

# ‘The History of Technology and the History of New Zealand’

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The history of technology has never been properly established in New Zealand. We have general histories that refer to industrial or technological progress to a greater or lesser degree; we have accounts (often from amateurs) of specific industries; we have ‘light’ accounts of our No. 8 wire culture; but we do not have either a dedicated general history or a group of professionals solely dedicated to the task of researching our technological heritage, explaining that heritage to their peers and the wider public, and training graduate students to write technological history. New Zealand requires a new disciplinary focus on the history of technology, in order to rationalize our scattered resources, define a generally accepted methodological approach and (most importantly, perhaps) provoke debate. There have been fundamental changes in social and governmental attitudes towards technology in the last decade, and we need to find a way to engage with the topic in an informed and intelligent manner.

## **Post Hoc Ergo Propter Hoc**

Whatever the difficulties (and there are many) in properly establishing the history of technology as a sub-discipline in New Zealand, therefore, one point is beyond dispute: despite fundamental problems of definition, modern society is highly conscious of ‘technology’, and the historical profession would be remiss not to enter into public discourse on the matter. As Leo Marx and Merritt Roe Smith<sup>1</sup> point out, technology not only plays a central role in our everyday lives, but also popular narratives that are absolutely central to our understanding of the past rely upon it for verisimilitude. Undergraduate topics as varied as colonization, religion, revolution and trade rely upon technology as a fundamental hinge in their logical structure: just as the New World is commonly said to have been discovered because of the invention of the compass, so the Reformation is said to have resulted from access to Gutenberg’s printing press, the American Civil War from the cotton-gin (which dramatically increased the commercial viability of slaves) and the economic development of New Zealand from the advent of refrigeration. Although vaguely disconcerting to historians, these ‘mini-

fables', with their 'simple yet highly plausible before-and-after narrative structure[s]'<sup>2</sup> go largely unquestioned in survey courses, scholarly articles and general histories alike; it is as though our profession is willing to elide the most basic methodological imperatives learnt in honours classes and gathered from supervisors while writing theses, in the interests of narrative consistency. When it comes to the *post hoc ergo propter hoc* fallacy, technology appears to get a free pass (otherwise we would not read such apparently innocuous statements as 'The automobile created suburbia' or 'The Pill produced a sexual revolution').

Of course, there is a high probability that many historians have simply put technology in the 'too hard' basket. There is general agreement amongst both philosophers and historians of technology, for instance, that we have only a thin grasp of just what the word 'technology' refers to, despite the 1990s witnessing use of the term to an extent that is unprecedented in human history. The problem is that, rather than being a collective noun which refers to a finite group of material artefacts (such as, most recently, computers), 'technology' has taken on all the attributes of an adjective lacking an identifiable essence; the term 'technological' floats freely in both conversation and academic discourse, but never refers to a concrete and identifiable body of material objects. Indeed, 'technology' is frequently used to refer not only to material objects, but also to practices like writing and even cognitive processes like psychoanalysis; some would suggest that the term has become so ubiquitous as to simply refer to anything that is suggestive of human sentience and our ability to transform the world we live in.

Martin Heidegger referred to this quality in his seminal essay 'The Question Concerning Technology'<sup>3</sup> when he suggested that the most important thing about technology was its ever-shifting essence, or 'isness'. Heidegger's genius was to note (after failing to describe the term to his satisfaction) that the essence of the term is more important than the term itself, because it provides people with the possibility of infinite logical regression, wherein the *post hoc ergo propter hoc* fallacy can flourish. In Heidegger, both the significance of technology and our fear of it lies in our inability to define it; at some level we are aware that we cannot control that which we cannot define. This 'thing' called technology thus appears to rule our lives, even though it may not – in any concrete sense of the term – even exist. At this level of extreme philosophical reduction, 'technology' merely appears as a shadow of human sentience (or Being) itself.

This rather obtuse perspective can be backed up through etymology. As the American cultural historian Leo Marx noted, the term is of extremely recent origin, and has consistently confounded attempts at definition. His essay 'Technology – The Emergence of a Hazardous Concept'<sup>4</sup> suggests that

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the word did not enter into common usage until the twentieth century, after being incubated for over a century in our institutions of higher learning. It was first used in America in 1828 by the Boston botanist and physician Jacob Bigelow, to address the socio-cultural and industrial implications of the first industrial revolution, and employed by him in an address to Harvard University about the future of science. Like Thorstein Veblen, who popularized the term later in the nineteenth century and directly associated it with the more nuanced German notion of *technik* (from the Greek *techne*),<sup>5</sup> Bigelow suggested that technology – or the exponential increase in the study and application of what were then known as the mechanical arts – had become the driving force behind science, and would continue to be so for the foreseeable future. From its inception, 'technology' referred to a melange of features peculiar to the industrial revolution, but remained indefinable in its particulars. It merely referred to an obscure combination of scientific techniques and industrial processes that had somehow begun to determine the course of history, and hence our lives; it has never had a concrete referent beyond the identification of a generalized, and increasingly global, episteme.<sup>6</sup>

Prior to the industrial revolution, people referred to artefacts created by humans and employed for efficiency or pleasure as 'machines', and the processes by which those machines were created as the 'mechanical arts'. Rather than being indefinable and possibly uncontrollable, machines were solidly under the control of their human operators. As late as 1931, Harry Holland published a pamphlet in New Zealand titled 'The Machine: Friend of Man – or Rival',<sup>7</sup> evoking images of automobiles, cranes, combine harvesters and myriad other devices. Significantly, the question for Holland was not whether or not machines were beginning to determine human actions, but whether humankind was well served to rely on them so much as labour-saving devices: the issue was related to unemployment and the possibility of moral and physical degeneracy rather than a fundamental issue of social control. Holland's readers still had a choice, in other words. If his pamphlet was titled 'Technology: Friend of Man – or Rival', the tone might have been altered substantially.

In America, the term 'technology' was coming into widespread use when Holland wrote his pamphlet. The deployment of electrical light and power, automobiles, cinema, aircraft and telephones at the close of the second industrial revolution provided the core of what commentators like Henry Adams referred to as a 'material core' for a vast, complex, yet ill-defined 'sociotechnological'<sup>8</sup> system. Adams noted the appearance of a new American, born after 1900, who would grow up in a vaguely menacing world of technology. Cultural critics were beginning to suggest that technology would replace politics at the core of society, and that the socio-technological

system would eventually become self-perpetuating and deterministic. (In wilder moments, there were even suggestions – which continue today – that it would become aware.)<sup>9</sup> Unlike Holland, who felt that machines simply presented humanity with rational choices, commentators like Adams felt that machines were capable of rendering human agency redundant. The point to note here is that the term ‘technology’ arose in combination with the social and cultural upheaval associated with the industrial revolution; its famous indeterminacy was a direct result of its genesis in the midst of an epistemological crisis.

It is necessary, therefore, to deal with the notion of technological determinism: the belief that the various material artefacts of the modern age (electric lights, automobiles, refrigeration units, computers) actually drive social and cultural progress. The centrality of this ‘superstition’<sup>10</sup> to the history of technology cannot be understated; it is implicit in the etymology of the term outlined above, and many historians of technology appear to believe that debunking it is their sole reason for existence. Technology, of course, does *not* drive history; even Karl Marx did not believe this. (It is reasonably widely accepted that he viewed it as one of a number of determinative forces, of which the whole was far greater than the sum of its parts.)<sup>11</sup> As M. L. Smith categorically points out, any belief that technology drives social and cultural progress is so wrong-headed as to ‘upend the Second Law of Thermodynamics, conjuring up a non-entropic universe in which dust never settles, things cohere and grow supple with time, and everything is always new and improved, forever young’.<sup>12</sup>

Historians of technology are increasingly turning to an approach which moves along a spectrum from ‘hard’ to ‘soft’ determinism, but which in almost all cases is balanced with a mode of ‘thick description’ which complements mechanical descriptions with a broad cultural or socio-technological perspective. At the ‘hard’ end of the spectrum, technological artefacts may indeed be seen in an inherently determinative light, but usually only insofar as human choice is either extended or curtailed by the technologies available to them. At the ‘soft’ end of the spectrum, the artefacts may only be used in a symbolic sense, as aids to narrative consistency and a methodological tool that allows the historian to ‘gain entrance’ to an under-researched aspect of a culture’s past. Technological artefacts are, therefore, located within the societies which produced and made them in an effort to describe the culture’s relationship to technology, providing descriptions of the culture’s different (and almost always ambiguous) attitudes towards those artefacts. In some cases (such as America and, I would argue, New Zealand), cultures may base a significant part of their identity around technological progress and closely identify with the notion of technological determinism; in other cases (such as pre-contact indigenous Australians and some South

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American tribes), technology might appear in their cultural traditions only as something practical that has strictly limited symbolic power.

This is a sea-change in approach. Historians of technology have traditionally refused to look outside the 'black-box',<sup>13</sup> and relate the arcana of fly-wheels, structural supports and integrated circuits to the broader socio-cultural context. Works such as the eight-volume *A History of Technology*<sup>14</sup> spent a great deal of time explaining, in fascinating detail, that –

. . . [a]t the close of the nineteenth century the carbon filament lamp was in widespread use and a metal filament lamp, using osmium, had been introduced in 1898. The bayonet cap lampholder used in Britain and the screw cap lampholder preferred in America had both become standard. The carbon filament lamp gave an average light output of about 1:4 lumens per watt in 1900, and had a life expectancy of 400-500 hours<sup>15</sup> –

but very little time relating that content to the broader world of users, whose lives were heavily impacted by this new technology, at home, in the workplace and in the global economic markets. Working hours were extended, neighbourhoods divided and moral panics relating to the loss of natural daily rhythms and the possibility of moral degeneracy swept societies across the world. Although the great efforts of 'traditional' historians of technology have provided us with a wealth of source material and accurate technical description, the fact is that prior to 1970, many historians of technology would have been more suited to engineering departments than history departments. Works like Lewis Mumford's *Technics and Civilization*<sup>16</sup> and Jacques Ellul's *The Technological Society*<sup>17</sup> provide socially-oriented parallels to the tradition of 'black-box' histories represented by the Clarendon project, but these were not informed by historical method in the strictest sense; Mumford was a literary and cultural critic and Ellul was a (highly deterministic) philosopher. For most of the twentieth century, historians of technology were involved in the necessary and painstaking task of recording mechanical, industrial and chemical developments through time, and the diffusion of these technologies through space.<sup>18</sup> Writers have only recently decided that the volume of information is great enough and the subject relevant enough to sustain technological histories with a broader, less pragmatic, purpose in mind.<sup>19</sup>

This could be put down to the huge increase in awareness about technology since the internet and World Wide Web boom of the 1990s, but investigation into this matter remains the domain of sociologists and cultural critics. What is of significance for New Zealand history is the way in which the history of technology might allow the accepted history of Aotearoa-New Zealand to be re-imagined and re-contextualized. Technology provides a new perspective on our past that it seems apposite to develop, especially

given the simple fact that our country's post-European settlement occurred in the midst of both the first and second industrial revolutions.<sup>20</sup> Within 100 years (1800-1900), we leapt from a pre-modern culture to one of the most industrialized in the world, permanently obfuscating what came before and continually making a connection in our culture and politics between those three pillars of the modern colonizing powers: progress, industry and technology.

Most historians would accept that there are major holes in the fabric of that story, especially when it is remembered that Maori had a degree of agency on first contact that they sometimes took advantage of; that European colonists were often vulnerable, alienated and at odds with their environment; that government initiatives often failed miserably at the same time as bridges were built, ports established and railways laid; and that many colonists probably came to New Zealand out of a strong desire to avoid the pitfalls of modern life that technology had apparently caused in the Old World.<sup>21</sup> We require a general history of technology that deconstructs the myths of progress that we have so tightly bound to notions of technological advance. Culture and society can move 'backwards' just as easily as we can find ourselves using poorly designed, unethical and frustrating technologies, and a heightened awareness of this can greatly assist our interpretation of the past.

Without having a prior New Zealand model to work from, it is difficult to envisage just what any general history of technology in this country would look like, but recent overseas publications provide some possibilities. While some might complain that my proposed approach is too broad, and some that it is too narrowly focused upon technology, three overseas publications would suggest that there is no single 'accepted' approach to the subject at present. While certainly not representing a cross-section of current approaches, Thomas J. Misa's *Leonardo to the Internet*,<sup>22</sup> Jenny Uglow's *The Lunar Men: Five Friends Whose Curiosity Changed the World*<sup>23</sup> and Richard Dawkins's *The Ancestor's Tale: A Pilgrimage to the Dawn of Evolution* suggest that the field has been thrown open to any number of approaches.<sup>24</sup> Misa uses a series of central determining contexts (such as Renaissance patronage) to describe the circuitous route from the engineering and military marvels of Leonardo da Vinci to the development of the internet from the 1960s, using comparative analysis of his cultural settings to provide balance and an extremely engaging level of insight. Uglow relates the friendship of five men who were crucial to the industrial revolution of the nineteenth century (Matthew Boulton, James Watt, Josiah Wedgwood, Erasmus Darwin and Joseph Priestley) in an inventive attempt at collective biography. And Richard Dawkins, in inimical style, inverts the traditional historical narrative and moves backward in time to chart the (inverted)

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evolution of homo sapiens sapiens from the evolutionary pool. Mirroring the current climate in science and technology itself, historians of technology are employing various and innovative techniques in their approaches to the past. Historians of technology now appear able to balance not only 'hard' or 'soft' determinism and/or technical and cultural content, but also play with narrative linearity and collective biography. The subject has suddenly exploded any methodological strictures and become (like many subjects across the humanities) open to multitudinous approaches.

Recent approaches to technology education in New Zealand present another possible perspective, based on research that has burgeoned worldwide since the year 2000. Following (and in some senses anticipating) global trends, the subject is now a well-established part of our secondary curriculum, and has recently been accepted as a subject for University Entrance.<sup>25</sup> Revealingly (and happily, for humanists), achievement criteria focus on what are termed technological 'outcomes',<sup>26</sup> allowing teachers to focus on a whole range of issues related to the design, socio-historical contexts, ethics and functions of different technologies. Like this essay, which suggests a 'soft' cultural approach to the subject to make best use of our present capacities and also (it is hoped) to prompt a more thorough-going approach to the subject in the future, educationalists employ a broad approach to technology, conceiving it 'as a process in which people are involved in order to meet a need or opportunity' – a process which results in an exceptionally broad range of technological outcomes.<sup>27</sup> Although open to charges of reductionism, the approach represents an important direction for historians of technology.<sup>28</sup> Significantly, a focus on the processes that are involved in the development of different technological 'outcomes' allows us to examine both technological artefacts and technological systems. This is an important distinction to be able to make, especially when referring to contemporary technologies. As the American historian of technology Thomas Hughes has shown, the great technological breakthroughs of the post-World War Two world were only possible because of the development of systems that enabled scientists and engineers to cope with the 'unprecedented complexity'<sup>29</sup> of technological projects such as the American ATLAS missile project and, more recently, the Boston (USA) Central Artery/Tunnel. If we refer only to technological artefacts, in the older tradition of technological history, we miss a fundamental aspect of post-1945 scientific and engineering practice. A proper understanding of 'technology', then, demands an understanding of processes, systems *and* outcomes. In this sense, the modern discipline lies at the interface between culture, design and implementation, presenting humanists with an opportunity to position themselves at the centre of a rapidly developing field.<sup>30</sup>

## The Study of Technology in New Zealand

One of the first issues that the history of technology raises relates to the exceptionally large source base present in any national archives. A quick and unscientific keyword search on the University of Canterbury and National Library databases indicates the sheer volume of material that has some claim to a relationship with 'technological' history in our archives. Using 22 different keyword terms ranging from 'New Zealand Technology' to 'New Zealand Colonization', 'New Zealand Agriculture' and 'New Zealand Antarctic', it is possible to return over 16,734 results from the University of Canterbury system and over 210,000 from the National Library system. The figures are insignificant in terms of any kind of audit of the material available to future historians of technology in New Zealand, but they do point to an anomaly in our historiography: although there is a mass of evidentiary material available for a general history of technology in New Zealand (the above searches can presumably be considered to be the tip of an iceberg), this has never occurred. Indeed, despite the oft-cited 'no.8 wire'<sup>31</sup> component to our collective culture, technological history has never figured highly even in our existing general histories. Although arguably being a defining feature of our culture (I would go so far as to suggest that New Zealand presents a useful case-study in technological nationalism), technology is largely absent as a focus of inquiry.<sup>32</sup> As the figures indicate, this is not to suggest that we do not have resources that can be construed as falling within the ambit of 'technological history', but merely to point out that the sub-discipline does not exist in this country in any kind of defined, organized or self-critical manner.

If the results from the online databases are cross-matched with an identical search through the index of the *New Zealand Journal of History*, the situation becomes clearer still, and suggests some immediate issues for New Zealand historians: in particular, the need for a generalized or 'soft' approach to the history of technology in this country.<sup>33</sup> Although the content for a general history of technology in New Zealand is present (across the many associated fields), there are very few in-depth accounts to work with. Using the same keyword terms, it would appear as if only 32 (out of a possible 286) articles published in the *New Zealand Journal of History* have any relation whatsoever to the history of technology, and only 82 (out of a possible 611) reviews. There are, of course, none that deal specifically with technology.

The point to these (reasonably subjective) investigations is twofold. Firstly, New Zealand history has a solid base of both primary and secondary sources that could be used in the service of histories of technology, and secondly, New Zealand historians have not engaged with the sub-discipline to any



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noticeable degree. Despite declarations that we have a no.8 wire culture, our historical record is almost devoid of sustained investigations into that culture, and provides us with few useful models to base a general history of technology on. In suggesting what a general 'History of Technology in New Zealand' might look like, we are forced to begin with a largely blank canvas.

The question over just where the history of technology might fit within our present historiographical tradition remains, however. Jock Phillips undertook an in-depth stock-take of the *New Zealand Journal of History* in 1990, in an attempt to discern the 'new institutional supports and the recent methodological developments'<sup>34</sup> amongst New Zealand historians, and found that the focus had shifted towards the twentieth century. For the previous five years (1985-1989), 45.9% of articles dealt with the period since 1910 and 21.9% with the period since 1940. Quite correctly, Phillips noted that '[t]his reorientation of interest reflects a growing sense by New Zealand historians that their own immediate past [is] worth studying . . .',<sup>35</sup> but again, this renewed interest in twentieth century history has done little to increase research into arguably *the* single most significant aspect of twentieth century society: technology.

More recently, Tony Ballantyne and Brian Moloughney have called for a greater willingness to 'disrupt conventional readings of New Zealand history in order to open up issues for exploration and debate',<sup>36</sup> and Erik Olssen and Miles Fairburn have suggested that we need to find subject-areas that are conducive to quantification so that we can develop a general narrative that is capable of engendering 'consensus'<sup>37</sup> within a methodologically-divided profession. The history of technology could help in both these regards, by opening up new areas for study and bonding the discipline through common interests across the socio-cultural continuum. Technological history is particularly conducive to large-scale data analysis and quantification and has an association with social history in America,<sup>38</sup> but also has applicability to cultural concerns. Indeed, the topic could enhance social, cultural and postcolonial approaches to the past.

For instance, Peter Gibbons has recently argued that the key to understanding New Zealand history lies in an assertion that European colonization is ongoing,<sup>39</sup> and Chris Hilliard supported him in noting that Gibbons inaugurated the focus upon 'cultural colonization' in Pakeha writing and that this should now be extended into studies of the emotional states of New Zealanders.<sup>40</sup> For most people, however, technology is far more indicative of colonization than the more intangible concerns of writing and emotional response.<sup>41</sup> Indeed, the lack of interest on the part of postcolonial historians could be construed as extreme when it comes to technology. Whereas language underpins consciousness, and emotion

underpins human motivation, technology is, fundamentally, just *used*: to bargain with newcomers, to level forests, to enhance pastureland, to open new markets, to communicate with the world, to leave the country. In this sense, the history of technology is boring, but it is also attractive, because it will move us in a direction which is counter-intuitive to our intellectual traditions at the same time as it opens up the world of material artefacts for historical inspection. Like Eelco Runia, I feel that the study of objects can complement the historical representationalism encouraged by Gibbons with a more traditional appreciation of historical 'presence' which tends towards metonymy rather than irony.<sup>42</sup> In the twenty-first century, it may well be that historians of technology provide new ways of writing history, by refocusing attention on the fundamentally material nature of historical reality. Such an approach allows for social, cultural and postcolonial approaches.

Indeed, the history of technology has the ability to add value to various different historical perspectives. While the postcolonial emphasis upon cultural colonization seems to imply that technology is perhaps the ultimate in colonizing agents (writing fades into insignificance as an act that merely borrows the term), feminist historians can rightly note that technology has traditionally acted as a determinant of the division of society into the private/public spheres, at the same time as mastery and control of it have been axiomatic to masculinist cultures around the world. The technology industry is, after all, probably the most heavily gendered domain in contemporary society, pulling with it centuries of cultural baggage laden with the male domination of tools and machines; the most world- (and some would say consciousness-) transforming cultural artefacts we deploy.<sup>43</sup> To put the matter crudely, tools and technology have been used to define us as a species, and are therefore laden with an extremely powerful set of cultural practices, assumptions and power relations.

### **Research Perspectives in New Zealand**

Of course, many historians simply find the history of technology unexciting; it conjures up images of dusty lecture halls and endless images of sixteenth-century windmill parts. If the history of technology is to be rehabilitated as a sub-discipline – a process which could increase our claims to legitimacy in the context of early twenty-first-century society – it needs to speak to the concerns of the discipline as a whole. It needs to be capable of speaking to New Zealand's status as a society which was 'born modern',<sup>44</sup> it needs to explicate imperial and other transnational bonds which contributed to the colonization process, and it needs to fit comfortably within our dominant tradition of social and cultural history. Luckily, the history of technology is extremely well suited to all of these concerns and could open up some very large areas of research across the entire span of New Zealand history.

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Without wanting to be prescriptive (and simultaneously displaying my preference for a broadly cultural approach), I would suggest that the history of technology in New Zealand follows the following general parameters: Pre-Contact: 1350-1642; Contact: 1642-1840; Colonization: 1840-1873; Colonial Nationalism: 1873-1914; Industrialization: 1914-1945; Nationalization 1945-1984; and Postmodern Globalization 1984-2006. Although I can provide only some very basic sketches here, I would suggest that there are some major technological questions that need to be asked in each of these periods.

### **Pre-Contact: 1350-1642**

In many ways, this period could be termed 'archaeological' and therefore outside the orbit of historians, but this is an unreasonable approach in terms of the history of technology. The Polynesian diaspora that led to the discovery and subsequent colonization of New Zealand was, fundamentally, a technological affair: it was predicated upon technological innovations in ship-building and navigation; it relied upon horticultural technologies both for the long voyages and for the adaptation of plants on arrival; the New Zealand environment demanded technological adaptation in terms of housing and clothing; the development of trade networks necessitated new methods of extraction and manufacturing; new modes of warfare led to innovations and advances in fortification and battle technologies; and the new inhabitants contributed to fundamental changes to both the landscape and flora and fauna. If a single question was to be posited about the pre-contact period, it might simply be, 'What relationship did pre-contact Maori have with technology, and what role did technology play in the first colonization of New Zealand?'

### **Contact: 1642-1840**

The history of European exploration and discovery lends itself easily to the history of technology; it is also a fundamental strand in the 'born modern' thesis. Much of the power of the narrative stems from the convergence of a powerful set of contingent historical processes, anchored around Enlightenment advances in science and philosophy and illustrated by developments in navigation, cartography, ship-building, medicine and food preservation.<sup>45</sup> It is a grand story with sometimes horrific results. As Anne Salmond has shown, however, the story need not be one-sided.<sup>46</sup> A good history of technology in New Zealand would also assess the role of technology in the establishment of Maori-Pakeha relations during first contact, alongside the relatively fast uptake of western technologies within Maori societies, and the effect of those technologies on wider Maori society (symbolized most forcefully in the Musket Wars, but in myriad other subtle

ways as well). In this period, technological history intersects with economic history, not only in relation to the bartering associated with first contact, but also to the development of sealing and whaling stations and, later, food production, housing and even distilling. Myriad questions could be asked, but the most enticing is, 'What role did technology play in the shifting balance of power between Maori and Pakeha prior to organized European settlement in 1840?'

### **Colonization: 1840-1873**

James Belich has provided us with an excellent account of the impact of technology on Maori colonial societies, and the way in which Maori society adapted to western technologies both socially and militarily, but far more could be done if the history of technology was viewed as a distinct project, rather than a sideline to military, cultural or social history.<sup>47</sup> The transference of technology and technological expertise to New Zealand in the period after 1840 was, arguably, unprecedented in human history. In the 30 or so years after the start of programmatic European settlement, a rudimentary but highly effective colonial infrastructure had been established, with extensively explored and surveyed land; the burgeoning of houses, roads, ports, factories and basic sewage systems; and the beginnings of railways, tunnels, mines and even telegraphic communication with the rest of the world. It is easy to overstate both the rapidity of technological advance and its role as a determining agent in the colonization of New Zealand, but there can be little doubt that Maori and Pakeha societies felt the impact of technological advance in stark terms. Unlike Europe, where science, accident and inquisitiveness coalesced over hundreds of years into the Industrial Revolution (which even under these circumstances provoked widespread social and cultural unease), New Zealanders witnessed the development of a skeletal technological (if not industrial) infrastructure in a mere 30 years. What social, cultural and intellectual dynamics were involved in this act of technological colonization? Miles Fairburn's suggestion that New Zealand's European settlement was delayed until 'a crucial point in the development of world history'<sup>48</sup> is clearly ripe for investigation from the perspective of technological history, as is Tony Ballantyne's identification of technology as a key component in the development of 'proto-globalization'.<sup>49</sup>

### **Colonial Nationalism: 1873-1914**

It is interesting that historians have yet to comment in depth on the relationship between colonial nationalism and claims of European autochthony, and technology. The Vogelite reforms of the 1870s were predicated almost solely upon the need to develop New Zealand's rudimentary technological infrastructure quickly into one that could both sustain higher levels of

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immigration and greater levels of industrial output. As the gold-rushes died out, it became necessary to move from a *laissez-faire* model of technological development to a programmatic, state-sponsored one, which could employ economies of scale to transform the landscape (and townscapes) radically with modern ports, railways, roads and communities. The problems and reversals of this period in our technological history need to be assessed alongside governmental claims of unmitigated progress: the uneconomic expense; the disregard of Maori society and increasing calls for land; questionable work practices on public works projects; environmental damage and hopeless attempts at biological control; and, not least, the competing claims of the Arcadian and 'social laboratory' tropes within a wider political discourse of technological triumphalism. What role did technology play in the growth of settler dominance, and how important were futurism and technological triumphalism to late nineteenth-century New Zealand?

### **Industrialization: 1914-1945**

Not enough is known about the industrialization of New Zealand. Alongside the obvious socio-cultural implications of this process (urbanization, changes in gender relations, alterations in national identity), it would be necessary to assess both the rate and nature of industrialization. Was the rate of industrialization faster or slower in New Zealand in comparison to other western societies? How did New Zealand compensate for distance and did this have any measurable effect on the type of industrial society that evolved? What effect did the wars have on industrialization and technological change in New Zealand? What differences were there between urban and rural experiences of technological change? Many of these questions have been approached by earlier historians, who appear to have been interested in industrialization;<sup>50</sup> by economic historians;<sup>51</sup> by environmental historians of the 'grasslands revolution';<sup>52</sup> and by a 600-page PhD thesis on the topic;<sup>53</sup> but the information has never been brought together into an accessible general narrative written by a historian dedicated to the history of technology. Cultural historians should be particularly interested in Patrick Day's writing on the radio stock boom of the 1920s on New Zealand:<sup>54</sup> a world-wide phenomenon comparable in impact to the dotcom bubble of the 1990s that must have had a huge globalizing effect on our culture.<sup>55</sup> Indeed, the interwar electronics boom – including the remarkable number of cinemas in 1930s New Zealand<sup>56</sup> – is of enduring interest as an analogy for the present boom in computer technologies, and as a process that should be capable of shedding significant light on New Zealanders' identification not only with technology, but also with its capacity for reducing distance to the outside world.

### **Nationalization: 1945-1984**

Most historians view the post-war era as one of insularity and provincialism in both culture and politics, but it would be interesting to investigate whether our technological development mirrors this narrative. In certain circumstances, the answer will undoubtedly be ‘yes’ – Muldoonism and ‘Think Big’ being the most obvious symbols of this attitude – but there are very many instances where technology did precisely the opposite. Increases in the efficiency of ports and general shipping processes, the advent of jet travel and the appearance of television (to note only the most obvious examples) worked precisely *against* the provincial attitudes that are traditionally remarked upon by historians. A history of technology would probably foreground the way in which our culture was dominated by imported technologies which contributed to a vast variety of processes, such as the growth of counter-culture and youth politics, a growth in demographic diversity and multiculturalism, and the boom in tertiary education. Technology was involved in all of these processes, and at each level, the implied narrative shifts focus away from the typical themes of insularity and provincialism towards global engagement and innovation. More negatively (but equally conducive to Fairburn’s argument that New Zealand culture had borrowed heavily from overseas because of its geographic isolation<sup>57</sup>), technology was also implicated in the gendering of the domestic sphere and the cult of motherhood during the 1950s; a dramatic rise in road deaths and problems with drink driving from the late 1960s; economic ‘stagflation’ in the 1970s; and, arguably, the degree of violence experienced during the Springbok Tour of 1981. Its failure was symbolized most forcefully in the Erebus disaster of 1979. The key questions here relate to the role of technology in mitigating (or compounding) New Zealanders’ sense of isolation, its effect on national identity, and its involvement in cultural and political programmes.

### **Postmodern Globalization: 1984-2006**

As their narratives near the end of the twentieth century, the great danger for historians of technology is that they might begin to attribute more determinative power to technology than it actually merits and forget that their subject is involved in some extremely long and complex historical trends<sup>58</sup> (many of which are not the sole domain of the West).<sup>59</sup> A good history of technology would point out to readers that the current fascination with information and communication technologies (and claims that they auger the end of history) are misinformed. Indeed, the sub-discipline’s ability to present the *longue durèe* should make it attractive to scholars like Tony Ballantyne who want to position New Zealand society within broader processes of cultural, intellectual and technological development.<sup>60</sup> It is important that technological development is adequately historicized, and that historians point

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out just how postmodern globalization actually functions: it is as important to note developments in urban planning, building and shipping technologies as it is nano-technology and bio-engineering.

That said, and like the rest of the world, post-1984 New Zealand has been buffeted by successive waves of technological innovation of a material, digital and systemic nature. Of particular interest is the way technology has facilitated national dialogues on subjects as varied as environmentalism, Maori land claims, feminism, our anti-nuclear stance and student loans. Talkback radio hosts and website editors now hold a degree of power that former governments would have balked at, and children, adolescents and adults alike have relationships that span the globe – with people they have never met. Even the much publicized 'braindrain'<sup>61</sup> is entangled with technological change in quite fundamental ways, and the government is now publicizing a Digital Strategy to cope with significant alterations in the way we work, learn and play.<sup>62</sup> Unsurprisingly, it is not difficult to find examples where New Zealanders appear concerned about technological advance. The post-Netscape boom in internet technology of the late 1990s has created a degree of unease throughout our society that would be termed 'moral panic' if noted in a past society: concern about online 'stranger danger' is one quite reasonable reaction; concern about an imminent 'singularity'<sup>63</sup> which could see computing networks attaining consciousness is something else altogether, and reminiscent of prior fears about railways, telegraphs and electricity grids. Like many societies around the world, New Zealand needs to ask itself how it reacted to technological innovations in the past in order to make sense of its concerns in the present. A renewed interest in the history of technology, and in particular the radically contingent nature of technological outcomes, should facilitate this.

### Conclusion

Few sub-disciplines within history can fully defend themselves against claims of presentism, and the history of technology might have more difficulty than most. In the space of a few decades, technology has become a central focus of the media, workplaces, schools, universities and polytechnics; it is a subject that has a remarkable amount of currency in our present cultural environment. Yet, despite this – and despite the fact that the history of technology has a reasonably aged and substantial historiographical tradition stretching back to the post-war era – the sub-discipline has never taken hold in this country. The reasons for this are many, varied and understandable, but it is time for a reevaluation of the place of technology in our narratives. Our historiographical tradition is deep enough now to sustain another level of specialization, and there could be few more pointedly relevant topics today than the venerable history of technology. Although much of our

technological history may prove to be rough and ready, it still speaks to our cultural practices and values, and the environment that helped shaped those practices and values. Indeed, the very fact that it *is* (or was) rough and ready is itself significant when weighed alongside the impact Maori and European colonization had on these islands. Much can be achieved with fire and fishing nets, or indeed, a cross-cut saw, corrugated iron and hammer and nails.

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