

ECHOES AND FREQUENCIES

TELE-VISIONS AND WIRELESS TECHNOLOGIES

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Introduction: Technologies, Fantasies, and the Politics of Wireless Tele-Visions

This issue, titled ‘Echoes and Frequencies: Tele-Visions and Wireless Technologies’, investigates the layered temporalities, shifting modalities, and evolving infrastructures of tele-visions – a plural, hyphenated term designating the spectrum of remote viewing technologies that have shaped, and continually reshape, how images travel and appear across distances.¹ From early optical telegraphs and nineteenth-century electromagnetic signal relays to today’s ubiquitous digital environments, these systems condition how we think about, imagine, and experience the televisual. Woven into the fabric of our societies, they evolve alongside, and often propel, scientific innovation, political change, and artistic experimentation – at once mirrors of their historical conditions and lenses onto the world they help configure.

Such an expansive understanding of television is informed by media archaeology. In recent years, this discipline-cum-methodology has branched into diverse fields, fostering productive hybridisations challenging traditional narratives of progress and disrupting rigid disciplinary boundaries within the histories of technology and the broader humanities.² Its influence has been especially pronounced in television studies,³ where it has helped unsettle linear chronologies, extend the medium’s history back into the nineteenth century, and bring attention to neglected dispositifs of seeing at a distance – an approach already advanced a decade ago by the seventh issue of *VIEW*, titled ‘Archaeologies of

Tele-Visions and -Realities'.⁴ Building on this foundation, and in dialogue with recent scholarship in media and visual studies attentive to the circulation, migration, and material conveyance of images,⁵ the present issue broadens the scope of the televisual to encompass a constellation of media, foregrounding questions of emission, transmission, and reception of visual data across distances. In doing so, it positions art history as a vital interlocutor in the expanded media-archeological project. Long attentive to regimes of spectatorship, art history offers critical tools to interrogate how visual information travels across space and time, contributing to a recasting of television not merely as a mass-broadcasting apparatus but as part of a deeper, entangled history of cultural imaginaries surrounding the desire to see, and to be seen, remotely.⁶

At the intersection of these disciplinary perspectives, one element emerges as a particularly fruitful entry point into the archeology of tele-visions: the wireless.⁷ In many ways, the integration of Hertzian waves into telecommunications at the close of the nineteenth century marked an epistemic shift – a profound reordering of the technical, perceptual, and conceptual frameworks through which reality is organised and understood.⁸ The present issue explores the historical, technical, and artistic dimensions of that transformation, which, beyond the mere absence of cables, ushered in a new media paradigm whose political, philosophical, and environmental ramifications continue to be redefined with each successive wave of wireless innovation. The 'wireless being'⁹ evoked by computer scientist Nicholas Negroponte in 2002 in response to the expansion of Wi-Fi thus echoed, and updated, the 'new and astonishing world'¹⁰ of wireless technologies envisioned by chemist and physicist William Crookes in 1892.

At once a technical reality and a cultural fantasy, what Eric Kluitenberg terms 'imaginary media',¹¹ wirelessness has long fueled visions of effortless, almost magical connectivity – dreams of seeing at a distance made instantaneous, unmediated, and ubiquitous through invisible flows of information.¹² This is vividly illustrated by *The Wizardry of Wireless*, a 1922 film produced by General Electric to mark the launch of the company's pioneering radio station in Schenectady, New York.



Video 1. *The Wizardry of Wireless* (1923), General Electric Co. | 22 min, 35mm (LoC), 20 fps | New music: Ben Model

Following an opening intertitle proclaiming wireless communication as 'one of the greatest contributions science has made to the cause of civilization', the film – a hybrid of animation and live-action designed to explain the workings of

radio broadcasting – begins with a staged genealogy of pre-Hertzian ‘wireless’ techniques for transmitting sonic and visual information. Actors in period costumes recount an ancestral lineage of communication methods, from the Incas’ polished sun-reflecting mirrors and Native American smoke signals to the later wig-wag flag system and eighteenth-century Chappe optical telegraph. These caricatured sequences, marked by their overtly reductive portrayal of Indigenous people, function less as theatrical embellishments and more as active constructions of a mythic continuity central to the film’s narrative. By staging communication history as an unbroken civilisational trajectory, these images position wireless technology as the culmination of humanity’s age-old desire to communicate across distance. Within this teleological framework, the absence of cables – underscored by the film’s playful contrast with a scene of rudimentary tin can ‘lovers’ telephone’ communication – emerges as more than a technical detail: it becomes the ultimate marker of progress, conflating technical advancement with fantasies of civilisational elevation, if not outright superiority.

Such a narrative exemplifies a key idea that resonates throughout the present issue: that wireless tele-vision should not be reduced to a mere technical feature but understood as a powerful discourse deeply embedded in popular, cultural, and industrial imaginaries. Whether in artistic practices, literary works, or the promotional language of trade journals and telecommunications firms, tele-vision infrastructures are overwhelmingly represented as wireless – a pattern that has persisted from at least the nineteenth century to the present. Laptops, cell towers, cloud computing, and satellites dominate the media landscape. Yet, as Nicole Starosielski’s study of undersea cables crucially reminds us, ‘we exist in a world that is more wired than ever’.¹³ Far from obsolete, wired infrastructures – particularly the vast, hidden networks of submarine cables – remain indispensable for high-density transmission, offering greater reliability and efficiency than wireless alternatives. More so, the widespread belief that our everyday devices function in absolute autonomy is itself a fiction: most so-called wireless technologies fundamentally depend on terrestrial, cable-bound infrastructure to operate.¹⁴

Why, then, does the wireless imaginary persist so powerfully? Perhaps because it resonates with an older trope of modernity: that of the ether – the elusive medium once posited to transmit electromagnetic action, which Joe Milutis aptly calls ‘the nothing that connects everything’.¹⁵ Long before its scientific discrediting, the ether had already taken root as a conceptual force, circulating across artistic, literary, and philosophical domains, where the porous boundaries between science, parascientific speculation, and popular culture allowed it to function as a potent metaphor for unseen connections and immaterial influences.¹⁶ So pervasive was this imaginary that it accompanied the rise of abstraction at the turn of the twentieth century, shaping what art historians have termed ‘vibratory modernism’,¹⁷ a cultural paradigm saturated with the language of waves, vibrations, and invisible energies. A key thread guiding our inquiry is the proposition that this enduring myth continues to fuel the imaginary of the electromagnetic spectrum, and the persistent fantasy of wireless connectivity it underpins.

But it is not only the imaginary of the electromagnetic spectrum that is at stake here; as studies on logistical media have noted, it is also its infrastructural, territorial, and geopolitical reality.¹⁸ Or rather, how this reality intersects – and often collides – with another enduring tension embedded in the vision of ‘the nothing that connects everything’: the idealisation of wireless tele-vision as a form of global communication freed from geographical constraints. One reason wireless technologies have proved so fertile for artistic exploration lies precisely in this association with boundlessness, positioning them as uniquely suited to connect the world into a seamless ‘global village’. Long before Marshall McLuhan popularised the term, this fantasy had already begun to crystallise, notably in the writings of Paul Valéry, who, in 1928, envisioned the coming ‘conquest of ubiquity’,¹⁹ imagining a future where sound and images would circulate instantaneously. Such visions would profoundly shape the intertwined history of art and media, from 1960s mail art to 1970s video experiments and the ambitious telematic projects of the 1980s.

The very possibility of wireless communication depends on access to, and control over, the electromagnetic spectrum, which – before serving as a powerful imaginary – is, above all, a finite, unevenly distributed, and tightly regulated resource. Not only does the Earth’s topography shape signal propagation, often necessitating innovative technological adaptations, but electromagnetic waves are themselves natural resources, if not elemental media,²⁰ whose extraction, control, and exploitation carry ecological, political, and economic consequences.²¹ Far from neutral, the spectrum

constitutes a highly strategic and contested domain, subject to national regulations, international negotiations, and techno-diplomatic power struggles.²² Wireless technologies of tele-vision, in this sense, operate less as vehicles of planetary connection than as sites of fragmentation, where competing sovereignties, asymmetrical access, and geopolitical rivalries continually shape – and constrain – the realities of connectivity. How artists, media activists, and other cultural actors have engaged with, negotiated, or even subverted this reality forms one of the central inquiries explored in this thematic issue.

Authored by art historians, artists, and media scholars, the nine essays collected in this issue interrogate the persistent gap between the fantasies and the material realities of wireless tele-vision. Far from incidental, this tension is central to understanding how tele-visual systems have been constructed and mythologised over time. The ‘Exploratory’ contributions address wireless technologies directly, while the ‘Discovery’ essays treat them as a symbolic horizon that informs broader reflections on the circulation, temporality, and visibility of images across space. In both registers, wirelessness emerges as integral to understanding tele-vision as both a technical reality and a cultural form.

Explorations

The issue opens with Matt Parker’s two-fold contribution – a short film and accompanying essay, both titled *Do Sheep Dream of Electric Ruins* – which revisits the wireless as a site of layered cultural memory, situated at the intersection of vernacular landscape and a specific historical moment: the short-lived Marconi transatlantic wireless station (1907-1922) on Ireland’s west coast and its subsequent fall into ruin. Through a practice-based, auto-reflexive artistic methodology, this case study blends media-archeological reflection with speculative inquiry into the afterlife of pioneering telecommunication infrastructure, as viewed from the standpoint of today – and, more crucially, of the future. Drawing on research into industrial ruins, especially within the context of ongoing Anthropocene discourse, Parker investigates what makes telecommunication ruins *sui generis*, contrasting them with ruins of extractive industries while interrogating the distinct cultural logics of their heritagisation.

Turning to the German Dadaist Raoul Hausmann, Erik Born offers a media-archaeological reading that brings early avant-garde experimentation into dialogue with the technical development of television. Challenging the prevailing historiography that situates Hausmann’s Optophone – a device intended to convert written characters into audible tones for the blind – within a lineage of ‘visual music’, Born reframes it as part of a broader, early para-televisual history centred on experiments with the signal-transducing capacities of electronic media. In doing so, he uncovers a modernist vision that resists fixed sensory hierarchies and media boundaries, revealing how the televisual already permeated artistic speculation well before television’s post-war mass adoption. This reframing not only revisits the role of early avant-garde practices in imagining new relations with technology; it also expands the historical scope of what might count as tele-visual media, making a compelling case for understanding television and its electromagnetic fulcrum less as a stable apparatus or broadcasting medium than as a mutable field of sensory and conceptual experimentation.

Simone Dotto’s and Peppino Ortoleva’s paper examines televisual imaginaries in interwar Italy, the birthplace of Guglielmo Marconi. Their media history piece closely dialogues with archaeological research on early television in other national contexts, analysing the discourses that predated the emergence of television as a mass medium. Drawing on newspapers, periodicals, and trade publications from the 1920s to the 1940s, the authors trace how early speculations converged around the fantasy of wireless, and hence unmediated and unconstrained, communications unfolding in both domestic and military contexts, where tele-viewing fed broader visions of the future of the air warfare. While these early fantasies encompassed a broad spectrum of tele-vision beyond entertainment, anticipating, for instance, contemporary uses of wireless for remote control, the first public demonstrations at the 1933 Milan Radio Exhibition revealed the technological limitations and material realities of the medium. In this light, Dotto and Ortoleva’s

contribution serves as a compelling case study for the entangled, though not always convergent, histories of wireless imaginaries and infrastructure.

Anna Luigia De Simone's essay explores Salvador Dalí's engagement with television, discussing as much his critical stance toward the medium as the imaginary, often fantastical, visions that surface in his artworks and interviews. Dalí imagined a mode of perception that transcended corporeal limits, enabling a cosmic communion shaped by his enduring fascinations with optics, physics, and mysticism. Central to this vision is his interest in televisual techniques, which De Simone interprets in dialogue with the contemporaneous development of the atomic bomb – an emblem of destruction grounded in the fragmentation and recomposition of matter, metaphorically echoed in the inner workings of the cathode-ray tube. While Dalí's interest in television resonates with broader Surrealist explorations of the unconscious, De Simone highlights the distinctive traits of his approach, enriching parallel historical and media theoretical discourses on how televisual technologies have inspired and shaped artistic imaginaries.

Nina Wexelblatt's paper revisits *Three Country Happening* (1966), a collaboration between artists Marta Minujín, Allan Kaprow, and Wolf Vostell, conceived as a live, satellite-enabled happening linking Buenos Aires, New York, and Berlin – though the transmission never materialised. Wexelblatt takes this failure as a critical entry point, showing how the artists deliberately mobilised the illusion of 'liveness' to expose the contradictions of global connectivity. Situating the project within the early history of communications satellites, she shows how it revealed the uneven realities behind promises of simultaneity, where geopolitical tensions, technological disparities, and territorial boundaries persist. In this light, *Three Country Happening* becomes a lens through which to interrogate both the ideal of planetary media unity and the expanding geopolitics of wireless tele-vision.

Mikael Proulx's contribution reconsiders Vera Frenkel's *String Games* (1974), a performance artwork that repurposed Bell Canada's experimental Conference TV network into a remote enactment of the childhood game cat's cradle. Proulx interprets the piece as a subtle yet incisive critique of Canadian technonationalism. Through a choreography of participants acting as 'fingers' of remote hands, *String Games* staged an alternative, playful logic of network connectivity that disrupted the controlling, centralised narratives embedded in tele-visual infrastructures. Situating the work within the context of the 1970s Canadian telecommunications policy, Proulx demonstrates how Frenkel exposed the entanglement of emerging telematic technologies with national identity and state power, offering a critical lens on the ideological stakes of wireless tele-vision.

Discoveries

Opening the 'Discoveries' section, Lori Emerson's essay proposes an expanded framework for thinking about networks by relocating them within the realm of the imaginary. Building on Eric Kluitenberg's concept of 'imaginary media', she introduces 'imaginary networks' as speculative, partial, or entirely fictional infrastructures that offer alternative models for communication beyond the corporate-dominated internet. Combining Marxist theory and the Black radical tradition, Emerson excavates overlooked media histories to reactivate lost technological possibilities. Her essay unfolds through nonlinear interludes that revisit historical or speculative networks, where wirelessness recurs as a symbol of 'imagination without strings'. From Jacques-Toussaint Benoît's 1850 pasilalanic-sympathetic compass to Paul Otlet's Mundaneum, The Voice of Free Algeria and later microbroadcasting initiatives, these interludes trace the enduring association between wireless communication and emancipatory futures.

Building on sound studies to rethink the electromagnetic spectrum beyond its usual instrumentality, Nicolas Holt's essay expands the scope of wireless media by turning to a less conventional but equally revealing terrain: radioisotopes. He addresses this by proposing that radioisotopes – unstable atoms that emit detectable energy as they decay – function as a provocative and counter-intuitive form of media, distinct from the image-based logic of tele-vision. Unlike televisual technologies, which privilege vision and the remote relay of images, radioisotopes

produce an energetic ‘tracing-at-a-distance’, challenging image-based meaning-making. Thinking radioisotopes in relation to – but not within – the televisual exposes the limits of dominant visual epistemologies and unsettles conventional boundaries between inscriptive and transmissional media. Through this lens, Holt reframes radioactivity as a nonvisual yet meaningful medium, one that opens new alignments between media studies, environmental history, and the energy humanities.

Lila Lee-Morrison’s closing contribution to this thematic issue looks upward from earth to sky and examines images that foreground the materiality of wireless technologies in the atmosphere. Departing from dominant epistemologies of technical visualisation in astronomy, the author draws on concepts from digital media studies – particularly *photobombing* and *selfies* – to explore how certain images emerge not as instruments for scientific measurement but as accidents or spectacles. Focusing on contemporary examples such as the Chinese ‘spy balloon’ that entered the US airspace in 2023 or NASA’s Mars exploration, Lee-Morrison discusses how wireless media shape environments that are otherwise uninhabitable, while also influencing how we perceive them. Challenging imaginaries of an all-seeing, God’s-eye perspective from above, she instead draws attention to images that render visible the infrastructural assemblages enabling remote viewing on planetary scales.

From the early twentieth century to the very contemporary moment, this issue offers pluridisciplinary discussions of what Maria Rikitianskaia, Gabriele Balbi, and Katharina Lobinger have termed the ‘mediatization of the air’²³: the increasingly dense occupation of the ‘vertical space’²⁴ above the ground for wireless communication, beginning with wireless telegraphy and continuing into the present. The televisual imaginaries and constellations examined across the contributions also participate in this mediatization, revealing the frictions, contradictions, and overlaps between discursive formations and the material realities of wireless image production, circulation, and reception. In this light, tele-visions and wireless technologies share entangled histories that illuminate the *longue durée* of contemporary connectivity.

Notes

1. This issue stems from the research project “Télé-Visions”, funded by the Sorb’Rising Program (ANR-21-EXES-0015). It builds on the international conference *Tele-Visions: Technologies of Ubiquity in Visuals Arts* held at the Institut national d’histoire de l’art (INHA) in Paris, on October 3-4, 2023, and organised by the research group IMAGO-Cultures Visuelles with support from Université Paris 1 Panthéon-Sorbonne, the Histoire Culturelle et Sociale de l’Art (HiCSA) laboratory, and the Laboratoire International de Recherches en Arts (LIRA) at Université Sorbonne Nouvelle.
2. For a recent overview of media archaeology’s development as a discipline and methodology, see Doron Galili and Erkki Huhtamo, “The pasts and prospects of media archaeology”, *Early Popular Visual Culture*, 18(4), 2020, 333–339. Foundational works the field include: Friedrich A. Kittler, *Gramophone, Film, Typewriter* (Stanford University Press, 1999); Siegfried Zielinski, *Deep time of the media: toward an archaeology of hearing and seeing by technical means* (Cambridge, Mass., MIT Press, 2006); Erkki Huhtamo and Jussi Parikka (eds.), *Media Archaeology: Approaches, Applications, and Implications* (University of California Press, 2011); Jussi Parikka, *What Is Media Archaeology* (Cambridge, Polity, 2012).
3. A key resource for the media archaeology of television is André Lange’s website *Histoire de la télévision* (<https://www.histv.net/>). Recent scholarship includes: Monika Elsner, Thomas Müller, and Peter M. Spangenberg, “The Early History of German Television: The Slow Development of a Fast Medium” (*Historical Journal of Film, Radio and Television* 10, no. 2, 1990); Siegfried Zielinski’s *Audiovisions: Cinema and Television as Entr’actes in History* (Amsterdam University Press, 1999); Stefan Andriopoulos’ “Psychic Television” (*Critical Inquiry* 31, no. 3, 2005); William Uricchio’s essays “Television, Film and the Struggle for Media Identity” (*Film History* 10, no. 2, 1998) and “Storage, Simultaneity, and the Media Technologies of Modernity” in *Allegories of Communication* (J. Libbey, 2004); Mireille Berton and Anne-Katrin Weber (eds.), *La télévision du téléphonoscope à YouTube. Pour une archéologie de l’audiovision* (Lausanne, Éd. Antipodes, 2009); Philip W. Sewell’s *Television in the Age of Radio: Modernity, Imagination, and the Making of a Medium* (Rutgers University Press, 2014); Erik Born’s article “The Promise of Television” (*The Promise of Cinema: German Film Theory, 1907–1933*, Companion Website, 2017); Doron Galili’s *Seeing by Electricity: The Emergence of Television, 1878–1939* (Duke University Press, 2020); and Anne-Katrin Weber’s *Television before TV: New Media and Exhibition Culture in Europe and the USA, 1928–1939* (Amsterdam University Press, 2022).

4. Andreas Fickers and Anne-Katrin Weber, "Editorial: Towards an Archeology of Televisions", *VIEW Journal of European Television History and Culture*, no. 7 (2015). See also John Ellis and Dana Mustata, "Editorial: Material Histories of Television", *VIEW Journal of European Television History and Culture* 8, no. 15 (2019).
5. In the field of visual studies, see: Jonathan Dentler, "Images câblées: La téléphotographie à l'ère de la mondialisation de la presse illustrée" [Cabled Images: Wire Photography and the Globalisation of the Illustrated Press], *Transbordeur* 3 (2019): 14–25; Henry Jenkins, Sam Ford, and Joshua Green, *Spreadable Media: Creating Value and Meaning in a Networked Culture* (New York: New York University Press, 2018); Olga Moskatova, ed., *Images on the Move: Materiality—Networks—Formats* (Bielefeld: transcript, 2021); Peter Szendy, "Iconoroutes et iconovéhicules", in *Sites du film: le cinéma et ses parages*, ed. Jean-Michel Durafour (Dijon: Les Presses du réel, 2023), 51–75; Geoffrey Batchen, "Electricity Made Visible", in *Negative/Positive* (London: Routledge, 2020), 115–27. On circulation within networked environments, see: Ulrik Ekman, ed., *Throughout: Art and Culture Emerging with Ubiquitous Computing* (Cambridge, MA: MIT Press, 2012). In media studies, see: John Durham Peters, Florian Sprenger, and Christina Vagt, eds., *Action at a Distance* (Lüneburg: Meson Press, 2020).
6. The present issue builds on and extends previous scholarship highlighting television's entanglement with the histories of modern art, design, and visual culture. Key works include Wulf Herzogenrath, *TV-Kultur: Das Fernsehen in der Kunst seit 1879* (Dresden: Verlag der Kunst, 1997); Lynn Spigel, *TV by Design: Modern Art and the Rise of Network Television* (Chicago: University of Chicago Press, 2008); Matthias Michalka, ed., *Changing Channels: Kunst und Fernsehen 1963–1987*, exhibition catalogue (Vienna: MUMOK, March 5–June 6, 2010; Cologne: König Verlag, 2010); Maeve Connolly, *TV Museum: Contemporary Art and the Age of Television* (Bristol: Intellect, 2014); Caroline Tron-Carroz, *La boîte télévisuelle: Le poste de télévision et les artistes* (Bry-sur-Marne: INA, 2018); Priska Morrissey and Éric Thouvenel, *Les arts et la télévision: Discours et pratiques* (Rennes: Presses universitaires de Rennes, 2019); Erica Levin, *The Channeled Image: Art and Media Politics after Television* (Chicago: University of Chicago Press, 2022); Francesco Spampinato, *Art vs. TV: A Brief History of Contemporary Artists' Responses to Television* (New York: Bloomsbury Academic, 2022); and Pierre-Jacques Pernuit, "Luminances comparées. Une archéologie plastique de l'image télévisuelle et digitale", *Transbordeur*, no. 8 (2024): 154–67. On art, wireless, and telecommunications more broadly, see Douglas Kahn and Gregory Whitehead, eds., *Wireless Imagination: Sound, Radio, and the Avant-Garde* (Cambridge, MA: MIT Press, 1992); Edith Decker and Peter Weibel, eds., *Vom Verschwinden der Ferne: Telekommunikation und Kunst*, exhibition catalogue (Frankfurt am Main: Deutsches Postmuseum, 1999–2001; Cologne: DuMont Buchverlag, 2000); Dieter Daniels, *Kunst als Sendung: Von der Telegrafie zum Internet* (Munich: C. H. Beck, 2002); Annmarie Chandler and Norie Neumark, eds., *At a Distance: Precursors to Art and Activism on the Internet* (Cambridge, MA: MIT Press, 2005); Jennifer L. Roberts, *Transporting Visions: The Movement of Images in Early America* (Berkeley: University of California Press, 2014); Pascal Rousseau, *Cosa mentale: Art et télépathie au XXe siècle* (Metz: Centre Pompidou, 2015); Pascal Rousseau, "Télévision. Le néo-impressionnisme, la vision électrique et la transmission de l'image à distance", in *Néo-impressionnisme*, exhibition catalogue (Paris: Musée d'Orsay, 2005), 94–105; Kris Paulsen, *Here/There: Telepresence, Touch, and Art at the Interface* (Cambridge, MA: MIT Press, 2017); Catherine Spencer, *Beyond the Happening: Performance Art and the Politics of Communication* (Manchester: Manchester University Press, 2020); Philip Glahn and Cary Levine, *The Future Is Present: Art, Technology, and the Work of Mobile Image* (Cambridge, MA: MIT Press, 2024); and Richard Taws, *Time Machines: Telegraphic Images in Nineteenth-Century France* (Cambridge, MA: MIT Press, 2025). Recently, questions of tele-visibility were also central to an exhibition at the Museum of Modern Art, New York, which revisited the transnational ambitions and critical uses of video art as a tool to rethink connectivity and image circulation globally. See Stuart Comer and Michelle Kuo, eds., *Signals: How Video Transformed the World*, exhibition catalogue (New York: Museum of Modern Art, March 5–July 8, 2024; New York: MoMA, 2023).
7. An early exploration of wirelessness in art history is Katja Kwastek (ed.), *Ohne Schnur: Kunst und drahtlose Kommunikation* (exh. cat., Cuxhaven, Cuxhavener Kunstverein, March 4–May 2, 2004), Frankfurt am Main, Revolver, Archiv für Aktuelle Kunst, 2004.
8. For recent accounts of this shift in media studies and media history, see Daniel Gethmann, "Media Space: Networked Structures in Early Radio Communication", in *Re-Inventing Radio: Aspects of Radio as Art* (Frankfurt am Main: Revolver, 2008), 179–198; and his article "The Aesthetics of the Signal: Noise Research in Long-Wave Radio Communications", *Osiris* 28, no. 1 (2013): 64–79; Grant Wythoff, "Pocket Wireless and the Shape of Media to Come, 1899–1922", *Grey Room* 51 (2013): 40–63; Barbara A. Crow, ed., *The Wireless Spectrum: The Politics, Practices, and Poetics of Mobile Media* (Toronto: University of Toronto Press, 2010); Adrian Mackenzie, *Wirelessness: Radical Empiricism in Network Cultures* (Cambridge, MA: MIT Press, 2010); Rahul Mukherjee, "Wireless Saturation", in Melody Jue and Rafico Ruiz, eds., *Saturation* (Durham, NC: Duke University Press, 2021), 123–143; and his article "Sensitivity and Sensing: Toward a Processual Media Theory of Electromagnetic Vibrations", *Critical Inquiry* 49, no. 3 (2023): 462–485; Ghislain Thibault, "Wireless Pasts and Wired Futures", in *Theories of the Mobile Internet* (New York: Routledge, 2014); and "Bolts and Waves: Representing Radio Signals", *Early Popular Visual Culture* 16, no. 1 (2018): 39–56.
9. Nicholas Negroponte, "Being Wireless", *Wired*, 10–10, 2002, <https://www.wired.com/2002/10/wireless/>.
10. William Crookes, "Some Possibilities of Electricity", *Fortnightly Review*, February 1, 1892, 174.
11. Eric Kluitenberg, ed., *The Book of Imaginary Media: Excavating the Dream of the Ultimate Communication Medium* (Rotterdam: De Balie, NAI Publishers, 2006). See also Grant Wythoff, "Pocket Wireless and the Shape of Media to Come,

- 1899–1922”, *Grey Room* 53 (2013): 40–63; Gabriele Balbi and Simone Natale, “Media and the Imaginary in History: The Role of the Fantastic in Different Stages of Media Change”, *Media History* 20, no. 2 (2014): 203–218.
12. On this, see Carolyn Marvin, *When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century* (Oxford: Oxford University Press, 1988).
 13. Nicole Starosielski, *The Undersea Network* (Durham, NC: Duke University Press, 2015), 9. For a historical account of cable telecommunication, see also Jenna Supp-Montgomerie, *When the Medium Was the Mission: The Atlantic Telegraph and the Religious Origins of Network Culture* (New York: NYU Press, 2021); Lisa Parks, “Around the Antenna Tree: The Politics of Infrastructural Visibility”, *Flow*, March 6, 2009, <https://www.flowjournal.org/2009/03/around-the-antenna-tree-the-politics-of-infrastructural-visibilitylisa-parks-uc-santa-barbara/>.
 14. The infrastructural turn in media studies discusses the material foundations of (wireless) media systems and the political implications of their production and maintenance. See Brian Larkin, “The Politics and Poetics of Infrastructure”, *Annual Review of Anthropology*, 42, 2013, 327–43; Lisa Parks, “‘Stuff You Can Kick’: Toward a Theory of Media Infrastructures”, in Patrik Svensson and David Theo Goldberg, eds., *Between Humanities and the Digital*, MIT Press, 2015, pp. 355–73; and Marie Sandoz, “The Big Ear of Leuk (1974–2020). The Cultural History of a Large Technical Infrastructure”, *Histoire et Informatique*, 2022, 51–70.
 15. Joe Milutis, *Ether: The Nothing That Connects Everything*, Minneapolis: University of Minnesota Press, 2006.
 16. Jeffrey Sconce, *Haunted Media: Electronic Presence from Telegraphy to Television* (Durham: Duke University Press, 2000); *The Technical Delusion: Electronics, Power, Insanity* (Durham: Duke University Press, 2019).
 17. See Linda Dalrymple Henderson, “Vibratory Modernism: Boccioni, Kupka, and the Ether of Space”, in Linda Dalrymple Henderson and Bruce Clarke, eds., *From Energy to Information: Representation in Science and Technology, Art, and Literature* (Stanford, CA: Stanford University Press, 2002), 126–49; Anthony Enns and Shelley Trower, eds., *Vibratory Modernism* (Houndmills, Basingstoke, Hampshire and New York: Palgrave Macmillan, 2013).
 18. On logistical media see Judd A. Case, “Logistical Media: Fragments from Radar’s Prehistory”, *Canadian Journal of Communication* 38, no. 3 (2013): 379–96; Ned Rossiter, “Logistical Media Theory, the Politics of Time, and the Geopolitics of Automation,” in Matthew Hockenberry, Nicole Starosielski, and Susan Zieger, eds., *Assembly Codes: The Logistics of Media* (Durham, NC: Duke University Press, 2021), 132–50; and Nicole Starosielski, ed., *Signal Traffic: Critical Studies of Media Infrastructures* (Chicago: University of Illinois Press, 2015).
 19. Paul Valéry, “La conquête de l’ubiquité” [1928], in *Œuvres*, tome II, *Pièces sur l’art* (Paris: NRF-Gallimard-Bibliothèque de la Pléiade, 1960), 1283–1287.
 20. On the notion of ‘elemental media’ and the broader environmental turn in media studies, see notably Eva Horn, “Air as Medium”, *Grey Room* 73 (2018): 6–25; John Durham Peters, *The Marvelous Clouds: Toward a Philosophy of Elemental Media* (Chicago: University of Chicago Press, 2015); Nicole Starosielski, “The Elements of Media Studies”, *Media+Environment* 1, no. 1 (2019).
 21. See, for instance, Christian A. Herter Jr., “The Electromagnetic Spectrum: A Critical Natural Resource”, *Natural Resources Journal* 25, no. 3 (1985): 651–663. On global communications and neocolonialism, see Brian Larkin, *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria* (Durham, NC: Duke University Press, 2008); Ginger Nolan, *The Neocolonialism of the Global Village* (Minneapolis: University of Minnesota Press, 2018); and Delinda Collier, *Media Primitivism: Technological Art in Africa* (Durham, NC: Duke University Press, 2020).
 22. The geopolitics of global communications have attracted significant scholarly attention in recent years. On spectrum politics—and wireless networks in particular – see, for instance, Ted Magder, “The Origins of the International Agreements and Global Media: The Post, the Telegraph, and Wireless Communication before World War I”, in *The Handbook of Global Media and Communication Policy*, eds. Robin Mansell and Marc Raboy (London: Blackwell, 2011), 23–39; Gabriele Balbi, Simone Fari, and Giuseppe Richeri, “The Bureaucratisation of the Telegraph Union”, *Storia Economica* 61, no. 2 (2013): 377–394; Nina Wormbs, “Negotiating the Radio Spectrum: The Incessant Labor of Maintaining Space for European Broadcasting”, in *Cosmopolitan Commons: Sharing Resources and Risks across Borders*, eds. Nil Disco and Eda Kranakis (Cambridge, MA: MIT Press, 2013), 97–122; Heidi J. S. Tworek, “How Not to Build a World Wireless Network: German–British Rivalry and Visions of Global Communications in the Early Twentieth Century”, *History and Technology* 32, no. 2 (2016): 178–200; Gabriele Balbi and Andreas Fickers, *History of the International Telecommunication Union (ITU): Transnational Techno-Diplomacy from the Telegraph to the Internet* (Berlin: De Gruyter, 2020). On communication satellites specifically, see notably Lisa Parks, *Cultures in Orbit: Satellites and the Televisual* (Durham: Duke University Press, 2005); and Marie Sandoz, *De l’orbite au territoire helvétique. Une histoire des communications par satellite des années 1960 à nos jours* (Lausanne: Alphil, 2025).
 23. Maria Rikitienskaia, Gabriele Balbi, and Katharina Lobinger, “The Mediatization of the Air: Wireless Telegraphy and the Origins of a Transnational Space of Communication, 1900–1910s”, *Journal of Communication* 68, no. 4 (2018): 758–779.
 24. On the notion of ‘vertical space’ as a framework for analysing media infrastructures and geopolitics, see Lisa Parks, *Rethinking Media Coverage: Vertical Mediation and the War on Terror* (New York and London: Routledge, 2018).

