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Annihilating Space and Time: The Modernization of Fire-Fighting in Late Nineteenth-Century Cornwall, Ontario

Jeremy Stein

Abstract:

The concept "time-space convergence" is rarely used in the context of internal urban communication or urban service provision. This paper applies the concept to the process and modernization of fire-fighting. It does so with reference to Cornwall, Ontario's experience of fighting fires in the late nineteenth century. Examination of the fire-fighting process and of technology's historical role within it shows "time-space convergence" to be a pervasive feature of urban fire control. Evidence from Cornwall supports this assertion. Speed was critical. The advent of manufacturing, the wish of Cornwall's elite to protect its property, and greater emphasis on the economic value of time and space, all contributed to renewed efforts to speed up the process of fighting fires. Repeatedly, these concerns prompted decisions to invest in new fire-fighting technology. Success was limited, but communities like Cornwall came increasingly to view technology as a measure of their modernity and communal worth. Acquisition of new fire-fighting technology was a clear demonstration of a community's intention to protect accumulated urban assets. This demonstration of intent was as much evidence of a community's modernity as were the multiple efforts to demonstrate and to improve upon the technology's effectiveness.

Scholars and social observers have long been aware of the significance of transport and communications technologies for re-orienting relations of time and space between places.[1] The "annihilation of space and time", for example, was a common mid-nineteenth century phrase, used to describe the combination of changes, and in particular the increased speed of movement of goods, people and services, made possible by innovations such as the telegraph, the steamship and the railroad.[2] Marx, writing in the 1850s, used similar terminology to describe the significance of transport and communications for the circulation and reproduction of capital.[3] In 1857-8, in the *Grundrisse*, he wrote that "while capital must on one side strive to tear down every spatial barrier to intercourse ... it strives on the other side to annihilate this space with time, i.e. to reduce to a minimum the time spent in motion from one place to another".[4] More recently geographers have coined the terms "time-space convergence" and "time-space compression" to describe similar historical processes: the former refers to the increased velocity of circulation of goods, people and information, and the consequent reduction in relative distances between places; the latter describes the sense of shock such experiences produce.[5] These concepts usually refer to the consequences of long distance inter-urban communications technologies but they are equally applicable to improved internal urban communication and urban service provision.[6] Their relevance here is undeniable for they imply the sense of acceleration and cumulative technological change present in these contexts, and point to a more broad-based acceleration in the conduct of social life than these concepts normally imply.[7] This paper applies these terms to the process and modernization of fire-fighting, the main purpose being to consider the significance and consequences of new technology to improved urban service provision.

My discussion focuses on a single urban community — Cornwall, Ontario — and on its attempts to protect itself from fire during the late nineteenth century.[8] The processes involved are of greater significance because discussions about how best to protect the urban environment from fire was a common problem to North American communities. The events related indicate how communities like Cornwall rationalised their decision to invest in new technology. A focus on Cornwall's communal discussions about protecting against and on its strategies for fighting fires, offers insights into the changing role and meaning of technology in an increasingly urbanized and industrialized society.

The first part of the paper describes the fire-fighting process and its various stages. At each stage the significance of new technology is explained. The "annihilation of space and time" is shown throughout to be a feature of the process. The second part of the paper considers Cornwall's experience of fires, and the various strategies employed by Cornwall's community leaders to prevent and to protect the town from fires. I describe, for example, how Cornwall instituted new fire regulations, purchased new fire-fighting technology and re-organized its fire department. These decisions, I argue, were manipulated by a self-interested elite who, wishing to protect its property, repeatedly demanded improvements to the town's fire-fighting capability. Because it was generally assumed that a swift fire warning and an immediate response were critical for effective fire-fighting, this need to protect property stimulated demands for the fire-fighting process to be speeded up. In Cornwall systematic attempts were made to improve the town's fire-fighting effi-

Résumé:

Le concept de la « convergence espace-temps » est rarement utilisé dans le contexte des communications urbaines internes ou de la prestation des services urbains. Le présent document applique ce concept aux techniques de lutte contre les incendies et à leur modernisation. Pour ce faire, il renvoie le lecteur à ce qui se passait à Cornwall (Ontario) à la fin du diz-neuvième siècle. L'examen de la technique uiltisée pour lutter contre les incendies ainsi que du rôle historique qu'y a joué la technologie démontre que la « convergence espace-temps » est un élément toujours présent dans la lutte menée par les villes contre les incendies. Ce qui s'est passé à Cornwall en est la preuve. La vitesse était un élément essentiel. L'industrialisation, le désir de l'élite de Cornwall de protéger ses biens et l'insistance plus grande mise sur la valeur économique du temps et de l'espace sont des éléments qui ont tous joué un rôle dans la recrudescence des efforts en vue d'accélérer le processus de lutte contre les incendies. À maintes reprises, ces préoccupations ont incité la ville à investir dans la nouvelle technologie. Le succès de ces initiatives était limité, mais des villes comme Cornwall en vinrent à considérer de plus en plus la technologie comme une mesure de leur modernité et de leur richesse collective. L'acquisition de nouvelles technologies de lutte contre les incendies démontrait clairement l'intention de la collectivité de protéger ses avoirs accumulés. Cette déclaration d'intention était une preuve tout aussi évidente de la modernité d'une collectivité que l'étaient des nombreux efforts pour démontrer et améliorer l'efficacité de la technologie.

ciency. Old and new technology were combined with new arrangements in order to manage the town's fire-fighting resources. The "annihilation of space and time" was thus achieved by social as much as by purely technical means.[9]

The paper also shows technology's growing historical significance. Internal to the fire-fighting process, the power, speed and precision of machines gradually outpaced those of their human handlers. Technology had also broader social significance, for increasingly Cornwall and communities like it measured their progress by their technological achievements. Judging themselves as they assumed potential investors would judge them, Cornwall's elite regarded technology as the primary measure of their communal worth.[10] They considered that technology was important because it enhanced the town's capacity to conquer time and space, allowing time and space to be valued differently. In the context of urban fire control it was the economic value of time and space that took on added meaning.

Fire: an Important Urban Problem

Developing North American towns and cities faced the common threat of fire. No city escaped its ravages, and repeated demands for improved methods of fighting fires, mainly from newspaper editors and community leaders, was common across North America.[11] The mid-nineteenth century saw municipal governments take a more active role in urban service provision. Professional fire brigades gradually replaced volunteer fire companies and professionalization was accompanied by an increasing reliance on new technology.[12] The timing of the transition varied from city to city. Often, the impetus for change was the labour-displacing qualities of the new technology. Toronto phased out its volunteer force for a smaller on-call paid department in 1862, one year after purchasing two steam fire engines.[13]

Technology affected all stages in the fighting of fires, beginning with the warning. The earliest warning systems relied on church bells, but the run from the scene of fire to the church wasted precious time. Telegraph boxes, and later telephones greatly speeded up the process. Once the alarm was sounded the next critical element was to transport water to the scene of fire. Early towns and villages forced households to keep buckets for fire-fighting purposes.[14] Water was usually pumped out of rivers, canals or wells and transferred by bucket brigade to the fire. As a supplement many municipalities compelled carters to attend fires, sometimes paying a cash bonus to the person first to reach the fire with a load of water. In an age before piped water, carters, who supplied affluent households with domestic water, regularly carried puncheons of water on their horse-carts.[15] Such supplies were insufficient for tackling large blazes, and insufficient water, a common problem at fires, accelerated moves towards modernizing methods of fire control.[16]

It was also essential that equipment and its handlers reached the fire as swiftly as possible. The need to drag a hand- or steam-fire engine through the streets gave meaning to the phrase the "friction of distance". The range of strategies used to speed up this process shows how pervasive the "annihilation of space and time" was in fire-fighting. Fire engines and waterworks systems, usually comprising a system of piped water at high pressure with a set of fire hydrants, went some way towards this goal for they allowed fire-fighters greater freedom from fixed water bodies and reduced the required manpower necessary to fight fires. A typical steam fire engine of the

1860s needed four or five men to haul and operate it. Earlier hand pumps required up to ten times that number to feed them with water.[17] Similarly, waterworks were sold as substitutes for fire engines because they promised an unlimited and easily targeted water supply.[18] These technologies, besides reducing necessary manpower, improved access to fires, in a context where urban growth and the rising scale of commercial and residential building found it increasingly difficult for fire companies to direct water at the interiors and upper storeys of burning buildings. Inaccessibility to fires and the equipment's labour-saving qualities encouraged the purchase of new fire-fighting technology. Pressure was also forthcoming from insurance companies. As properties became larger and more expensive lenders opted for insurance as a financial imperative; a guarantee they would not lose out in the event of fire. In return insurance companies, operating in earnest in British North America from the 1820s and 1830s, insisted on adequate fire protection.[19]

It is unclear if the performance of the first steam fire engines was much better than their manual counterparts but as they were perfected they enabled a greater quantity of water to be discharged at a greater distance.[20] The greater force of the jet of water, needed to reach greater heights, also improved efforts at containing and subduing flames. This was a major reason for installing waterworks systems. Insufficient water pressure was blamed for the unsatisfactory attempts at controlling the Toronto fires of 1849 and 1904, and was a prime motivation for Toronto acquiring a modern high-pressure water system in 1909.[21]

Modern fire-fighting technology did not guarantee successful fire control for technological improvements created as many problems as they solved. Engines had to be regularly cleaned or else they decayed and decreased in efficiency. Hoses became rotten and brittle causing leaks. Pipes froze and burst. Ultimately, too, technology was dependent on fallible manpower for the expertise and astuteness in handling equipment. A steam fire engine or a waterworks system offered better potential for the abatement of fires, but when fire inevitably struck, technology often failed to match the claims of its salesmen and the hopes of community leaders.

The Nature of Risk and Early Fire Protection

For any small nineteenth century town the potential for fire was woven into the fabric of the built environment. At mid-century, frame buildings dominated the urban landscape in Ontario, as indeed throughout North America. Two-thirds to three-quarters of all structures were wooden in construction.[22] Cornwall at this time was almost entirely wooden. The town boasted thirty-one brick or stone residences out of a housing stock of two hundred and twelve buildings.[23] Other hazards abounded. Merchants and mill-owners stored countless flammable materials in their shops and yards. Shingle roofs and wooden sidewalks posed additional dangers, as did waste-strewn streets. Inside, candles, oil-lamps and stoves provided common catalysts for domestic fires. In short, the nineteenth century city was built to burn.

Cornwall, like other North American towns and cities, learnt to take the fire threat seriously. The town experienced few fires by Canadian standards and no fires of conflagration proportion (involving property damage in excess of $1,000,000).[24] By comparison, Kingston, Ontario suffered one hundred fires between 1831 and 1864, reported by a local diarist, and Rudachyk found for Halifax, Nova Scotia, 281 separate incidents of fire, reported in the local press between 1830 and 1850.[25] Cornwall remained overwhelmingly wooden until well past mid-century, suggesting fires were not significant until the early 1870s. Fires however were frequent enough to make them a pervasive part of Cornwall's urban experience.

Cornwall's Experience of Fighting Fires

From the 1870s onwards Cornwall, Ontario, became a thriving manufacturing town. Between 1868 and 1882 Montreal industrialists established three large textile mills there. (Figure 1).[26] The textile mills dominated the urban economy. By 1890 they employed together more than 20% of Cornwall's resident population.[27] Three years later these mills were significant enough for the Toronto *Globe* to christen Cornwall the "Factory Town".[28]

Prior to December 1870, when a fire destroyed the Cornwall Manufacturing Company's Mill, lifetime resident of Cornwall, Judge Jacob Pringle, recalled only one significant fire in Cornwall's history. This was in January 1841 when a fire destroyed three buildings including a store and a private residence. During this period before the arrival of large scale manufacturing, Cornwall relied on tried and tested methods of fire control. Since 1826 St. John's Church bells sounded the alarm of fire.[29] Fire-fighting was a community pursuit. The town relied on bucket brigades until 1835 when a volunteer fire company was established and put in possession of a hand fire engine.[30] This followed the example of many other North American towns and cities. Volunteer fire clubs, besides their utilitarian goals, had important social functions. They furnished an arena for playing out ethnic and civic rivalries, and provided an exclusively male self-interested status

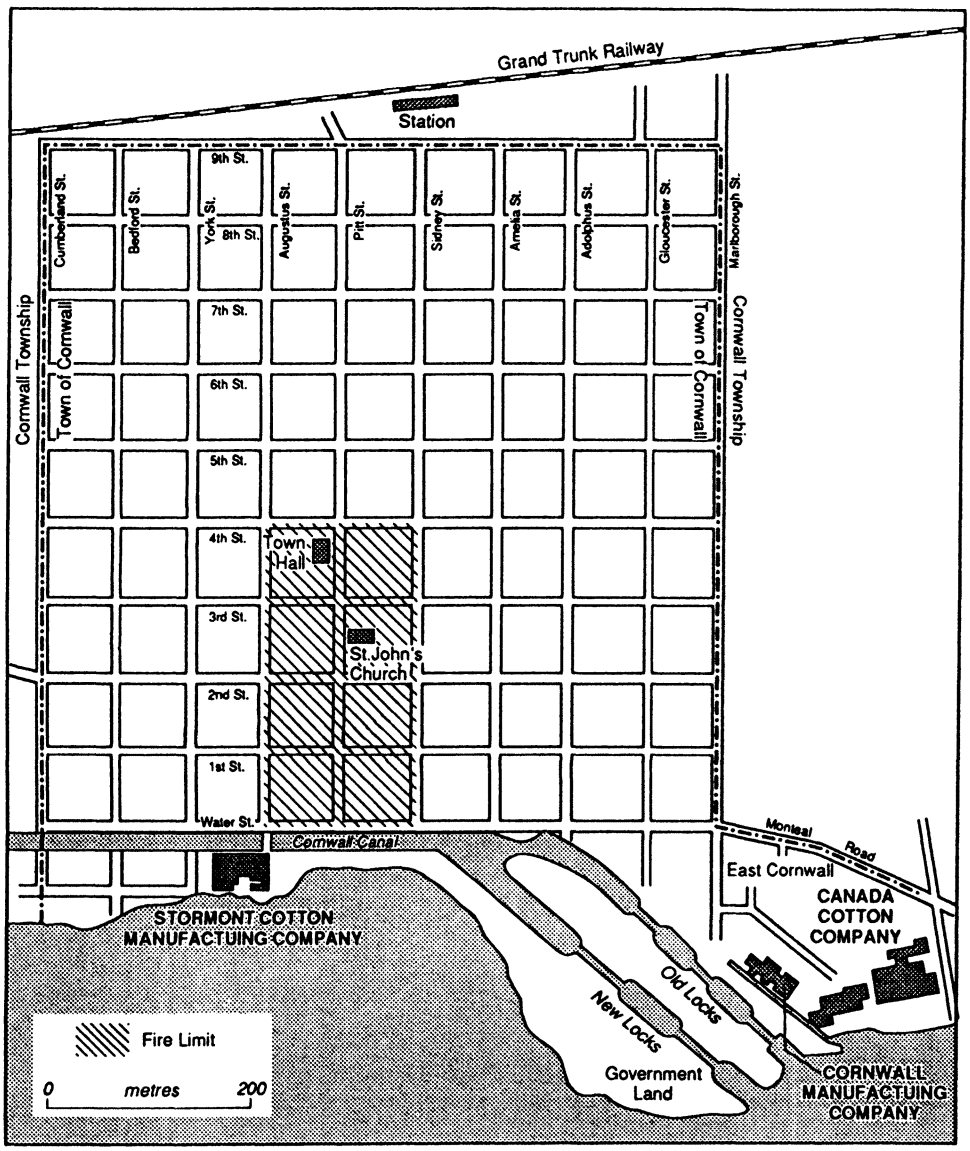

Figure 1: ***Map of Cornwall showing the "fire limit": the area affected by the 1876 fire regulations.***

group in the community.[31] Cornwall's fire company comprised twenty-eight men and was the town's first formal fire-fighting institution. Many of the town's influential citizens and largest property holders figured prominently among its ranks.[32]

Cornwall's embrace of large scale industry coincided with growing concerns for improved fire protection. In 1870 and 1874 fires destroyed two of the town's textile mills.[33] Because Cornwall's prosperity was intimately tied to the fortunes of its mills, those incidents proved powerful ammunition in support of the case for improved fire protection. Manufacturing added new urgency for Cornwall to reassess its fire control strategies. Population growth was also a factor. In 1871 the town had 2,033 inhabitants, in 1881, 4,468 and in 1891, 6,805.[34] Equally important was the widespread perception among the town's business community, that for Cornwall to grow further, it had to compete with other communities in the vital area of fire protection. Community attitudes were shaped too by the cruel reality of fire which shattered feelings of complacency and pretensions of security.

These elements all surfaced in 1876 when Cornwall's Town Council debated the purchase of a steam fire engine. When the Council authorised the purchase of an engine in May 1876, its geographical limitations were immediately appreciated. The expectation was that the engine would be located in Cornwall's central business district, a practical decision on technical and administrative grounds, but having the consequence of restricting the engine's value largely to Cornwall's centrally located merchants. After its purchase, the engine was indeed permanently stationed at the Town Hall. Several councillors expressed the view that residents most likely to benefit by the engine should subsidise its acquisition. However an amendment, tabled by an East Ward councillor, requiring that one third of the engine's cost be paid by those "most directly benefitted by it", failed because merchants, the chief beneficiaries, were overrepresented on the Town Council.[35]

Because the steam fire engine was one of Cornwall's largest public investments the Council appointed a special fire committee to oversee its purchase.[36] The committee considered two offers from fire engine manufacturers, one from the Ontario based Chatham company, and the other from the Silsby Company of New York State. Both companies offered to sell the Council an engine, 300 ft of hose, hose reels and hosecarts. The

committee recommended the more expensive Silsby engine because of its constant water pressure and its "improved plan, being crane necked and allowing every movement in a very small space." Reliability and ease of operation in confined spaces took precedence over cost.[37]

This did not settle the matter. On the 25th July 1876 the by-law necessary to ratify the fire committee's decision was defeated. This was because of local protectionist sentiment, the assertion being that it was unpatriotic to buy an American-made fire engine.[38] Chance intervened. A day after the by-law defeat a fire broke out on the south side of First Street. By coincidence, the Chatham engine, brought to Cornwall by the Chatham Company as a demonstration model, was conveniently stationed at the canal wharf.[39] Owing to the ingenuity of two local engineers the engine was primed for action. Water, pumped from the canal, and directed by the engine onto the fire prevented the flames spreading across Pitt Street and, according to the Cornwall *Reporter*,[40] saved the town's commercial sector from almost certain destruction.[41]

The performance of the Chatham engine at the July 26th fire settled "the war of the engines". Shortly afterwards, the Town Council received a petition, signed by 287 Cornwall residents, praying that for the better protection of their property the Chatham engine be purchased immediately.[42] The Council hastily negotiated a deal with the Chatham company, agreeing to purchase for $3,450 a steam fire engine, 300ft of hose and two hose carts. In light of the July 26th fire, the Council reconsidered its fire protection strategy. The fire engine was entrusted to a new volunteer fire brigade, now managed and controlled by the Town Council, responses to fires were standardized,[43] further precautions were taken to reduce hazardous wastes, and strict fire regulations were imposed in Cornwall's business district.[44]

The Council had also to ensure the steam fire engine could function throughout the town. A letter to the *Cornwall Reporter* summed up the problem:

> As things are at present the engine would be practically of no service to check a fire originating at a distance from the canal, greater than could be covered by the length of hose which the town might possess. ... There is an urgent necessity, therefore, for such a system of water distribution, by means of tanks, as would extend the benefit of our expenditure for fire purposes to that portion of town lying north of Second street.[45]

To remedy this serious spatial constraint the Council constructed a series of watertanks and sought to provide enough hose to enable the engine to function throughout the town's boundaries. Water tanks were placed on the corner of Pitt and Fourth Streets and at the east end of Second Street.[46] 500 ft of hose was purchased, sufficient to reach half way between the individual tanks.[47] A further 1000 ft of hose was placed in storage at the Cornwall Manufacturing Company Mill to service fires in Cornwall's east end.[48]

The steam fire engine was insufficient to guarantee successful fire control. It relied on a series of supplementary fixtures and on manpower to keep it maintained. Acquisition of a steam fire engine also forced the Council to upgrade its other fire-fighting facilities. Remodelling its volunteer force, providing watertanks, ensuring there was sufficient and reliable hosing, and passing a set of fire restrictions, was recognition on the Council's part of the steam engine's limitations.

The ultimate test of these efforts was their effectiveness in a fire. When everything went well blazes could be controlled in surprisingly short periods of time. In September 1877, when a fire was discovered in a stables on First Street, it took only eighteen minutes for the Cornwall Fire Brigade to haul the Chatham engine the half a mile from the Town Hall to the canal bank, and to play two streams of water on the burning structures. Within two hours of the initial alarm the fire was completely quenched.[49] Fires also pointed out deficiencies in Cornwall's fire-fighting strategy. This was clear in the fire which struck Cornwall in the early morning of 24th January 1884.

The fire broke out in the Commercial Hotel, on the corner of Pitt and Second Streets. Cornwall's volunteer fire brigade responded quickly, hauling the steam fire engine to the foot of Pitt Street from where water could be pumped out of the Cornwall Canal. It was midwinter and the Canal was frozen solid. This compelled the brigade to drag the engine further westward to a point on the ice where a hole could be cut through it, so enabling the suction hose to be placed in water. When one of the ropes used to pull the steam fire engine gave way the firemen were forced to pull the engine unaided through deep snow. By the time the hose was laid along Pitt Street the older frame part of the Commercial Hotel was entirely destroyed and the fire had spread to the newer brick part. Several minutes later the volunteer fire brigade succeeded in playing two streams of water onto the burning structure. Then the hose burst. This caused another delay and enabled the fire to spread to adjacent structures, at which point five of the town's most valuable commercial buildings were simultaneously ablaze. At the fire's height great tongues of flame leaped across Pitt Street, threatening Cornwall's principal commercial thoroughfare and its entire

commercial district. Ultimately both were saved by the townspeople and their vigilance in keeping the roofs of the buildings on the opposite side of Pitt Street well covered with snow.[50]

This was Cornwall's worst fire since its incorporation in 1834. The episode shows the degree of struggle still necessary in the late-nineteenth century for a community like Cornwall to protect itself from fire. The weather was against them but in possession of a new steam fire engine, new hose and water tanks, and a well trained and frequently drilled volunteer fire brigade, Cornwall was still unable to guarantee the safety of its principal commercial district from fire. In the end human initiative and good fortune prevailed, not technology.'

After the January 24th fire Cornwall's *Freeholder* accused the Council of mismanagement and complacency, and ridiculed its efforts to improve the town's means of fire-fighting.[51] Beside the threat to life and property, worse, for the *Freeholder* was the series of mishaps which prevented the fire being contained in its early stages.[52] For example, no means existed for getting readily at the fire bell, or for quickly finding the engineer or horses to transport the engine.[53] Significantly, the newspaper identified *time* as the essential element, always valuable but "peculiarly precious" in fires.[54] The newspaper understood that accessibility and speed were the key to successful fire-fighting, that delays could prove exceptionally costly and that the costliest error was time wasted between the fire alarm and the positioning of the fire engine near the fire. Five minutes lost at the start of a fire was potentially serious. In Cornwall, the newspaper asserted, fifty minutes, not five, were usually wasted, and conjectured that an additional thirty minutes at the start of the January 24th fire might have saved Cornwall fifty thousand dollars.[55] Repeatedly after this and other fires the *Freeholder* stressed the need to manage Cornwall's fire-fighting resources so better to overcome the barriers of space and time. The Council, in response, modified its fire-fighting strategy to ensure, for example, that the engine reached the fire more swiftly. To transport the engine in winter the Council in 1883 invested in a pair of bob-sleighs.[56] After the January 24th fire the Council's fire committee recommended a set of rollers and a team of horses be purchased for the engine, and instructed the engineer to live close to the engine house.[57] Horses were finally purchased for the engine in August 1884 but it took another fire to illustrate their necessity.[58] On this occasion fire-fighting was delayed for a hour while citizens searched the town for a team of horses to pull the engine.[59]

Waterworks

Further cries for improved fire-fighting resurfaced after the January 1884 fire, with suggestions that Cornwall invest in a system of waterworks. That the arguments for waterworks were similar to those advanced a decade earlier for the steam fire engine, reminds us how rapid technological obsolescence really is, and how advocates of technology fuel it by espousing a rhetoric of technological efficiency. This kind of argument can be swiftly and usefully overturned; it is first successfully used to promote a new technology based on claims for its efficiency; then, in a matter of years, it is used again to point out that same technology's deficiencies and to favour some newer one.

Waterworks promised improved fire control and the boon of piped domestic water. In Cornwall it was as the former that proposals for waterworks were considered and found to be attractive. Waterworks proposals were tabled several times in the early 1880s but the Council only considered the suggestion seriously after the January 1884 fire. The *Freeholder* raised the issue immediately after this fire, insisting that a plentiful water supply was badly needed and that a waterworks system would pay for itself in several years.[60] The Council responded by soliciting waterworks proposals from a company in Sorel, Quebec.[61] The issue was raised at a public meeting but defeated because it was considered too large a public investment.[62] A second waterworks proposal tabled in March 1886 was rejected because of a "compulsory clause" that threatened to levy a water tax on all properties supplied with water.[63] The discussion again revealed how technology could be seen to benefit disproportionately certain sections of the community. Genuine concern was felt over the uneven impact of the proposed waterworks. One councillor asked why waterworks should be subsidised by all ratepayers, through the rental of hydrants, when only the town's central and most valuable section would benefit.[64]

Waterworks promised the latest and most sophisticated means of fire control, reductions in insurance rates and unlimited supplies of water. Cornwall's elite first considered waterworks a luxury but soon regarded it as a necessity. Fires encouraged this change of attitude by showing up deficiencies in the existing system; the steam fire engine's geographical limitations, and the problem of dependence on watertanks and on the Cornwall canal to supply it with water. The promise of an inexhaustible water supply, easily targeted, and accessible throughout Cornwall's downtown core was therefore significant. This was clear in the Council's assessment of the third and final proposal to construct waterworks from Messrs. Freeman and Bassett, of Watertown, New York. This system comprised four miles of mains with pumping apparatus, an 80 to 100 ft steel tower reservoir, and forty to fifty hy-

drants for fire-fighting purposes. The company's agent claimed that with pressure of up to 170 lbs per square inch, three separate streams of water could be played from any single hydrant; enough to sustain a jet of water one hundred feet high through a thousand feet of hose, and to outshoot any steam fire engine. The proposal was discussed at a public meeting. Despite the Mayor's opinion that this was the best offer yet made to the town, the general feeling was that the town possessed insufficient information to judge it. The proposal was therefore referred to a special committee of the Council and was later shelved.[65]

Once again events intervened. In the early hours of 21 April 1886 a fire broke out in the Town Hall's Police Court Room. Two prisoners were confined in the cells. The alarm was sounded promptly and the engine quickly placed in position, upon the Fourth Street water tank. The *Freeholder* later on described "AN HOUR OF SUSPENSE", when the Town Hall was attacked by flames on all sides and the water supply was limited. It was a close call, for if the Town Hall had been destroyed there was little to stop the fire spreading to surrounding buildings. The *Freeholder* believed fifteen minutes were critical in deciding the town's fate. In that time the fire-fighters managed to control the blaze. By 5:40 a.m. the engine ceased working and the fire was extinguished. All that remained was the need for damage assessment and the task of retrieving two scorched bodies from the police cells.[66]

This fire again pointed out the deficiencies of existing water distribution. Two lives were lost. The total property damage amounted to only $2,000. But the consequences could so easily have been worse. It was this delicate balance between the actual and the possible that forced the issue. The *Freeholder* candidly described the town's luck that the water supply had held out, for

> had the fire lasted ten minutes longer the tank would have been empty, when, with but one other tank within reach, and no water in the canal, the look-out would have been bad for the buildings in the vicinity. Coming right on the heels of the agitation for waterworks, this fire has convinced almost everybody of the urgent necessity for their immediate construction. ...[67]

The prime motive for change was inadequate water supply but the limitations of a particular spatial patterning of water supply was really to blame, a pattern that severely limited the ability to control fires effectively. Fires that occurred outside the range of water bodies or outlasted their capacity threatened to destroy Cornwall's downtown core.

In light of this fire Cornwall's Town Council again considered the merit of constructing waterworks. This time there was little debate and little dissension.[68] On 28th May 1886 the Council considered four waterworks proposals, and accepted the offer of an American company. The Council's decision to proceed with waterworks was justified financially, believing the system would reduce the fire department's expenses. The Mayor thought waterworks would save $1,000 and reduce insurance rates by 25 to 33%. The likelihood of dispensing with the steam fire engine was also discussed.[69] Cornwall's press and its merchant-led Town Council saw the purchase of waterworks as another step forward for Cornwall. It demonstrated to would-be industrialists that Cornwall was serious about protecting its urban assets and showed to the wider world Cornwall's progressiveness as a community. The *Freeholder*, congratulating the Council's boldness in finally securing an abundant water supply and adequate fire protection, commented that it was too late in the nineteenth century for the need to detail the system's advantages.[70] By May 1887 the waterworks system was connected to the St. Lawrence with fifty-five hydrants installed and ready for use.[71]

Conclusion

Limited fiscally, short on experience with modern ways of fighting fires, and dependent throughout the nineteenth century on voluntary manpower, Cornwall's Town Council struggled as best it could to find a means of containing and controlling fires. The usual reaction was piecemeal improvement in the aftermath of fires, when inadequacies were clear and protests for their amelioration the most earnest. Besides having to deal with technological inefficiencies, the uncertainty of the elements, and the fire-prone built environment, the Council also faced a complacent community. The Council's remedial measures illustrate two decisive trends in fire-fighting: to centralize as much as possible the fire department's human and physical resources, and to speed up the transport of these to multiple, geographically dispersed potential sites of fire. Balancing these two objectives was a constant nightmare for communities like Cornwall, faced with the problem of protecting its citizens from fire, but perhaps more concerned to protect its property, commerce and industry. Such a social reality may well explain the intense desire of Cornwall's Town Council and its urban elite to "annihilate space and time" in the process of fire-fighting. This social valuation of time and space repeatedly prompted their decision to invest in new technology.

Technology re-oriented relations of time and space. "Time-space convergence" and "time-space compression" give de-

scriptive force to this process. Usually these terms are used to refer to advances in long-distance space-binding technologies; less frequently to other kinds of technology, and with social contexts of a more modest scale. Here, in the context of urban fire control, the social consequences of technology were no less profound. We observe a persistent tendency to subdue space and time, revealing their pervasive economic significance. Advances in fire-fighting technology combined with more efficient social organization enhanced a community's ability to fight fires. The trend was never linear or smooth, but the language of fire-fighting did change from one of containment to control. This strengthened the perception that humans had "mastered" nature. It reinforced the view that communities in possession of sophisticated technology were modern and superior. This was not solely a measure of effectiveness but also a measure of intention, of the community to protect its accumulated urban assets.

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Notes

1. For commentaries mainly on the nineteenth century see Wolfgang Schivelbusch *The Railway Journey: Trains and Travel in the 19th-Century* (New York, 1977); Stephen Kern, *The Culture of Time and Space 1880-1918* ((Cambridge, Mass, 1983); and Nigel Thrift, "Transport and Communications 1730-1914" in R.A. Dodgshon and R.A. Butlin (eds) *An Historical Geography of England and Wales* (London, 1990) 453-86; on nineteenth century communications see Allan Pred, *Urban Growth and the Circulation of Information: The United States System of Cities, 1790-1840* (Cambridge, Mass, 1973); and also by Pred, *Urban Growth and City-Systems in the United States, 1840-1860* (Cambridge, Mass, 1980); Peter G Goheen, "The Changing Bias of Inter-Urban Communications in Nineteenth-century Canada" *Journal of Historical Geography* 16, 2 (1990) 177-96; and by the same author, "The Impact of the Telegraph on the Newspaper in Mid-nineteenth Century British North America" *Urban Geography* 11, 2 (1990) 107-129. On more recent events see Manuel Castells, *The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process* (Oxford, 1989); and Nigel Thrift, "A Hyperactive World" in R.J. Johnston, Peter J. Taylor and Michael J. Watts (eds) *Geographies of Global Change: Remapping the World in the Late Twentieth Century* (Oxford, 1995) 18-35.
2. Eric Ross, *Full of Hope and Promise: the Canadas in 1841* (Montreal and Kingston, 1991), 46-81. Interestingly William Cronon uses the same metaphor in his recent book on Chicago. See Chapter 5, "Annihilating Space: Meat", in William Cronon's *Nature's Metropolis: Chicago and the Great West* (New York, 1991) 207-59.
3. See for example Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy* (Harmondsworth, Middx, 1973), esp. 524-44, 620-37, 670-3.
4. *Ibid.*, 539.
5. See Donald G. Janelle, "Central Place Development in a Time-space Framework," *The Professional Geographer* 20 (1968), 5-10; also by Janelle, "Global Interdependence and Its Consequences" in Stanley D. Brunn and Thomas Leinbach (eds) *Collapsing Space and Time: Geographic Aspects of Communication and Information* (London, 1991) 49-81; Thomas Falk and Ronald Abler, "Intercommunications, Distance, and Geographical Theory," *Geografiska Annaler*, series B, (1980), 59-67; David Harvey, *The Condition of Postmodernity: an Enquiry into the Origins of Cultural Change* (Oxford, 1989); also by Harvey, "Between Space and Time: Reflections on the Geographical Imagination," *Annals of the Association of American Geographers* 80, 3 (1990), 418-34.
6. On this latter theme see Joel A Tarr, "The City and the Telegraph: Urban Telecommunications in the Pre-Telephone Era" *Journal of Urban History* 14, 1 (1987) 38-80; and Joel A Tarr and Gabriel Dupuy (eds) *Technology and the Rise of the Networked City in Europe and America* (Philadelphia, 1988).
7. Anthony Giddens on the significance of routine for the reproduction of social norms lends support to such an assertion. See Anthony Giddens, *Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis* (Berkeley, 1979), 198-230.
8. For further examination of Cornwall's economic and social development see Jeremy Stein, *Industrializing Cornwall: Time, Space and the Pace of Change in a Nineteenth-century Ontario Town*, (Unpublished M.A. Thesis, Queen's University, Kingston, 1992).
9. This accords with the conceptualization of technology in systematic terms, as a continual set of improvements and modifications, and not merely as physical machines. See Nathan Rosenberg, *Perspectives on Technology* (Cambridge, 1976), 61-84.
10. On the theme of technology as a measure of human worth see Michael Adas, *Machines as the Measure of Men: Science, Technology and Ideologies of Western Dominance* (Ithaca, 1989).
11. Richard C. Wade, *The Urban Frontier: The Rise of Western Cities, 1790-1830* (Cambridge, Mass, 1959), 87, 91-94.
12. Eric H. Monkkonen, *America Becomes Urban: The Development of U.S. Cities and Towns 1780-1980* (Berkeley, 1988), 89-110.
13. Donal M. Baird *The Story of Firefighting in Canada*, (Erin, Ontario, 1986), 75.
14. Baird, 39.
15. *Ibid.*
16. Nelson Manfred Blake, *Water for the Cities: A History of the Urban Water Supply Problem in the United States* (Syracuse, 1956), 5, 108, 121.
17. John C. Weaver and Peter De Lottinville, "The Conflagration and the City: Disaster and Progress in British North America during the Nineteenth Century," *Histoire Sociale/Social History* 26 (Nov 1980), 428.
18. For a discussion of the significance of waterworks on fire-fighting efficiency see Letty Anderson, "Hard Choices: Supplying Water to New England Towns," *Journal of Interdisciplinary History*, XV, 2 (Autumn 1984), 216-17.
19. Weaver and DeLottinville, 442-43.
20. Eric Monkkonen insists the early steam engines were not superior to their manual counterparts. He recounts the instance when in 1855 New York's City Council were debating purchase of a steam fire engine and organised a competition between a hand-powered and a steam-powered engine. The length of the hand-powered machine's water stream out-distanced that of the steam engine's by 200ft to 185ft. Monkkonen suggests that steam engines were adopted more for their labour-displacing qualities. This was significant for it enhanced the municipal authorities' political control over the streets. See Monkkonen, 107.

21. See F.H. Armstrong: "The First Great Fire of Toronto, 1849", *Ontario History*, LIII, 4 (December 1961), 201-21; and also by Armstrong, "The Rebuilding of Toronto After the Great Fire of 1849," *Ontario History*, LIII, 4 (December 1961), 233-49; and "The Second Great Fire of Toronto, 19-20 April, 1904," *Ontario History*, 70 (1978), 3-38.
22. Weaver and DeLottinville, 420.
23. Pringle, 72.
24. The North American continent seems to have been more prone to fire than other parts of the world. Between 1815 and 1915, of 528 recorded conflagrations, 290 occurred in the United States and Canada. Canada itself between 1870 and 1918 recorded 21 major conflagrations and an additional 134 large fires which wiped out entire villages or sections of towns. See J. Grove Smith, *Fire Waste in Canada* (Ottawa, 1918), 99.
25. Brad Rudachyk, "City with a Heart of Stone: Fire in Kingston, 1838-73," (Unpublished BA Paper, Special Collections, Queen's University, 1979), 4; Brad Rudachyk, "The Most Tyrannous of Masters: Fire in Halifax, Nova Scotia, 1830-1850," (Unpublished MA Thesis, Dalhousie University, 1984), 33-34, 64-66.
26. These mills were the Cornwall Manufacturing Company, The Canada Cotton Company and the Stormont Cotton Manufacturing Company.
27. There are no detailed industrial statistics for Cornwall during this period. This figure is a crude measure of industrial employment in the Town of Cornwall. It is an estimate of the number of industrial employees as a proportion of Cornwall's 1891 population. The employment figures are derived from the Report of the Royal Commission on the Relations of Capital and Labor in Canada, Ontario Evidence (Ottawa, 1889), 1058, 1062, 1068. The population figure is taken from the *Census of Canada*. 1890-91. Vol. 1. p.46.
28. *The Globe* (18 November 1893).
29. Pringle, 285; Elinor K. Senior *From Royal Township to Industrial City: Cornwall 1784-1984* (Belleville, Ont, 1984), 184-85.
30. Pringle, 135; Senior, 184-85.
31. Rudachyk, "The Most Tyrannous of Masters", Chapter 4.
32. Pringle, 135; Senior, 184.
33. Pringle, 293-94.
34. *Census of Canada*. 1870-71. Vol. 1 p.130-31, 1880-81. Vol. 1 p.79, 1890-91. Vol. 1 p.46.
35. Town Council Minutes (9 May 1876).
36. *Ibid.*
37. Town Council Minutes (9 June 1876).
38. *Cornwall Reporter* (12 August 1876).
38. It is unclear whether the Silsby engine was similarly tested.
40. A note on Cornwall's newspapers. The *Reporter*, started up in August 1876, was staunchly conservative, under the proprietorship and editorship of R.W. MacFarlane. It extolled the virtues of local manufacturing and urban improvement. Bought out by Roderick McClennan, it was superseded by the *Standard* in May 1886, under the editorship of William Gibbens, formerly of the *Ottawa Citizen*. Gibbens maintained the *Standard* as a firm tory tract in the interests of McClennan, someone who made his fortune in railroad construction out west. The *Freeholder* was founded in 1846 by John Sandfield Macdonald to espouse the interests of the Reform Party. The newspaper maintained its liberal principles throughout the century. Alexander McLean was editor until 1885 when Charles Young bought the paper and assumed the editorship. The *Freeholder* ridiculed extravagance and mismanagement whether it was associated with Cornwall's Town Council or its mills but lauded progress otherwise. It applauded and campaigned for local health and sanitation improvements.
41. Pringle, 142; Senior, 266-67; *Cornwall Reporter* (5 August 1876).
42. Town Council Minutes (7 August 1876).
43. Upon sounding of the alarm Cornwall's police constables were now to proceed immediately to the scene of fire. They were to keep the peace and obey all orders of the Mayor or the Chief of the Fire Brigade. Officers of the Fire Brigade and Town Councillors were also empowered to sequester male able-bodied citizens for fire-fighting purposes. Cornwall's fire brigade remained a voluntary one and was still so in 1906. *Cornwall and the United Counties of Stormont, Dundas and Glengarry Souvenir of the Old Boys' Re-union 1906* (Cornwall, Ont, 1906), 25.
44. Town Council Minutes (13 October, 6 November 1876). See Figure 1 for the section of Cornwall covered by the fire regulations. All new buildings within the fire limits were to be at least two storeys in height and to be built of stone, brick, iron or some other incombustible material. Infractions of the by-law were punishable by fine.
45. *Cornwall Reporter* (23 September 1876).
46. *Cornwall Reporter* (6 January, 28 April, 8 September 1877).
47. *Cornwall Reporter* (8 September 1877).
48. *Cornwall Reporter* (11 May 1878).
49. *Cornwall Reporter* (25 September 1877).
50. *Cornwall Freeholder* (25 January 1884); Jacob Farrand Pringle, *Lunenburgh or the Old Eastern District* (Cornwall, 1890), 286-87.
51. *Cornwall Freeholder* (24 January 1884)
52. *Ibid.* The January 24th fire resulted in no loss of life and limited property damage, estimated at $98,595. I calculate this figure from the series of losses listed in the *Freeholder*. The *Freeholder* gives the figure of $75,000 but this does not tally with the accumulated losses covered in its columns.
53. *Ibid.*
54. *Cornwall Freeholder* (25 January 1884).
55. *Ibid.*
56. *Cornwall Freeholder* (8 February 1884).
57. *Cornwall Freeholder* (30 March 1883).
58. *Cornwall Freeholder* (15 August 1884).
59. *Cornwall Freeholder* (23 May 1884).
60. *Cornwall Freeholder* (25 January 1884).
61. *Cornwall Freeholder* (8 February 1884).
62. *Cornwall Freeholder* (5 December 1884).
63. *Cornwall Freeholder* (19 March 1886).
64. *Ibid.*
65. *Cornwall Freeholder* (16 April 1886).
66. *Cornwall Freeholder* (23 April 1886).
67. *Ibid.*
68. *Cornwall Freeholder* (30 April 1886).
69. *Cornwall Freeholder* (28 May 1886).
70. *Ibid.*
71. *Cornwall Standard* (5 May 1887).