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Electrical futures past

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Futurist writing about technology emerged in the late 19th century at the same time as new kinds of electrical technology were making utopian futures seem practically attainable. Electrical writers and novelists alike thus borrowed from the popular 'science' fiction of Jules Verne, Edward Bellamy and others to try to create self-fulfilling prophecies of a future in which electrical gadgets and machines met all major practical needs of civilization. To the extent that many parts of our world are populated by the hardware that they forecast, they succeeded in their goal.

Who wouldn't want a future in which housework was abolished by handy gadgets and labour-saving devices, and in which music was on tap everywhere? Who could now imagine a positive future in which electricity was not ubiquitously available to power a safer, fairer and more pleasantly technological society? Such facilities were the cornerstone of the world presented in Edward Bellamy's Looking Backward 2000–1887 [1], an astoundingly popular utopian novel that was published in 1888 to critique the harshness of contemporary American life. However, even if Bellamy's hi-tech millennium looks superficially familiar, by no means has every aspect of his ideal society arrived. How many of us use only municipal cooking and cleaning facilities, listen to sermons on the domestic telephone and work a three-day week on an equal wage? Although our lives are more electrified and our futurist fiction more diverse than Bellamy anticipated, our 21st century environment falls short of his egalitarian technotopia. How then did we come to be so fascinated by the fallible horoscope-like art of predicting futures defined by technology – knowing full well that heavily mooted futures such as the 'paperless office', nuclear energy too cheap to meter and mass supersonic flight did not arrive and seems unlikely ever to do so. The rise of electrical technologies in the 1880s helped to make plausible the futures imagined in the emerging genre of science fiction, thus encouraging readers to interpret these stories as predictions, not mere fantasies.

In Victorian Britain, as in other industrializing nations, the major sites of technological innovation were outside the home. The new industrial landscape constituted of factories, railways and telegraph-lines, and set the ever hastening pace for ordinary city-dwellers, who were now increasingly able to access the new public utilities of water, gas and drainage. Stoical Victorians could therefore have been forgiven for thinking that machinery moulded human destiny as inevitably as the biological forces of natural selection and the political forces of

empire building. However, it might not have been obvious to them how technological expansion would affect their future domestic existence.

In the 50 years leading up to World War I, one particular force was widely tipped to transform the nature of civilized life: the mysterious, invisible and yet immensely powerful natural agent of electricity. Many had read Mary Shelley's multi-facetted warnings against meddling with it powers in her popular 1818 novel Frankenstein, and by the early 1870s an equal number of people had been inured to the risks of electricity by the impressively tamed displays of sparking apparatus conducted by popular electrical lecturers and the worldwide lightning fast communication facilitated by the electrical telegraph [2]. Indeed, readers of Jules Verne's 1870 novel 20,000 Leagues under the Sea had an even more daring representation of the possible future usage of electricity suggested to them. In a chapter headed 'All by electricity', Captain Nemo explains the extraordinary operation of his advanced submarine The Nautilus:

> 'There is a powerful agent, obedient, rapid, easy, which conforms to every use, and reigns supreme on board my vessel. Everything is done by means of it. It lights, warms it, and is the soul of my mechanical apparatus. This agent is electricity' [3] (Figure 1).

During the next few decades Verne's intimations of more practical uses of electricity were borne out in ways that grabbed the attention of the press and public alike. The two most startling innovations were Alexander Graham Bell's telephone and Thomas Alva Edison's sound-recording phonograph, which were unveiled in 1876 and 1877, respectively. Each were astonishing ways of communicating with people in other places and at a later time, which could extend the annihilation of space and time seemingly begun by global telegraphy [4]. Yet the future roles of the phonograph and the telephone were not as obvious to those encountering them for the first time as we might have expected from their use in the 21st century. The telephone was initially used for theatrical entertainment, relaying operas to remote subscribers and sending oral telegrams between businessmen – as if it were a direct extension of the telegraph. Few imagined it would be adopted en masse for extensive leisure conversation with those far and near. Similarly the phonograph was designed primarily as a Dictaphone for use in offices or as a telephone answering machine. Who would have guessed that its descendants – record and CD players – would end up playing pre-recorded music to people across the world before the end of the next century? [5]

Whatever the future would look like, the enormous potential of electricity to be the driving force of change was clear to many. Its prospects seemed so promising that when Edison announced a radical innovation in electrical lighting in October 1878 the world took notice. For decades, the only kind of electrical lighting available had been the harsh, glaring arc lamp, which was suitable only

for outdoor public lighting. Edison now claimed to have made an electrical lamp that was soft enough for regular household use. The intimation that this process would render gaslight obsolete sent the price of gas-shares tumbling rapidly, and fortunes were lost in the ensuing panic [6].

However, two years later Edison had still not produced a satisfactorily reliable electric lamp: houses across Europe and the USA were still lit by candles, oil, paraffin or gaslight. The public discontent from prospective consumers, not to mention investors and erstwhile gas shareholders, generated a backlash nearly as fatal to the electrical industry as the monstrous force unleashed by Dr Frankenstein had been to the characters in Shelley's novel. The future of the home did not seem quite so obviously electrical after all. However, Edison – an expert self publicist backed by a large support team at his New Jersey headquarters – presented a brave face to the press. In the summer of 1880 he had announced to newspapers that he had eliminated 'all the obstacles in the way of the utilization of the electric light as a convenient and economical substitute for gaslight'. And yet in October of the same year, Edison wrote a feature for the North American Review brazenly titled 'The success of the electric light' in which he acknowledged that he had failed to deliver. Because other electrical experts had declared Edison's lighting system a failure, it was hardly surprising that he conceded that the 'unscientific public' should begin to ask whether he had duped them or they had been 'hoaxed by unscrupulous newspaper reporters' [7].

Noting that all previous great innovations had suffered from teething troubles, Edison asked the public to be patient and ignore his critics. After all, in earlier decades eminent scientists had pronounced ocean steam navigation and submarine telegraphy as 'impossibilities', even down to the day when they were proven successes. Answering demands about when his system would be successfully demonstrated, Edison replied that 'in all probability' it would be within two months; and on New Year's Eve 1880, Edison his team at last displayed his light to the public at Menlo Park [8]. However, this light only became commercially available to homes and offices in 1882 and even then at a very high cost compared to gaslight, leading to it only being installed in the financial districts of New York and central London. Because too few citizens at the time bought into Edison's vision of an electrically lit future, both of these ventures were commercial failures and were closed down by 1884. Edison's predictions of the future success of the electric light and its defeat of its allegedly poisonous and corrosive gas counterpart were, to say the least, premature.

As Edison's company struggled to realize the future it had promised, his British competitors were also being asked pressing questions. Like him they responded by displacing difficult matters to the future – although they were rather more circumspect than Edison about specifying exactly when that future would come. In May 1882, St George Lane-Fox lectured on 'The Future of Electric Lighting' to

the Royal United Services Institution in London. He specifically responded to common queries: would householders ever have the electric light in their houses and would electricity ever be as cheap as gas? With greater humility than Edison, Lane-Fox claimed he could not 'withdraw the veil entirely' from the 'too vast and complicated' subject of the future. Nevertheless, as an electrical inventor and patent-holder needing to create demand for his version of an electrical future, he assured his listeners that in due course their homes would be electrically lit from a public supply system at 'probably' a twelfth of the cost of gas. Following the example of the kitchen staff onboard the Nautilus, Lane-Fox even heated water in a electrical boiling pot – thereby showing that the future might not just be lit by electricity, but also heated and powered by it too. The meeting chair William Spottiswoode – President of the Royal Society and Chairman of the English Edison Company – sympathetically suggested that, unlike so many treacherous areas of forecasting, it was safer to prophesy what electricity 'can do' than what it could not [9].

Borrowing from Jules Verne stories, speculation about the many possibilities of an electrical future in the form of fantasies soon became an important feature of popular writing by electrical entrepreneurs, journalists and others. In 1883 the Scottish-American polymath scientist, John Macnie responded to the continuing optimism concerning the electrification projects of Edison et al. in a futuristic novel titled The Diothas: or, A Far Look Ahead. Macnie prudently wrote under the pseudonym 'Ismar Thiusen' as speculative fiction was not (yet) a respectable area for a professional scientist to be writing in. Given the very limited and slow success-rate of contemporary electric light projects, Macnie believed the prospect of a fully electrified society lay in the remote future – nearly 7500 years hence. He conceived that by then electricity would power the whole of a democratic world civilization, in which homes were fitted for electrical lighting, music was on tap and there would be so much automated machinery that servants had become superfluous. Moreover, so many labour-saving devices would be employed in an electrically powered industry that men and women would only have a three-hour working day, using their leisure time to enjoy intercontinental electric transportation and global telecommunication – ideas that Macnie later angrily accused Edward Bellamy of plagiarizing from him [10].

The Diothas was as much a conventional romance as it was an innovative foray into envisioning the longer-term beneficial transformations to be wrought by electricity, with both wrapped up in a melodrama concerning the Diotha family. As in so many early time-travel stories written before H.G. Wells' The Time Machine, the 19th century hero of The Diothas is induced into a sleep that carries him into the future; perfectly preserved, he wakes up in the 96th century to find himself addressed as 'Ismar Thiusen'. In the ensuing sentimental narrative his clumsiness in handling an advanced electric boat leads to the tragic death of his fiancée – Reva Diotha – and his own return to 1883. In the real world, futurological fiction about electricity was no more successful or popular in the

doldrum years of the electrical industry (1884–1888) than the electrical endeavours that inspired Macnie.

The situation changed considerably in 1888, however, when Bellamy published Looking Backward [11]. The book was a socio-political critique set in the remote future that contained little of Macnie's pulp romance, although the technologies cited in both stories are strikingly similar. Bellamy's Bostonian protagonist Julian West awakes from a mesmeric sleep of 113 years to find men and women working as equals in a peaceful Christian civilization facilitated by nationalized transport and communication utilities. Poverty, exploitation and war have been abolished, and all citizens live in fully electrified homes. When West looks back to 1887, the America of Bellamy's own day is made to look like an unjust nightmare waiting for a benevolent revolution to occur. Bellamy does not specify whether the social transformation implied in his story would be facilitated by electrification or vice versa – although perhaps he says more by having the two develop in symbiosis. Either way, for Bellamy the prospect of a fully electrified world lay only a little over a century away – arriving rather sooner than for Macnie.

For a society already starting to see the electrification process in action in 1888, the greater proximity and plausibility of Bellamy's future helped it attract readers. Selling hundreds of thousands of copies on both sides of the Atlantic, the enormous popularity of Looking Backward inspired imitations about technologically enhanced future societies that have earned it a prominent place in the history of science fiction. The following year, Macnie opportunistically republished The Diothas as Looking Forward, strongly hinting in his still anonymous preface that Bellamy had plagiarized his work and simultaneously rejecting the socialism of Looking Backward. But it was not merely Macnie that responded with opportunism to the enormous readership that Looking Backward inspired. In the ensuing decade, dozens of speculations describing possible future homes and societies vitalized by electricity flowed from the pens of engineers, journalists and short-story writers. Their efforts to construct attractive future worlds drew upon electrical technologies that were – owing to newly favourable conditions and technical improvements – starting to flourish and generate further interest in those very products produced by electrical development.

In early 1890, the New York inventor and writer Park Benjamin wrote on 'The possibilities of electricity' for the American engineering journal Forum. Some of his prognostications dwelt on relatively conventional predictions such as the use of electrical heating for welding, warmth and cookery, and the production of electric light without heat (in contrast to the hot and smelly gaslight). Benjamin's intimations of 'music on tap' echoed the future luxuries detailed in both Looking Forward and Looking Backward. However, Benjamin was more radical in nonchalantly forecasting such marvels as instant photography across continents; electric trains traveling at 300 miles an hour; the telegraphing of tastes and

smells for remote medical diagnosis; telegraphic and telephonic transmissions without wires; and even electrically illuminated wallpaper [12].

In a rather more sober vein than Benjamin's piece, A.E. Kennelly – Thomas Edison's senior electrician – wrote an article titled 'Electricity in the household' for Scribner's Magazine in the same year. Focusing on the practical needs of the home, Kennelly explained how electricity could be used in a burglar alarm service; to regulate domestic temperature; to keep clocks on time; to power carpet sweepers; to operate a table train to serve meals and to heat large quantities of coffee. This was unmistakably a move to promote the interests of the Edison Company in getting future prospective customers to think beyond the use of electricity merely for lighting. After all, the survival of Edison's business hinged on getting customers to think about employing electricity in Macnie's and Bellamy's terms to create a future that was electrified from domestic lamps to urban railways [13].

In Britain, the futurist tendency in electrical writing was nearly as marked as in the USA. Soon after he had concluded his electrical researches under James Clerk Maxwell at Cambridge in 1877, the electrical inventor and engineer James Gordon had begun writing for the public on electrical matters. Gordon became famous in 1886 for developing the first public installation of alternate current power at Paddington Railway Station, and by 1892 he was an independent consultant drumming up business for his new electrical projects. He had been impressed by Nikola Tesla's lecture at the Royal Institution on 3 February 1892, where he demonstrated a 'wireless' form of fluorescent illumination uniquely possible with very high frequency alternate current. In the Nineteenth Century for March 1892, Gordon wrote that this latest electrical discovery entered a new region of 'mystery and hope'. Tesla's results could fulfill the 'bold dreams of scientific imagination' in bringing socio-political change on a scale comparable with the development of the railway and telegraph systems in the preceding half-century. As he wrote in consonance with Bellamy's vision of social equality:

> Most manual labour will become unnecessary, as unlimited power will be available at every man's hand. Engineering works will be carried out on a far greater scale than has yet been even contemplated, and doubtless a corresponding era of material prosperity will set in. [14]

In understanding the historical significance of such writing, the important issue is not the accuracy or otherwise of Benjamin's, Kennelly's or Gordon's predictions: history is not in the business of awarding points for clairvoyance or the lack of it. It is much more significant that as electrical engineers and inventors, these men felt it necessary and appropriate to borrow the literary strategies of Macnie and Bellamy to inspire readers to imagine a benign future for electricity. Engineers

thus melded the excitements of speculative fiction with the concerns of household management in a quite unprecedented way. This was a contentious move to make: the status of electrical experts was primarily based on what they knew about how electricity and electrical machines actually behaved, not on clairvoyance concerning the social benefits that might or might not come from merely conjectural technologies.

Such a daring redrawing of the lines of professional expertise drew a negative reaction. In November 1891 the conservative Spectator magazine criticized the unholy marriage of 'Science and conjecture' [15] in which expertise was mingled with speculations that had yet to be validated – as was apparent in some of William Crookes' writing. The Spectator editorial complained that so-called 'scientific authorities' had adopted a rather exasperating habit of 'taking the public into their confidence, making known to it discoveries that are as yet only half known to themselves, and building upon them the basis of those discoveries a bewildering fabric of conjectural possibilities.' The message was clear: if electrical experts engaging in futurism wanted to be taken seriously, they had to adopt a responsible caution if they were to be differentiated from charlatans.

The Spectator was by no means the only critic of this new species of futurism. The most prominent commentator was the radical journalist William Stead (Figure 2), famed for campaigns against child prostitution in the 1880s and posthumously for sinking with the S.S. Titanic. In 1890 Stead launched the Review of Reviews – a survey of contemporary media that the masses could afford to purchase – in both British and American editions. Strongly sympathizing with Bellamy's vision of a Christian egalitarian future, the Review of Reviews staff avidly summarized journalism on Bellamy himself and the new futurist literature on electricity that his Looking Backward had inspired. This was not simply 'cut-and-paste' journalism, although Stead had passed harsh comment on the more self-indulgent and materialistic prognostications that came under his eyes; particularly those that failed to live up to his religious standards. Stead's editorial pen thus introduced Kennelly's homely essay on domestic improvement through electricity rather more kindly than Benjamin's outlandish flights of electrical fantasy – the latter being given rather short shrift indeed [16].

The most prominent futurist piece to induce indignation in Stead was William Crookes' article on 'Some Possibilities of Electricity' published in the Fortnightly Review for February 1892.William Crookes (Figure 3) was famous for his investigations of cathode ray tubes, and in 1891 his eminence won him the Presidency of the Institution of Electrical Engineers in London. Following Tesla's demonstration of wireless lighting, Crookes suggested that wireless telegraphy was an imminent possibility. More contentious, however, was his suggestion that electricians might be able to harness electricity to improve the environment, especially the weather, for the purposes of agriculture and hygiene. Stead disparaged Crookes' Fortnightly piece as 'sufficient to take away one's

breath' for its unnecessary indulgence in futurism:

> Professor Crookes gives a clear run to his fancy, and thinks that we may, by electrical action, rout the parasitical insects and fungi which in some seasons rob us of no less than the tenth of our crops. Electricians, he thinks, should aim at nothing less than the control of the weather, and always make it wet at night time and sunshiny all the day; and when it was to rain, rain a downpour never a drizzle. Incidentally he would abolish London fogs and sterilise all germs in the water supply [17].

In closing his paper, Crookes had recognized that 'I would perhaps, be styled a dreamer, or something worse, if I remotely hint at still further amending the ways of Nature'. Certainly Stead styled Crookes as a supposed expert out of his depth and drifting into quackery. Tellingly, Crookes was careful in subsequent writing to avoid such speculation: he knew he had crossed the boundary demarcating what scientist/engineers could credibly claim [18].

Nevertheless, scientists and engineers alike were not wholly deterred from futurism. Until the majority of households had electricity, and as long as ultra-economic gas lighting offered a competitive alternative (especially the Welsbach mantle that became available in the 1890s), futurist writing was an effective means of inspiring the imaginations of prospective electricity users. Indeed it became a principal feature of the journal Modern Electrics, which American radio engineer Hugo Gernsback established in 1908 to promote sales of the self assembly radio kits made by his company. It was in this famous magazine that Gernsback first experimented with science fiction stories to forecast the gadgetry that could be used by electrically powered superheroes of the future, the most famous example being his 1911 story, which was subsequently published as a novel, Ralph 124C 41C, Thrilling Adventures in the Year 2660 (Figure 4). Gernsback is sometimes said to have prophesized the technologies, among others, of radar, tape recorders, loudspeakers, solar power and microfilm [19]. Gernsback's futurist writing reputedly inspired many aspiring engineers in the USA to develop just these sorts of technologies in the 20th century – the very paradigm of self fulfilling prophecy.

With hindsight, we can see that in the long-term the electrification projects, started by the likes of Edison and Fox-Lane, were technically and commercially successful. However, it was clearly only by hard work, good luck and support from popular futurist writing that this came to be so. Moreover, the projects did not bring the utopian futures of reduced-labour, prosperity and equality that had been forecast by Macnie and Bellamy: the horrors of the Boer War and World War I ended the optimism that electricity alone could bring about a modern egalitarian utopia [20]. Until the start of the 20th century at least, the hyperbolic

fictions of electrical futurism did serve their purpose and stimulated many ordinary householders to invest in electricity and embrace this mysterious invisible agent in their homes. Although we do not (yet) occupy the world envisaged by Edward Bellamy, we can at least be sure that we all live in an amalgamation of several past electrician's futures.

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Figure 1. The cover of La Vie Electrique. Albert Robida's The Twentieth Century was published in 1883 and speculated on a hi-tech France in the year 1952. This 1890 edition bears an additional subtitle 'the electric life'. Robida's futurist writing was arguably less daring and more optimistic than Jules Verne's novels.

Figure 2. William Stead (1849–1912). As founder/editor of the Review of Reviews, Stead promoted the high-tech Christian utopias of Edward Bellamy and 'Ismar Thiusen' to wide audiences. He was rather more critical of the more worldly and material writers on electrical futurism that followed in their wake..

Figure 3. William Crookes (1832–1919), eminent chemist and electrical experimenter. In 1892 Crookes predicted the imminent arrival of wireless telegraphy (radio), but rather less successfully forecast the electrical conquest of weather, parasites and crop diseases.

Figure 4. The cover of Ralph 124C 41C. Hugo Gernsback's gadget-filled adventure, published in 1911, borrowed much from earlier electrical futurism and set the template for what he later christened 'science fiction'. As well as bringing him literary notoriety, it also helped him sell many a radio kit.

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