be also a solid fence of about ten feet in length, and of the height of a man, that the torches, being raised along the top of these ramparts, may give a more certain light, and when they are dropped again, that they may also be concealed behind them.

.....

When all things, then, are thus prepared, if it be intended, for example, to convey this notice, 'that some of the soldiers, about a hundred in number, have gone over to the enemy,' it will be necessary, in the first place, to choose words for this purpose which contain the fewer letters. Thus, if it be said, 'Cretans a hundred have deserted,' the same thing is expressed in less than half of the letters which compose the former sentence. These words, then, being first written down, and communicated by means of torches in the following manner. The first letter is K (Kappa) which stands in the second division of the alphabet and upon the second tablet. The person, therefore, who makes the signal first, holds up two torches upon the left, to signify that it is the second tablet which is to be inspected; and afterwards five upon the right to show that Kappa is the letter, which who receives the signal must observe and write - for Kappa stands fifth and the second division of the letters. Then again he holds up four torches upon the left, because P (Rho) is found in the fourth division; and two upon the right to denote that it stands the second in that division. From hence the person who receives the signal writes Rho upon his tablet, and in the same manner all the rest of the letters. By this method, an account of everything that happens may be conveyed with the most perfect accuracy.

It is true, indeed, then, because every letter requires a double signal, a great number of torches must be employed. If the necessary pains, however, be used, the thing will be found to be very practicable. In both these methods it is principally requisite, that the person employed should first be exercised by practice: that, when a real occasion happens, the signals may be made and answered without any mistake.

There were naturally some problems in reading signals sent by Polybius' system, due in the main to the lack of telescopes. It was difficult at long range to discern the left screen from the right. To alleviate this Polybius used what he called "a geometrical instrument." Professor Chevalier of the Royal College at Paris has described this portion of the system:

An upright post was driven into the ground, and provided at the top with a pin, on which the cross-bar works on a pivot horizontally at right-angles to the bar; each tube being exactly parallel to the other, and in the same plane. When the signal stage has been prepared, the "geometrical instrument" of two tubes is set up, in such a position that the right and left tube align directly on the right and left screen of the distant station. An observer is stationed at the tube and by carefully watching the opposing screens reads off the signal lights.

Needless to add, each signal station is provided with one of these instruments.

Source: David Woods, A History of Tactical Communication Techniques, 1965, pp. 8-10.

APPENDIX 2: ADMIRAL POPHAM'S LAND AND SEA TELEGRAPH 1816

Sea Telegraph

The ship telegraph consisted of two posts, side by side, each carrying one arm. For a ship the size of a frigate the posts were to be 12 ft. 2 in. high, the vanes 6 ft. 4 in. in length by 10 in. wide. For larger vessels, the sizes might be increased in proportion. When signalling abeam, the foremost post was considered as carrying the upper arm, the aftermost the lower. Similarly, when signalling ahead or astern, the starboard post meant upper arm, larboard lower.

In 1816 there was a general demand for Popham's sea telegraphs to be supplied to the fleet. On July 6th, for instance, approval was given to supply all of Lord Exmouth's line-of-battleships. Communication was kept up between Chatham and Sheerness by means of Popham's semaphores on board the guardships and intermediate vessels lying off Upnor and in Saltpan Reach.[1] In this same connection, the Admiralty on November 2nd, 1818, gave approval for the Bulwark and Northumberland, guardships at Chatham (Long Reach) and Sheerness respectively, to bear each two supernumerary seamen for keeping up semaphore communication.

The foot of the ship semaphore post was stepped into a block of wood, but the Explanations said "the posts may be fixed on trucks, to be moved from one part of the ship to the other." As a matter of fact Popham did, when submitting his quarterdeck telegraph to the Admiralty on April 22nd, 1816, suggest the fixing of one of his semaphores on the topmost cross-trees for distant communication. Although this might conceivably have been put into practice, it was a very different proposition to hoisting the machine to the truck, an operation which one would prefer to have seen before believing.

Land Telegraph

Popham's land machine consisted of a hollow hexangular mast made of timber, 30 ft. high above the building, with two arms, pivoted at 12 ft. and at the top, 8 ft. long, and 16 in. wide. When at rest, the arms folded inside the mast, and the machinery, composed of "bevil" wheels, rods and screws, was also enclosed. The whole contrivance was pivoted, and could be trained all round the horizon. The purpose of this was not evident in a straight line of overland stations, but it

was a necessity at a coastal post, where a ship might have to be followed as she passed in the offing.

Source: Commander H.P. Mead, R.N., "The Story of the Semaphore," Mariners Mirror, Vol. 20, No. 3, pp. 349-70.

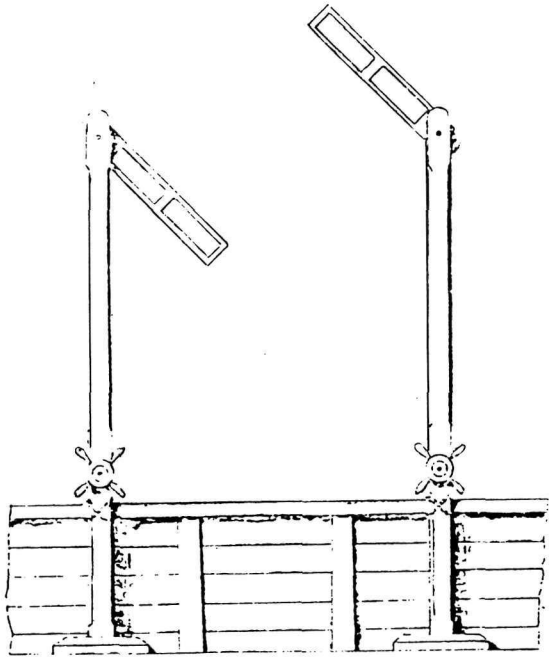


FIG. i. POPHAM'S SEA TELEGRAPH

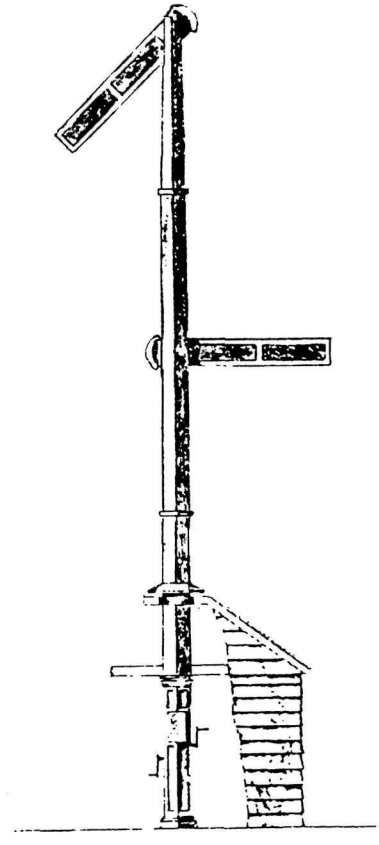


FIG. ii. POPHAM'S LAND TELEGRAPH

PLATE XVI

APPENDIX 3: DESCRIPTION AND USE OF THE TELEGRAPH, QUEBEC 1809

Description of the Telegraph

Lower Yard

The Lower Yard is equally divided into Two Arms, (one upon each side of the Mast,) and Each Arm, into Five divisions; the alternate divisions being marked by a square piece of wood placed under them, for the greater facility in distinguishing the divisions.

Arm A --- UNITS. Upon the Arm A, Units are represented, and a second Ball (suspended upon another,) upon this Arm, invariably denotes Five.
----Thus the No. 3, is made by hoisting One Ball as the third division from the end of the Arm.----The No. 8, by suspending a second Ball from the same.

Arm B --- TENS. Upon the Arm B, Tens are represented, and a Second Ball upon this Arm, invariably denotes Fifty.----Thus the No. 20 is made by hoisting One Ball at the Second Division from the Mast.----The No. 70 by suspending a Second Ball from the same.

Slider C- HUNDREDS. Hundreds represented by means of a Triangular Slider C, which is placed behind the Mast when not in use.----It slides along the whole extent of the Lower Yard, and by placing it upon any of the nine divisions from 1 A, to the 4th division upon B, any number under One Thousand can be made.

N.B. The Arm A, upon which Units are represented, is invariably that upon the Right Hand when looking up the River.

Upper Yard

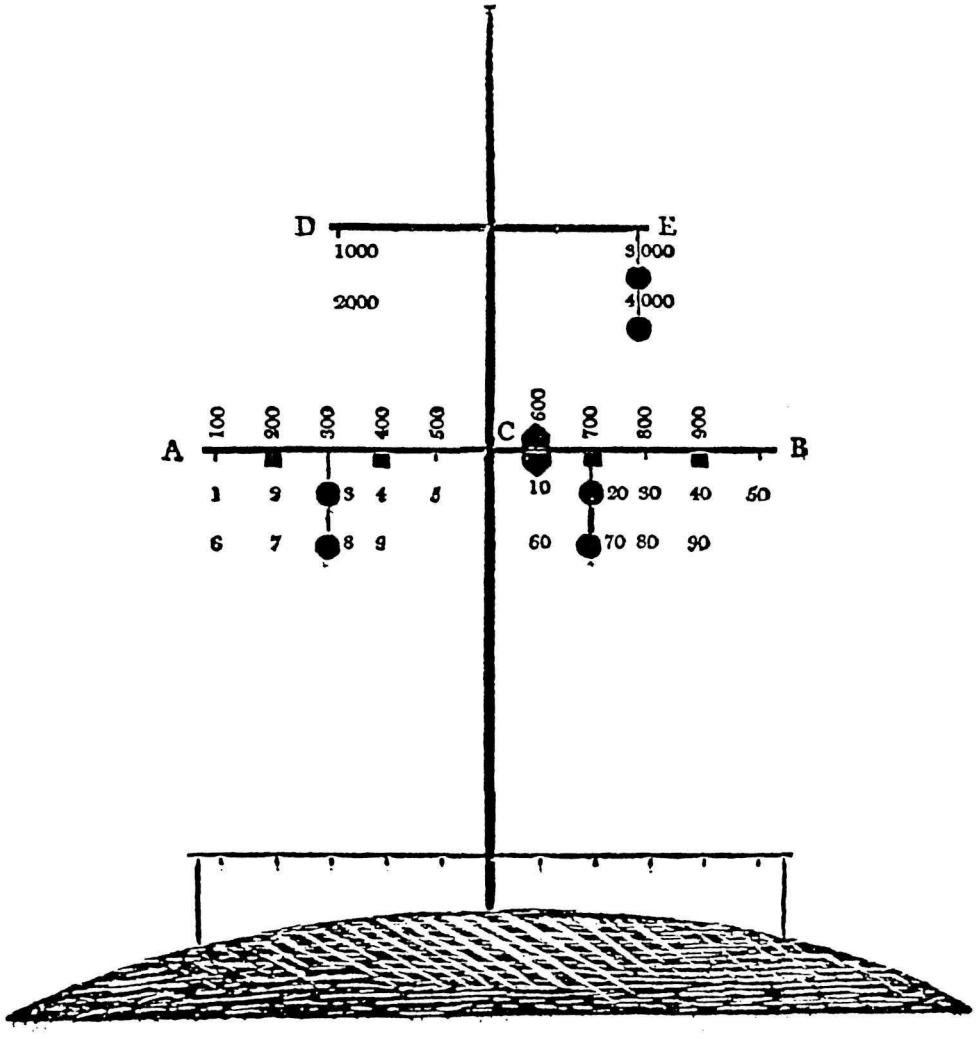
Upon the Upper Yard, Thousands are represented in the following manner:

Arm D --- One Ball denotes . . . . . One Thousand.
A Second Ball . . . . . Two Thousand.

Arm E --- One Ball . . . . . Three Thousand.
A Second Ball . . . . . Four Thousand.
One Ball upon Each Arm . Five Thousand.

In the annexed Plan of the Telegraph, No. 4678 is represented.

THE TELEGRAPH.



Lower Yard. { Arm A — — — — Units represented.
Ditto. B — — — Tens Do.
Slider C — — — Hundreds

Upper Yard. { Arm D — — — — } Thousands,
Ditto. E — — —

Instructions for the Use of Telegraph

Preparative - Previous to making any Communication by the Telegraph, a Blue Flag is to be hoisted (as a preparative) at either end of the Upper Yard, and kept flying till repeated by the next Station; the Message will then be proceeded with, number after number, until finished.

Message FINISHED. - When the Message is finished, a Blue Flag is to be hoisted at either end of the Lower Yard (where the Communication originated,) and kept flying till repeated.

Message UNDERSTOOD. - A Red Pendant at either end of the Upper Yard, indicates that the Message is understood.

Message not UNDERSTOOD. - A Red Pendant hoisted at either end of the Lower Yard, indicates that the Message is not understood.

EXAMPLE - Suppose it were required to convey a Message from the First to the most remote Station;-The Preparative Flag will be hoisted at the 1st, and kept flying till repeated by the 2d Station.-The Flag at the 1st will then be taken down, and the first number of the Message hoisted.-The Preparative Flag at the 2d Station, will, however, be kept flying until it is repeated by the next; it will then be struck, and the No. communicated from the first Station hoisted, which must be kept up until repeated by the third Station. The 2d Station will then take a new number from the 1st, and proceed as before, taking care always that no signal is to be struck till correctly repeated by the next in succession.

REMARKS - Each Station will have a Distinguishing Number.-Communications originating with any of the intermediate Stations, or which apply only to them, must be preceded by the distinguishing number of such intermediate Station, hoisted immediately after the Preparative Flag, and previous to the first No. of the Message.
Every signal made is to be correctly entered in a Book, at each Station, in the form and manner therein prescribed.

VOCABULARY. - Words are represented by Numbers as arranged in the annexed Vocabulary.-Prepositions and articles will be used as seldom as possible, and the sentences will be made short.-In verbs, the number, person, tense and mood must be applied to the sense of the sentence, and attention in the same respect must be paid to words having more than one termination; but when it happens that the exact word is not in the Vocabulary, one nearest synonymous will be adopted; should it however be necessary to use a word not in the Vocabulary it can be spelt by the Numerical Alphabet, which may be known by the numbers from 1 to 25, and is to be spelt as short as possible.-When it is required to spell more than one word in succession by the Alphabet, No. 3051 must be hoisted, to mark the termination of Each word.

Simple words may be used to form a compound (which will save time in spelling,) and when any simple word forms a syllable, it may be also used, and the other part of the word spelt by the letters.

Head-Quarters, Quebec, 1st April, 1809.
By His Excellency's Command
James Kempt,
Q.M.G.
N.A.

Source: PAC, RG8, C, Vol. 1712, Cypher Book, 1809, pp. 2-6.

APPENDIX 4: SIGNALS MADE IN HALIFAX 1799

The following signals are made in the Citadel when vessels are coming into Halifax Harbour.

One Ball - For one square rigged vessel.
One Ball half hoisted - For two square rigged vessel.
Two Balls close - For three square rigged vessel.
Two Balls separated - For four square rigged vessel.
A Pendant of any colour - For five square rigged vessel.
A Pendant under one ball - For six square rigged vessel.
A Pendant over a ball half hoisted - For seven square rigged vessel.
A Pendant under two Balls close - For eight square rigged vessel.
A Pendant between two Balls separated - For nine square rigged vessel.
A Flag of any colour - For ten or more.

The above are hoisted at the East or West Yard Arm, according to the Quarter the Vessel first appears in, and as soon as the Vessel can be described one or more of the following Colours are hoisted at the Mast head.

A Union - For a Flag Ship with or without a Squadron.
A Union with a Red pendant over it - For a two decker.
A Union with a Blue pendant over it - For a Frigate.
A Union with a White pendant over it - For a small armed vessel.
A Red flag pierced White - For a Packet.
A Blue pendant - For a merchant ship.
A Red pendant - For a merchant Brig.
A White pendant - For a Topsail Sloop or Schooner.
A Red flag - For a Neutral Man of War.
A Red Flag with Blue pendant under it - For a Neutral Merchant Ship.
A Red Flag with Red pendant under it - For a Neutral Merchant Brig.
A Red Flag with a White pendant under it - For a Neutral Sloop or Schooner.

Enemy's Signals

A French Jack - For an Enemy's Fleet.
A Blue Pendant under a French Pendant - For an Enemy's Ship.
A Red Pendant under a French Pendant - For an Enemy's Brig.

A White Pendant under a French Pendant - For an Enemy's sloop or Schooner.

N.B. No Signals can be made with those for describing Enemy's Vessels except when they are in our possession, in which case, a Union Jack will be hoisted over the Signal.

Signal of Distress

In cases when immediate assistance is necessary, A Ball at the mast head, in addition to the descriptive colours of the Vessel in Distress, and Guns occasionally until the Signal is attended to.

By Command

G.S. Smyth, D.Q.M.G.
November 21, 1799.

Source: PAC, RG8, 1, C, Vol. 371, pp. 7-10.

APPENDIX 5: PLAN OF THE HALIFAX TELEGRAPH, 1817

1 January 1817

No Copy to be made from this Signal Book nor any part of its contents made known to any person not entitled to be instructed in the Signal Duty. No writing to be put into it, or alteration made, except at Head Quarters. This Book is to be returned to the Deputy Quarter Master Generals' Office, when the person to whom it is entrusted may be leaving Nova Scotia, or has retired from a situation the duties of which require its use, except in cases where it may be delivered over to the Successor in Office.

Plan of the Halifax Telegraph and Directions for Taking the Signals Made on it

As many of the above Numbers as are hoisted at the same time form one Signal, and must be written down under each other, in the following order, viz:-

1. The thousands according to the situation of the Pendant.
2. The hundreds according to the situation of the Flag.
3. The number hoisted at the east yard-arm.
4. The number hoisted at the centre of the yard.
5. The number hoisted at the west yard-arm.

Every numerical signal, and the first letter of telegraphy, must be answered by the Post to which it is addressed, by hoisting as one answer, and lowering a second.

A numerical signal will always have two balls in one of the three positions, a flag or a pendant with it.

Orders and Instructions for the Signal Duty at Halifax

1. All balls and colours composing one signal, must be hoisted and lowered exactly together therefore no signal is to be commenced until all the balls and colours which will be necessary for the signal are fixed.
2. All figures shewn under the same view, are to be written under each other.

3. Should it be necessary to fire guns to call attention to a signal of which guns compose a part, the guns which belong to the signal must be fired after the signal, in addition to those used to call attention.
4. Guns never to be fired in thick weather when the duty can be executed without; and fog signals are never to be repeated, except by the Post which first makes them.
5. Guns "to call attention," are only to be fired when dispatch is indispensably necessary.
6. When no particular time is specified, all orders by telegraph are to be immediately complied with; therefore doubts respecting the meaning of, or inability to comply with, an order, must be instantly notified otherwise it will be understood that the communication is clear; and in cases where a signal has been repeated, and is still not fully comprehended, a messenger must be sent to head quarters for an explanation.
7. In repeating signals from one Post to another, the first signal is not to be altered until it is accurately repeated by the Post which is to forward it, and so on with every successive one.
8. Out Posts are to report by telegraph, all useful information which is obtained from a good authority.
9. Officers commanding at advanced Posts are responsible that the harbour is not surprised by an enemy; to prevent which, should any number of armed ships have approached on Out Post in thick weather or under a supposition that they are friends, or by night, a signal must be made to give the alarm, on which every preparation is to be made for action by all Harbour Posts, and all persons are to remain at their alarm posts until dismissed by authority from headquarters. As a surprise would be the the most dangerous, as well as the most disgraceful thing to an officer, whose particular duty is to guard against it, too much attention cannot be paid in maintaining the strictest regularity and vigilance amongst the guards and sentinels, especially during thick weather and by night, and though false alarms should be carefully avoided, yet they had better be hazarded, to avoid the possibility of surprise.
10. Should any vessel pass in during the night, or in thick weather, a report thereof is nevertheless to be made the next morning, or by guns, as directed when the weather is thick and foggy.
11. When signals are made to or from distant Posts in thick weather, it is the duty of officers at the intermediate Posts to repeat the signals if possible, or otherwise send them to the place where they are addressed.
12. The commanding officer at a Post is alone responsible for the correct execution of all signals made at his Post, and also for the interpretation of such as are addressed to him.
13. All signals made by army boats or vessels are to be answered and attended to by the harbour posts; if they convey information, it must be reported to headquarters.
14. When a Post repeats signals from a vessel, the name of such vessel is to be given.

Alarm

Fog - 4 or more guns fired quickly.
Clear - 3 balls over a flag at mast-head 'till every Post repeats the signal.
Night - guns and rockets alternately, until every Post repeats.

Fog

1. One gun from Fort George, is for a Boat and a non-commissioned officer from Post to report to Head Quarters for orders.
2. Two guns fired quick - the signal for desertion.
3. When a square rigged vessel passes York Redoubt, one gun is to be fired as a signal to Head Quarters.
4. Should a vessel be on-shore or need assistance, two guns to be fired from York Redoubt, Point Pleasant, or Sherbrooke's Tower, wherever the distress may be visible from.
5. One gun is to be fired from the Light House in answer to each gun heard at sea, as a guidance for ships endeavouring to make the port.

Night Signals

1. Will require four lanthorns, one of which is only for the purpose of shewing the centre of the signal yard, and therefore must not be reckoned as a figure, and will make No. 4, appear thus  and No. 3, thus  .
2. Telegraphy by Night should always commence with a letter, requiring three numbers to describe it, in order that the person who is to take the signal may ascertain the exact position of the yard.
3. In changing from one figure to another, the lanthorns must all be moved at the same moment.
4. Great care must be taken that no lights are shewn at Out Posts, except such as are intended as signals.
5. Numerary Signals by night, are to be made agreeably to the following directions, to prevent the necessity of using two lights on the same haulyards.

1 2 3 4 5 0 in the same manner as with balls, and

1 2 3 4
5 5 5 5
6 7 8 9

A double light in the centre of the yard, thus  is the general

preparation and will be used as No. 100, in making the number of Posts.

6. A night signal should always be examined at the same time the answer is made to it, and if not then correct, it must be annulled.

Signal of Desertion by Night

Four lights under each other.

Note: The particulars will be explained by Telegraph, early next morning, if necessary.

Explanation of Signals made on the yard of the Signal Staff at Fort George, to denote the number of Vessels coming into Harbour.

These Balls, &c. to be fixed either on the East or West Yard Arm, according to the quarter the vessel first appears in.	One ball, close up, one sail square rigg'd.
	One ball, half hoisted, two do.
	Two balls close, three do.
	Two balls separated four do.
	A pendant five do.
	A pendant under a ball six do.
	A pendant over a ball seven do.
	A pendant under two balls close, eight do.
	A pendant between two balls, nine do.
	A flag ten do.

Explanation of Signals Made on the Signal Staff at Fort George, Descriptive of Vessels Coming into Harbour.

A St. George's Jack, a flag ship.
Ditto with red pendant over, a two decker.
Ditto with a blue pendant over, a frigate.
Ditto with a white pendant over, a sloop of war.
Ditto with a red and white pendant over, a schooner or cutter of war.
A red flag pierced white, a packet.
A blue pendant, a merchant ship.
A red pendant, do. brig.
A white pendant, do. sloop or schooner.
A blue and white flag horizontally divided, a neutral fleet.
White and blue pendant, a foreign man of war.
Blue flag, a foreign merchantman.
A red, white and blue flag, an enemy's fleet.
A red, white and blue pendant, an enemy's man of war.
A red flag, an enemy's merchantman.
A union jack over neutral or enemy's signals, vessel is detained or prize.
A white flag, over any signal, vessel bears a flag of truce.
A ball at the mast head, a vessel is on shore or in distress, should immediate aid be necessary, guns to be fired.

Explanation of Signals made on the Ensign Staff at Fort George, to denote the Port which vessels entering the Harbour have arrived from.

A red flag, from Great Britain.
A red and white do. the Mediterranean,
A red pendant, the Continent of Europe,
A white and red pendant, Madeira, Canary or Western Isles,
A blue glas, the West Indies,
A blue pendant, Bermudas, Bahamas or Turks' Islands,
A blue and white flag, the United States,
A white flag, Newfoundland,
A red and white flag, horizontally divided, Quebec, or Gulph of St. Lawrence.
A blue and white flag do. do. New Brunswick or Bay of Fundy.
A white and blue pendant, Vessel has an English Mail on board.
A white pendant, Coasts of Nova Scotia or Cape Breton.

Merchants Private Signals will be shewn upon the Telegraph Mast Head.

When vessels are reported off, from an Out Post, the following Signals will be hoisted on the Yard of the Signal Staff.

Two Balls of a size, one at the yard-arm, the other in the centre, to denote a square rigg'd vessel.
A large Ball out, and a small one in the centre, a ship.
A small Ball out, and a large one in the centre, a brig.
A Cross in the centre, close up a schooner.
Do. do half hoisted, two or more Schooners.

The Royal Standard will be hoisted on the Ensign Staff, in fine weather, for rejoicing Days, and during Salutes. In thick weather, an Union, which will also be hoisted on Fort George, when any of His Majesty's Ships are sailing in or out of Harbour, and by the Harbour Posts, when any Man of War passes them.

Numbers of Out-Posts

No. 100 General Preparative for all Posts
101 Fort Clarence
102
103 Sherbrooke Tower
104
105 Melville Island
106 Camperdown
107 York Redoubt
108 Light House
109 Fort Charlotte

Answers Between Head Quarters and Out Posts

No. 1 Fort Clarence
2 Fort Charlotte
3 York Redoubt
4 Sherbrooke Tower
5 Melville Island
0 Camperdown
Thick weather, a flag used instead of a Ball.

Numerical Table

A	E	I	O	U																	
1	2	3	4	5																	

B	C	D	F	G	H	K															
31	21	30	20	32	22	33															

L	M	N	P	Q	R	S	T	V	W	X	Y	*
23	34	24	35	25	36	26	37	27	38	28	39	29

* signifies repeat.

Source: PRO, WO44, Vol. 203, pp. 66-68, Nicolls to Board of Ordnance, 30 April 1827.

APPENDIX 6: EXPLANATION OF SIGNALS, 1867

Made on the Ship at Citadel Hill, When Vessels Are Seen From the Citadel or Reported at an Outpost

For 1 square rigged vessel, 2 balls close up, one on the outer halliard and one on the inner halliard.
" 2 Do. 1 ball hoisted on the outer halliard, and one close up on the inner halliard.
" 3 Do. 2 balls close up, one out and one in.
" 4 Do. 2 balls separated, and one close up on the inner halliard.
" 5 Do. a pendant of any colour on the outer halliard, and one ball close up inside.
" 6 Do. a pendant under a ball close up on the outer halliard, and a ball at the inner halliard close up.
" 7 Do. a pendant over a ball close up on the outer halliard, and a ball close up on the inner halliard.
" 8 Do. a pendant under two balls close on the outer halliard, with a ball close up on the inner halliard.
" 9 Do. a pendant between two balls close up on the outer halliard, with a ball close up on the inner halliard.
" 10 Do. a flag of any colour close up on the outer halliard, with a ball close up on the inner halliard.

The above balls,& c., are hoisted at the east or west yard-arm, according to the quarter the vessel first appears in.

When sailing vessels are reported from an outpost, the following signals are made on the lower yard, now used exclusively for sailing vessels, as repeats: --

For a square rigged vessel, two balls of a size, one at the outer, the other at the inner halliard, close up.

A ship, a large ball at the end of the yard, with a small one of the inner halliard.

A Barque, a large do. at end, with a small one dropped at the inner Halliard.

A Brig, a small ball at the end of the yard, and a large one at the inner halliard.

A Brigantine, a cross close up at the outer halliard.

Two or more do., a cross half hoisted.

A topsail Schooner, a cross close up at the inner halliard.

The upper yard of the Ship Staff is used solely to designate Steam Vessels, thus: --

Two large balls close up, one at the outer and the other at the inner Halliard, E. or W., a Steamer reported in that quarter.

A small ball at the outer, and a large one at the inner halliard, a second class Packet or Merchant Steamer.

A large ball at the outer, and a small one at the inner halliard, a Man-of-War Steamer, or Royal Mail Steamer, or large Merchant Steamer.

Two lanterns, one red and the other white, are hoisted at night to denote a Steamer reported.

The red lantern is always shewn at the end of the yard-arm, and the white one at the inner halliard, E. or W., according to quarter the Steamer is reported in.

Numbers are indicated the same as on the lower yard.

When the description of vessel is ascertained, the following descriptive colours will be hoisted at the mast-head:

A Union Jack--a Flag Ship.

Man-of-War Screw Steamer, a white pendant with a blue ball in the centre, over the Union Jack.

Man-of-War Paddle Steamer, a white pendant with a blue ball in the centre, under the Union Jack.

A red Flag pierced white, Royal Mail Steam Packet from England.

A blue and red Flag crossed white, do. from Boston.

A white and blue Pendant, do. from St. Johns, Nfld.

A white and red Pendant, do. from Bermuda.

A blue Pendant - a Ship.

A blue and white Pendant - a Barque.

A red Pendant - a Brig.

A red and white Pendant - a Brigantine.

A white Pendant - a Sloop or Schooner.

A blue and white Flag horizontally divided - a Foreign or Neutral Fleet.

A white and blue Flag vertically divided - a Foreign or Neutral Man-of-War.

A blue Flag - a Foreign or Neutral Merchantman.

A red Flag - an Enemy's Merchantman.

A red, white and blue Flag, red next the mast - Enemy's Fleet.

A blue, red and white Flag, red next the mast, under Steamer's signal, a French Man-of-War.

American Flag (stars and stripes) under Steamer's signal, American Man-of-War.

When an English Packet arrives between evening and morning gunfire, a red triangular flag will be kept flying at the mast head from seven till eight o'clock.

Source: Belcher's Almanac, 1867, pp. 116-17.

COMMUNICATIONS CHRONOLOGY

* indicates Halifax-related material.

300 B.C. Polybius, Greek historian reports a method of signalling the 24-letter Greek alphabet was devised.

586 B.C. Babylonian priests (Jewish) informing Jerusalem by bonfires that the moon was up and a new year? month? had begun.

1084 B.C. First feat of telegraphy ordered by King Agamemnon to his Queen on the fall of Troy using beacon fires on line-of-sight locations covering 500 miles.

1340 Early naval signal codes in England described in the "Black Book of the Admiralty."

1543 Publication of "Book of War by Sea and by Land" by Jehan Bythorne containing signal references.

1551 Gerolamo Cardano of Italy devised 5 torches on 5 towers to spell out words.

1665 Duke of York's Fighting Instructions drawn up by Wm. Penn and the first time signals are incorporated into such instructions.

1684 Robert Hooke outlines system of optical telegraphy to the Royal Society.

1753 First mention of proposed electric telegraph in *Scots Magazine*.

1780 Admiral Kempenfelt devised a plan of flag signalling, the parent of the present system. Instead of varying the position of a solitary flag he combined distinct flags in pairs.

1783 McArthur, Secretary to Lord Hood devised a plan to show flags in combination.

1792-93 Lord Howes' signals used with some additions by McArthur (*see* 1783).

1794 First semaphore message sent between Lille and Paris by using the I.U.G. Chappe system.

1794 Lord George Murray proposed visual telegraph system to British admiralty.

1795 Lord George Murray, England devised the shutter telegraph.

*1799 Admiralty Signal Book issued to Commanders-in-Chief of the British fleet by Admiralty.

*1799 News of Duke of Kents' arrival in Halifax sent to Windsor, N.S. by telegraph system.

*1800 Telegraph has been completed from Halifax to Annapolis.

1800 First visual telegraph using semaphore built by Jonathan Grant and connected Martha's Vineyard with Boston (104 km).

1803 Alphabetical code of signals devised by Sir Home Riggs Popham, British navy.

1805 Sir Howe Popham's code used instead of Lord Howe's (1792-93). It is the basis of the present system.

1806 A "number box" telegraph system devised by Governor Patton in St. Helena.

1810 Use of seamen by British army in Spain for communicating by signalling.

1812 Sir Howe Popham, British Navy, used alphabetical and numerical flags and increased vocabulary on a 3 and 4 flag hoist to 30,000 words.

1816 In England, a synchronized clock telegraph was tried.

1816 New General Signal Book issued by Admiralty.

*1817 Sir Frederick Marryat Royal Navy, adopted Popham (*see* 1803) system to merchant service.

1831 Principle of the telephone arrived at by Charles Wheatstone, Britain.

1833 Germans had semaphore line from Berlin to Coblenz.

1835 Samuel Morse developed the Morse code.

1837 U.S. Congress considering a New York-New Orleans semaphore line, while Morse requesting support for his electric telegraph.

1837	First practical telegraph line in world on the Great Western Railway from Paddington to West Drayton, England.
1837	Wm. Cooke and Charles Wheatstone devised the 5-needle telegraph. It was used by the railway beginning in 1839.
1838	Russian semaphore line from Moscow to Warsaw.
1842	Semaphore system of signalling considered at Quebec City.
1844	Telegraph systems in Quebec discontinued. Transferred to Royal Engineers.
1844	First line between Baltimore and Washington.
1845	Telegraph line opened between Washington and Baltimore.
1845	First telegraph line completed in France.
1846	Electric Telegraph Co. formed by Wm. Cooke and Charles Wheatstone.
1846	First crude printing telegraph experimented on.
1847	First telegraph line completed in Italy.
1850-51	Submarine cables laid Dover to Calais.
*1851	N.S. act passed to incorporate the Nova Scotia Electric Telegraph Company.
*1851	N.S. act to establish line of electric telegraph from Halifax to New Brunswick border.
1852	Wales, Scotland, and Ireland linked by telegraph.
1853	England linked with Belgium and Denmark by telegraph.
1853	First telegraph line completed in Russia.
1854	Crimean War, telegraph first employed militarily by allied army at Varna, Bulgaria to connect command H.Q. with troop units.
*1855	Nova Scotia act to incorporate the Transatlantic Submarine Telegraph Company.
1855	400-mile telegraph under the Black Sea during Britains' stay in the Crimea.

*1856 The New York, Newfoundland and London Telegraph Company laid 85 miles of cable from Newfoundland to Cape Breton, 140 miles were added to connect it with the Nova Scotia mainland.

*1856 2 submarine cables laid Newfoundland to Canada.

1856 Flag telegraphy devised by Albert J. Myer in the U.S. and two British officers Captain Francis Bolton and Captain P.H. Colomb in Britain.

*1857 First commercial code of signals produced by British Board of Trade.

1857 Ceylon and India linked by telegraph.

*1857 First attempt at laying transatlantic cable fails.

*1858 Halifax Signal Station on Citadel has been dismantled of its yards and flagstaffs.

*1858 First transatlantic cable completed and on August 5, Cyrus Field telegraphed from Trinity Bay, Newfoundland to (Dowlas Bay, Valentia) Ireland. "The Cable is laid." It only remained in operation for a month.

1859 British Government laid the Red Sea cable.

1860 London and India linked by telegraph.

*1863 Lanterns to be used at signal station at Fort George when a steamer comes in.

1863-64 British Government laid the Persian Gulf cable.

1865 Transatlantic cable attempt made and failed.

1865 British military authorities took up questions of army signalling and a school of signalling was set up at Chatham.

1865 First International Telegraph Union meeting held.

*1866 2nd transatlantic cable completed to Hearts Content, Trinity Bay, Newfoundland from Valentia, Ireland.

1867 P.H. Colomb's Flashing Signals adopted by Royal Navy (this consists of the Morse Code being used with hooters and lamps).

*1869 Military telegraph line from Fort George to York Redoubt in operation(?).

*1870	International Code of Signals adopted.
1870	France laid cable from Brest to the island of St. Pierre.
1870	Administration of all telegraphs in Britain went to Post Office authorities.
1871	Duplex cable introduced and messages could be sent in both directions simultaneously on the same wire.
1872	Telephone completed.
*1873	A storm signal staff completed on Halifax Citadel.
*1873	Nova Scotia act to provide a Fire Alarm Telegraph for Halifax.
1876	First telephone message made by Alexander G. Bell to Watson.
1877	Thomas Edison patented a telephone transmitter and receiver.
1878	First telephone and switchboard for commercial purposes set up in New Haven, Connecicut.
1882	News of the British victory at Tel-el-Kebir was telegraphed from the battle field.
*1882	Act to allow Bell Telephone Company of Canada to build in Nova Scotia.
1884	Establishment of the Royal Engineer Field Telegraph Battalion.
*1885	Nova Scotia connected to Ireland by cable.
1887	12,000 telephone subscribers in Canada.
*1889	Halifax and Bermuda Cable Company formed connecting these two important naval stations.
1891	First telephone circuit opened between London and Paris.
1893	Scotland and Ireland connected to England by telephone.
1898	First commercial radio telegram was transmitted in England.
1899-1900	Heliograph used extensively in Boer War.
1902	The last link in the Empire was completed with Australia linked to Canada by Telegraph.

1904-05	Radio-telegraphy used in time of war during the Russian-Japanese war.
1927	First public transatlantic telephone service opened using radio transmission.

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Shutters and Arm Waving - 1790-1828

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Sound Replaces Sight - 1828-80

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44 Ibid., 12 May 1851, p. 147.
45 Ibid.
46 PANS, MG12, RE 33, p. 75, P.S. Hamilton, Secretary Nova Scotia Telegraph Company to Savage, 30 May 1854.
47 Nova Scotia Legislative Library, Scrapbook of "An Occasional" Acadian Recorder, 7 December 1929.
48 PANS, Vertical Manuscript File, Lord Panmure to CRE, Copy 7, 22 September 1857.
49 The Acadian Recorder, Vol. 46, No. 9, 22 February 1858, p. 3.
50 "An Act Relating to the Signal Station of Halifax," Statutes of Nova Scotia, Chap. 64, 1859, p. 80.
51 Charles Perry Stacey, op. cit., p. 51. This is also outlined in Piers op. cit. and Clarence Stuart MacKinnon, "The Imperial Fortresses in Canada: Halifax and Esquimalt 1871-1906," Ph.D. dissertation, University of Toronto, 1965, pp. 39-56.

52 The 8 June 1863 edition of the Evening Express (Halifax) described in vague detail Captain Bolton's presentation to the Royal United Services Institution. His name occurs later with that of Commander Phillip Colomb in an article entitled "Signal Lights of Captains Colomb and Bolton," Journal of the Royal United Services Institution, Vol. 12, pp. 373-77.
53 PAC, RG8, I, C, Vol. 1431, p. 310, Hastings Doyle 6 to T. Westmacott, 2 February 1866. This work was actually begun in October 1865.
54 Ibid., Vol. 186A, pp. 136-38 and pp. 258-60.
55 The Morning Chronicle, 12 August 1869, p. 3.
56 PAC, RG8, I, C, Vol. 1653A, pp. 597-607, Report and Estimate of Works and Repairs ..., 1869-70.
57 PANS, MG12, HQ 117, p. 238, Garrison Orders, 20 May 1871.
58 PAC, RG8, I, C, Vol. 1371, pp. 301-2, Burnaby to Ansell, Halifax, 5 August 1870.
59 Colomb, The Defence of Great and Greater Britain..., p. 130.
60 Harry Piers, op. cit., p. 54, F. 3.
61 Clarence Stewart MacKinnon, op. cit., p. 69.
62 PRO, Adm 1, 6448, Vice Admiral Inglefield to Secretary of the Admiralty, No. 88, 22 July 1878. Both Sutcliffe op. cit. p. 140 and Piers, op. cit., p. 59 have written of the telegraph hookup between the Citadel and York Redoubt as being established in 1879. It had been completed ten years previously and 1879 the signal staff was no longer in existence.
63 The Morning Chronicle, 25 May 1870, p. 3.

The Spoken Word

1 Anthony R. Michaelis, op. cit., p. 91.
2 Ibid., p. 85.
3 Clarence Stewart MacKinnon, op. cit., p. 20.
4 Statutes of Nova Scotia, Chap. 59, 1883, p. 139.
5 "Notes from Corresponding Members May 17," Minutes of Proceedings of the Royal Artillery Institution, Vol. 20, 1893-94, p. 3.
6 W. Howel Jones, "The Garrison Artillery Signaller," Minutes of Proceedings of the Royal Artillery Institution, Vol. 31, 1904-5, p. 74.
7 N.H.C. Sherbrooke, "Signalling as Applied to Field Artillery," Minutes of Proceedings of the Royal Artillery Institution, Vol. 31, 1904-5, p. 336.

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