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RADIO FEVER?

The health roots of early radio

Bill Kirkpatrick

In spring 2020, assertions that fifth-generation (5G) cellular technology was responsible for the COVID-19 pandemic circulated throughout US political discourse, continuing a long tradition of dubious claims about the health effects of radio waves going back over a century. A decade earlier people worried about radio waves in cell phones causing brain cancer. During the Cold War, concerns focused on Soviet mind control and radiation experiments (Weinberger, 2017). Early broadcasting technology also had its conspiracy theorists, as in a 1931 pamphlet claiming that your radio was a pathogen waiting to pounce: ‘Broadcasting waves are capable, trough [*sic*] the factor of any radio set, of producing several diseases in the body. The present gripe epidemic is one of its effects!’ (Weissman, 1931). And three decades before that, the threat was wireless telegraphy. A letter to the *Wichita Eagle* in 1903, for example, warned of mass electrocution by wireless, claiming that villains wielding radio waves could ‘in one second ... kill the whole or two-thirds of the population of Kansas from where they stand’ (‘Death Lurks,’ 1903).

Fortunately for whichever Kansans survived, radio was also linked to beneficial health effects, as in the spate of stories during the 1920s touting radio’s curative powers (e.g., ‘Deaf Man Puts on Phones and Hears: Affliction Is Overcome by Ether Waves after 26 Years’ (1924) [see also Figure 17.1]). Although such claims usually proved unfounded, some turned out to be true. Many radio communications technologies *are* also medical technologies, and electromagnetic waves *can* produce a range of positive and negative effects on the body. Radio content as an early form of music therapy *did* help many patients recover, and some of those ‘radio cures deafness’ stories merely conflated wireless transmission with the headphones that, via bone conduction, *did* allow some deaf/hard-of-hearing people to hear the radio.

Such true, false, and somewhat-mistaken claims linking radio and health became an important part of the social construction of radio in the early twentieth century. Indeed, despite being known as the ‘disembodied’ medium, radio has always been connected to the body and to biodiscourses (Braidotti, 1994) from the fields of medicine, public health, and more. Since before the advent of broadcasting, and well beyond pseudoscientific hopes and panics, radio and health have been what Sheila Jasanoff (2004) calls a ‘co-production,’ entangled

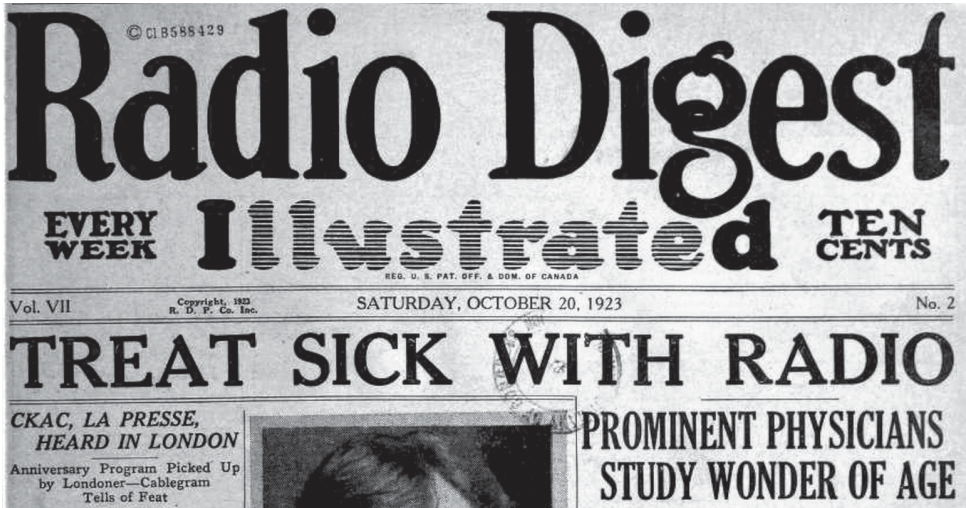


Figure 17.1 A 1923 issue of *Radio Digest* constructing radio not just as a life-saving device ('Radio Pilot') but as a medical technology in its own right

Source: Radio Digest, 1923 Media History Digital Library

in their 'structures and practices, their ideas and material products, and their trajectories of change' (p. 2).

Surprisingly, this co-production represents a gap in radio scholarship. On the one hand, scholars of medicine, electricity, and the body have largely ignored radio, focusing on wired applications or forms of radioactivity like X-rays and radium, but neglecting connections between radio as a communications medium and health (Cartwright, 1995; Clark, 1998; Kevles, 1997; Lavine, 2012; Marvin, 1988; Mould, 1993; Natale, 2011; Peña, 2003; Rentitzi, 2011). On the other hand, scholars of medical electricity and radio as a communications device have largely ignored the body itself, focusing on 'mental radio' (i.e., telepathy) and on spiritualist/paranormal contexts in which *disembodiment* is the main attraction (Douglas, 1987; Klassen, 2018; Lysen, 2020; Peters, 2010; Sconce, 2000; Taylor, 2002; Warner, 2008).¹ Those who have discussed early wireless as a life-saving device in depth (e.g., Douglas, 1987; Streeter, 1996) have, I will argue, tended to understate the significance of this dimension of radio history. In other words, radio as a communications technology and its associations with health, medicine, and the physical body have largely been overlooked and/or underappreciated.

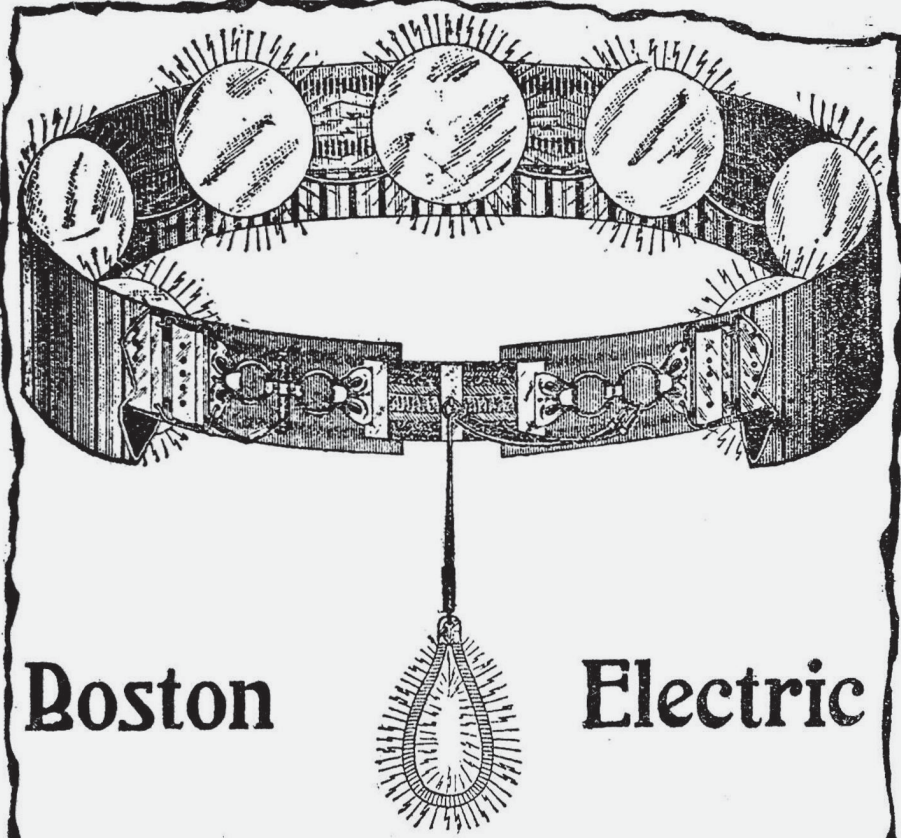
This chapter will seek to close that gap by showing how radio and health/medicine are part of a common story. From the core technologies shared by communications and medical devices, to a kind of 'constitutive confusion' around the medical effects of radio waves, to the popular imagination of radio as a life-saving device, to the role of biodiscourses in justifying media policies as a matter of national security, physical health became part of what radio meant to American culture. At the same time, radio became part of the increasing medicalization of US society in the early twentieth century, an integral part of the processes through which health, medicine, and biopolitics emerged as dominant ideological, economic, and political forces in American life. In detailing these relationships, I argue that the co-constitutive nature of radio and health helps explain the technological, cultural, and regulatory development of the medium, particularly in the US.

Radio technologies: thinking with the body

Material connections between health and radio go back to the mid-nineteenth century – much farther if we properly situate radio in the long trajectory of medical electricity. This fascinating history goes back at least to ancient Greece, when jolts from torpedo fish were used to treat arthritis; its modern incarnation begins in the eighteenth century, most famously when Luigi Galvani wired up frog legs to attempt to reanimate dead tissue. As Galvani's experiments and texts like *Frankenstein* illustrate, scientists as well as the public understood electricity as a kind of 'lifeforce' hovering between physics, medicine, and religion. Commerce soon followed: medical applications arrived in the late nineteenth century with the rise of electrotherapy and, less credibly, gadgets like battery-powered belts for finding one's 'lost manhood' ([Figure 17.2], Aitken, 2014; Armstrong, 1998; Bertucci & Pancaldi, 2001; Finger, 2006; Gritzer & Arluke, 1985; Peña, 2003; Scott, 2018; Wexler, 2017).

Radio emerged from within this history of medical electricity as scientists in the late nineteenth century sought to understand electromagnetic waves and their sociocultural possibilities. Early devices resulted from and were applied to research in both medicine and communications, blurring the two fields in significant ways. In 1889, for example, two years after Heinrich Hertz published his first paper on Hertzian (radio) waves, Jules François Joubert tested the effect of these radio waves on frog muscles, a wireless iteration of Galvani's wired experiments (Mallik, 1988). William Crookes' 'Crookes tube,' an early vacuum tube, was antecedent to both wireless telegraphy and X-ray machines, while Nikola Tesla did much of his pioneering work, including the development of the Tesla coil (an innovation central to wireless telegraphy) in pursuit of medical rather than communications applications (Sarkar et al., 2006). Tesla's followers, like Jacques-Arsène d'Arsonval, used the Tesla coil in electrotherapeutics and X-ray machines, even as the invention also became a part of Oliver Lodge's (and subsequently Marconi's) coherer, a key component of wireless telegraphy until around 1907. A few years later, Valdemar Poulsen's arc converter found applications in both wireless telegraphy and medicine; the blurring of the two fields is exemplified by the 'radio knife,' a cold-cautery surgical device patented in 1907 by Lee de Forest, self-proclaimed 'Father of Radio' (Mallik, 1988). As often with de Forest, more credit is due elsewhere, in the case of the 'radio knife' with Karl Franz Nagelschmidt, who had already been iterating on wireless telegraphy and wireless telephony devices to pioneer the field of diathermy, that is, using radio waves to produce heat during surgery (Blake, 1929). The triode, a core component of wireless voice transmission, also revolutionized neurophysiology by introducing electric amplification (Borck, 2001); as Cornelius Borck (2001, p. 239) noted, 'Instruments traveled from one field to another and back in a process of ongoing alteration and refinement.' In short, radio and medicine were building on the same technological base and borrowing terminology from each other as well (including the promiscuous use of the term 'radio,' to which I will return).

Radio and health were also a co-production insofar as the body and biodiscourses shaped the thinking of key researchers. Most famously, Crookes's 1892 article predicting wireless telegraphy also foresaw a multitude of public health benefits from the same technology, including killing parasites and purifying sewage (which did come to pass, albeit at much shorter wavelengths), while researcher Amos Dolbear suggested the possibility of delivering pharmaceuticals by wireless (Marvin, 1988). Such thinking clearly shaped the research that followed. For example, like Tesla, Oliver Lodge had the body rather than communications in mind when he provided what may have been the first public demonstration of wireless telegraphy in 1894. Lodge was using the coherer to illustrate his speculations on the workings of the human retina, and the ability to signal at a distance was merely a byproduct (Aitken, 2014). In other words, one of



Boston Electric

BELT.

The powerful electric current, fully warranted and guaranteed, the most perfect belt known on account of its wonderful and peculiar electric power. It is not recommended for general use

Boston Medical Institute,
152 LAKE ST., CHICAGO, ILL.

Figure 17.2 One of the more dubious examples of devices from the late nineteenth to early twentieth century using medical electricity to cure impotence, assist weight loss, restore muscle function, and more. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0); <https://wellcomecollection.org/works/q2z8gnyf>

the founding moments of what would become radio was a demonstration rooted in anatomical rather than communications research, guided by metaphors of medicine and the body. Such biodiscursive analogies, especially to eyes and ears, were both commonplace and pivotal: Sungook Hong (2001) argues that scientists' 'adherence to optics obscured a telegraphic application of Hertzian waves. Even when they imagined signaling by means of Hertzian waves, an optical rather than a telegraphic analogy dominated' (p. 7). That the human body has electrical properties of its own further encouraged scientists to 'think with' the body, especially since the differences between mechanical electricity (like that produced by turbines) and bioelectricity (such as neuronal firing) were still poorly understood (Scott, 2018). This confusion can be seen in an 1889 speech from Hertz himself:

Even when a body does not give off any light, provided only it radiates heat, it is the source of electric actions. The domain of electricity thus pervades all nature – it pervades ourselves; in fact, is not the eye an electric organ?

as quoted in Marvin, 1988, p. 127

These biodiscourses were not merely theoretically consequential but had practical and industrial effects on radio's development as well. Many of the most brilliant scientists who might have further explored the communications potential of radio waves, including Karl Braun, Alexander Popov, and Jagadish Bose, were lured away by the enticing promise of X-rays and other medical applications. As suggested by Charles Süsskind (1965), apart from whatever other motivations researchers might have had to focus on medicine, many simply discounted the possibility of wireless telephony due to the impracticability of making Hertzian waves audible to the human ear. Even for those who continued to work on communications, the impulse to analogize from the human body encouraged them to experiment with shorter wavelengths closer to the visible spectrum, leading them farther away from practical wireless telegraphy (Hong, 2001). In contrast, Guglielmo Marconi, using his 'see what works' methods, turned to longer wavelengths for his experiments. As Aitken (2014, p. 37) put it:

it is strange that the first deliberate and successful laboratory use of radio waves was at what we now call very high frequencies while the first successful commercial exploitation was at the other end of the spectrum, at the low and very low frequencies. It is as if the first explorer of a new continent had sighted land at one latitude, but the first colonization had taken place somewhere quite different.

By thinking in metaphors of the body, then, most scientists investigating radio waves pursued an approach that all but precluded successful development of wireless telegraphy under the technological conditions of the time, thereby leaving the field open for Marconi to engineer practical applications of the coherer and ultimately dominate commercial exploitation of wireless communications (Aitken, 2014; Sarkar et al., 2006).

The biodiscursive construction of radio

Biodiscourses were not merely integral to the technological and commercial development of radio but also to its popular uptake from 1900 to 1920. The rise of public awareness of wireless communication was characterized by a kind of 'constitutive confusion' around the biodiscursive properties of radio technology that profoundly shaped the meanings, purposes, and ultimately

the regulation of media. This confusion can be seen in several significant areas: in overlapping vocabularies, in claims of radio's healing power, in *deliberately* confusing areas like radionics, in the political claims of radio's importance to the nation, and in the biopolitically motivated interventions of the state into the medium.

Overlapping vocabulary is particularly revealing and accounts for much of the constitutive confusion between radio and medicine. For example, the word 'ether' could refer to the mysterious substance (luminiferous ether) thought to carry radio waves, to an anesthetic compound (diethyl ether), or to a generalized healthful energy (e.g., a 1780 'Temple of Health and Hymen' at the Adelphi in London promised 'restorative aetherial essences' [Kang & Pedersen, 2017, p. 280]). Similarly, 'static' referred to both the bane of the listener-in and the medical condition of lacking vitality; conversely, 'radiant' described both the action of Hertzian waves and a person in the prime of health. The best example of this terminological blurring is, of course, the word 'radio' itself. The earliest usages of 'radio' seem to be from the late eighteenth century as a prefix in the health context (e.g., the radiocarpal joint), and by the late 1890s X-ray photographs were commonly known as 'radiographs.' Radiotherapy, radiothermy, radiology, radioactivity, and radium all came into public consciousness around the same time, and 'radio' was widely used in brand names to indicate radium, a trend boosted by a radium fad that spurred sales of 'Radio Thor' cure all, 'Radio Brand' squirrel poison, 'Radio-X' tablets, and many more. A 1904 *Good Housekeeping* article on the health effects of radium conflated radio, radium, and X-rays (Came, 1904), while a 1909 Alexandria (Virginia) *Gazette and Advertiser* article referred to both radium and X-rays as 'radio agents' ('Killed By X-Rays,' 1909). Thus 'radio' was first associated in the popular imagination with health discoveries and only subsequently came to refer to wireless communications.

Some of this constitutive confusion was deliberately sowed by so-called 'quacks' who had radium – or even a version of radio – to peddle as a health cure. This was especially true of radionics, machines that resembled radio electronics and were used to (supposedly) diagnose and treat illnesses (see Figure 17.3). Although the heyday of radionics was the 1920s and 1930s, paralleling popular interest in radio itself, such scams had been circulating since the early 1900s. The nonsense explanations for how they ostensibly worked drew on both medicine and wireless telegraphy, as illustrated by ads for the most famous of these machines, the Pathoclast:

The Pathoclast ... employs three screen-grid radio tubes to amplify the vibrations which are collected by a specially constructed antenna and which is approximated to the patient's diseased organs. This antenna collects the diseased vibrations similar to the manner in which the antenna in your yard picks up music from your favorite broadcasting station. ... If the patient does not have a particular disease the antenna will not pick it up any more than the radio will pick up a silent broadcasting station.

'Day In, Day Out,' *n.d.*

During a period when ordinary people were still wrapping their heads around wireless telegraphy, and the newspaper, as noted above, was telling you that radio waves can cure deafness or, perhaps, wipe out Kansas, and you had just seen your own bones in what the doctor had called a 'radiogram,' the claims of radionics frauds could easily have sounded as plausible as what mainstream experts were saying. While it's safe to assume that most people could keep the differences between medical devices and communications technologies straight in their minds, press accounts betray confusion lurking just below the surface. For example, in 1911, *Good Housekeeping* ran an exposé intended to help readers distinguish legitimate medicine from

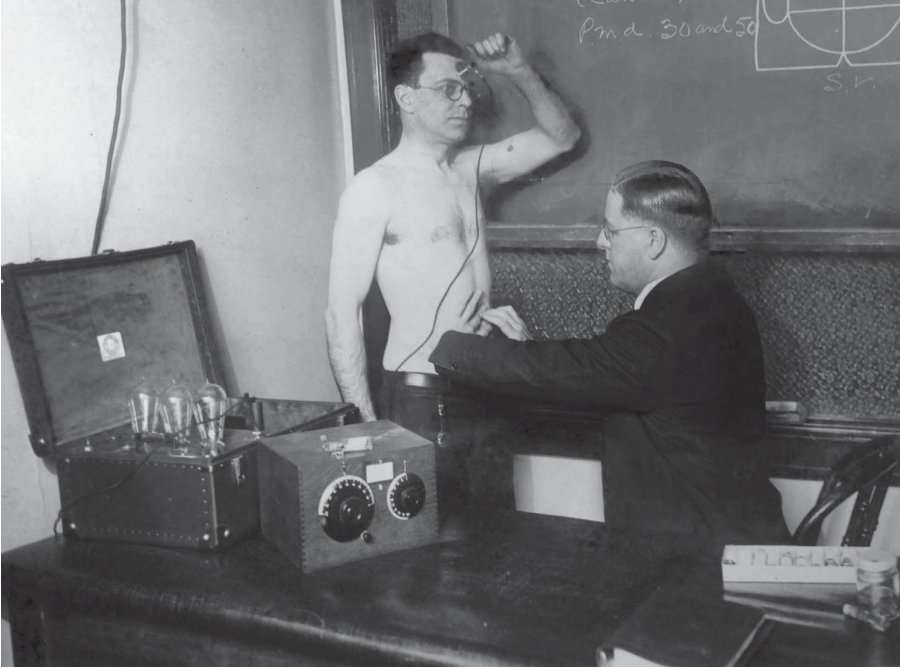


Figure 17.3 A patient being diagnosed with a Radionics machine, 1922

Source: Archives of the American Medical Association, Box 717, Folder 'Radiotherapy' (Pathoclast Machine 1922–1932), Chicago, IL

'quack' therapy like radionics, suggesting a need for such clarifications among their readership, but their efforts were hardly less confusing than the flim-flam they sought to debunk:

The basic condition of ... all parts of the body when functioning properly is *vibratory movement*. If this vibratory movement can be permanently augmented in the cell itself ... through contraction and expansion of the ultimate unit of matter, the ion of protoplasm itself, certainly there is ample reason to regard the agent which does this as a valuable instrument in medicine.

Austin, 1911, p. 820

Finally, in addition to all the blurring above, Americans of the era regularly encountered discourses constructing the wireless as a literal life-saver, further intensifying the association of radio with health. Here a popular genre was accounts of sea rescues, with headlines such as 'Wireless Saves 28 Men at Sea'; 'Hundreds in Fire Panic on Liner, Saved by Wireless'; and the Santa Cruz *Evening News*' painfully premature headline of April 15, 1912: 'Wonderful Wireless Saves the *Titanic*.' These stories, by turning the wireless itself into a rescuer of souls, reinforced the technology in the popular imagination as the greatest potential medical hero of the age.

The widespread and sometimes deliberate confusion around life, death, health, and the wireless helps explain how the term 'radio' caught on as Americans' preferred term for the medium. Thomas H. White (n.d.) has noted that 'radio' was shortened from 'radiotelegram,' a usage that was encouraged by the 1906 Berlin Radiotelegraphic Convention and then de Forest's American Radio Telephony Company in 1907. White ultimately gives most of the

credit for popularizing the term to the US Navy beginning in 1913. However, this explanation seems incomplete, especially considering that, during this exact period, the word 'radio' was most closely associated with X-rays, radium, and other medical technologies in the public imagination. Instead, the popularization of 'radio' is inseparable from that word's ideological resonance with life, death, and the body. What Americans today call 'radio' could easily have come into common parlance under any number of names: once-common, now-forgotten terms like 'coherer' or 'crystal' or 'airphone' might have stuck, or genericized trademarks like 'Marconi' or 'Audion' could have caught on. Most readily, of course, Americans could have simply stuck with 'the wireless' as the British did well into the 1950s (despite the British Post Office having endorsed 'radio' as early as 1904). Instead, they adopted a term that carried within it the hopes, fears, and confusions around wireless and health. Similar resonances are found in other languages as well, from the German *Funk*, meaning both radio and spark (with echoes of *Lebensfunk*, or 'spark of life') to, in Zambia, the Bemba words for broadcasting (*umulabasa/imilabasa*) that 'suggest a framing of radio as a living, vibrant phenomenon' (Vidali-Spitulnik, 2012, p. 264). Without claiming any kind of universality, such cases do demonstrate that biodiscursive understandings of radio are not uncommon; indeed, we still speak today of 'live' broadcasting and 'dead' air. Thus, the fact that the term that won the battle for popular usage in the US was the one most closely associated with health, medicine, and the body illustrates the 'thinking together' of radio and health at a transformative moment, a co-production that would have profound economic and political consequences as well.

Biopolitics and early radio

As the above demonstrates, radio's connection to health and medicine was firmly established in the public imagination by 1910. As the electromagnetic spectrum was harnessed for wireless telegraphy, then developed into wireless telephony and subsequently broadcasting, biodiscourses saturated the medium and became integral to its meanings and significance. In this final section, I connect this co-production of radio and health to a biopolitical interpretation of the state's involvement in radio.

Biopolitics, as explicated by Foucault (1990, 2003, 2007, 2008) and many subsequent scholars (see, e.g., Agamben, 1998; Balibar & Wallerstein, 1991; Esposito, 2013; Puar, 2017), arose in the eighteenth and nineteenth centuries, when states increasingly exercised social control through ever greater knowledge of and intervention into the biological lives of citizens, justified by the perceived importance of life and health to the security of the state. In the US, the early twentieth century saw the most profound biopolitical transformations, including the creation of the Hygienic Laboratory in 1901, the Public Health and Marine-Hospital Service in 1902, the Pure Food and Drugs act in 1906, and the restructuring of medical education beginning in 1910, not to mention increased attention to worker safety and the physical fitness of the populace. Biopolitics played a critical role in increasingly restrictive immigration policies during this period as well, with public health and national security serving as key justifications for clamping down at the border (Baynton, 2016). This dovetailed with a thriving eugenics movement that put physical and mental health at the centre of its racist and ableist fantasies of national vitality. In this political and cultural context, health was not merely a 'good thing' for the government to foster in individual citizens, but a social problem of critical importance to the future of the nation.

Radio technology, already associated with medical progress, recognized by the Navy as significant to national defence, and popularly constructed as a literal life-saver, easily became articulated to specific policy decisions designed to harness radio for biopolitical ends. As Susan

Douglas (1987) and Thomas Streeter (1996) have demonstrated, this can be seen, most notably, in the Wireless Ship Act of 1910, requiring most large passenger ships leaving US ports to be equipped with wireless telegraphy equipment, and the Radio Act of 1912, which began licensing radio stations and dividing up the airwaves. The former was an almost direct response to the 1909 sinking of the *Republic*; the latter had been in the works but was given impetus by the *Titanic* disaster. These policies, together with the Navy asserting priority in the management of radio, have not sufficiently been recognized as the biopolitical measures they clearly were. The stated purpose of the first federal regulation of radio speech was not to assign property rights in the spectrum, nor to advance the commercial interests of private corporations, but to prioritize distress calls at sea. Even relocating radio amateurs to a different part of the spectrum was primarily justified not by the importance of commercial traffic but by the importance of distress calls and the need to manage health-related threats, such as communicating with quarantined ships before they were allowed to disembark at US ports.

Previous scholars have interpreted these given rationales largely as window-dressing for the underlying political and economic power struggles between the Navy and commercial interests; for example, Douglas frequently characterizes the life-saving justifications for the 1910 and 1912 Acts using terms like ‘fig leaf,’ ‘guise’ and ‘journalistic rhetoric.’ But even without assuming the utmost sincerity among politicians, there is another way to think about these discourses, starting with what made such rhetoric so effective and persuasive at this time, when the urgency of public health and safety had rarely been a winning argument during the *laissez-faire* era of the late nineteenth century. In the context of the increasing involvement of the state in public health as discussed above – not to mention proliferating new measures to increase public safety at this time, such as the creation of the US’s first state police force in 1905 – it is misleading to discount the life-saving potential of radio as so much ‘public relations work’ (Douglas, 1987, p. 238) designed to rhetorically align corporate interests with those of the public, as if wireless legislation represented a continuation of corporate hegemony with a friendlier face. Instead, we need to emphasize the context: wireless emerged during a period of increasing state responsabilization for the health, safety, and well-being of the population, and both the 1910 and 1912 Acts reflected an acknowledgement of that shifting biopolitical governmental role even as they became building blocks in the legal and ideological edifice supporting it. Thus, while the wrangling for power between the Navy and the private sector was certainly significant, the resolution of those power struggles (as expressed in radio regulation) reflects not a deference to corporate power but rather an effort to use state power to recruit wireless for the intensifying biopolitical obligations of the state *despite* corporate power. To borrow from Foucault, society, through radio, would be defended. In that light, the radio-health linkages described in this chapter can be seen as the continuation of a biopolitical–biodiscursive triad connecting radio to (public) health, health to national security, and national security back to radio, justifying the state’s intervention in radio’s development. Although these policy decisions resulted from multiple complex factors, the governing logic of early US media policies was biopolitical, not commercial – a perspective that better helps explain subsequent developments in US media policy.

Conclusion

I have argued that radio and health have been co-constitutive since at least the late nineteenth century, with health, medicine, and the body inseparable from the technical and commercial development of radio, the social imaginary within which it fit, and the role it would play in social management in the twentieth century. Radio was always a communications

medium *and* a health technology, suffused with ideas about life, death, and healing, at times confused in important ways with related technologies, and ultimately claimed by the state for biopolitical ends. Given the overwhelming attention paid to political-economic explanations of US media policies by media scholars, it seems an important corrective to policy history to suggest that corporate-commercial interests were secondary beneficiaries and delegates of primarily biopolitically-driven radio regulations. Although I have not been able to explore the class, gender, and racial politics of this phenomenon, nor the ableist ideas about the 'healthy' body that undergirded these ideas, it will come as no surprise that normative white able-bodied masculinity looms large in all of these discourses. Nonetheless, I hope I have demonstrated, in ways not previously explored, the significance of health, medicine, and the body to our understanding of media history and policy.

Note

- 1 For example, the most widely cited of these studies, Jeffrey Sconce's (2000) *Haunted Media*, states from the outset that its interest in radio leaves the body behind:

When harnessed by the telegraph and the media that were to follow, this 'life force' seemed to allow for a mechanical disassociation of consciousness and the body. Telegraph lines carried human messages from city to city and from continent to continent, but more important, they appeared to carry the animating 'spark' of consciousness itself beyond the confines of the physical body.

p. 7

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