The Post-Media Condition, circa 1885:
Media Theory and the Archaeology of Television

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The recent proliferation of digital technologies for the production, manipulation, delivery, and display of audiovisual media has stirred debates in the fields of film and media theory. Often appearing to be more than mere markers of technological change, new media forms have been claimed in those debates to mark the beginning of anything from "a digital utopia" to "a digital attack."[1] Famously, the most persistent debate, which continues to draw commentators beyond scholarly circles, addresses digital media's contribution to the impending "death of cinema."[2] Other scholarly debates revolved around questions of indexicality and truth-value in digital moving images, while revisiting (and sometimes revising) fundamental notions in film theory. These debates focused on the material distinctions between traditional photochemical image production and the material properties of digital devices, specifically highlighting the notion that unlike photography and film, where the image is created by the physical imprint of the light reflected from the object, in digital visual devices it is, rather, discrete numerical meta-pictorial data about luminosity and colour that is being stored, processed, and transmitted.[3] But perhaps the most radical proclamation about the impact of digital technologies appeared in the writings of scholars who noted the coming of a "post-media" era, in which digital technologies allegedly erase our existing conceptions regarding the distinctions among media and their correspondence to our senses.[4]

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[1] Lev Manovich, "Post-media Aesthetics" (2001), online: http://manovich.net/content/04-projects/032-post-media-aesthetics/29_article_2001.pdf, p. 3; Philip Rosen, *Change Mummified: Cinema, Historicity, Theory* (Minneapolis: University of Minnesota Press, 2001), 303.

[2] Niels Niessen offers a good discussion of the key arguments in the death of cinema debate in his "Lives of Cinema: Against Its 'Death'," *Screen* 2, no. 3 (Autumn 2011): 307-26.

[3] Among the writings on this see P. Rosen, *Change Mummified*, op. cit.; David N. Rodowick, *The Virtual Life of Film* (Cambridge: Harvard University Press, 2007); Tom Gunning, "What's the Point of an Index? or, Faking Photographs," *Nordicom Review* 5, nos. 1-2 (September 2004): 39-49; and Frank Kessler, "What You Get Is What You See: Digital Images and the Claim on the Real," in Marianne van den Boomen, Sybille Lammes, Ann-Sophie Lehmann, Joost Raessens, and Mirko Tobias Schäfer (eds.) *Digital Material: Tracing New Media in Everyday Life and Technology* (Amsterdam: Amsterdam University Press, 2009), 187-97.

[4] On the various meanings affiliated with the concept of post-media see Ágnes Pethő's Introduction in Pethő (ed.) *Film in the Post-Media Age* (Newcastle upon Tyne: Cambridge Scholars Publishing, 2012), 1-14.

As the context in which those claims were made is well known, I will only briefly summarize some key notions of the "post-media" arguments. Principally, not unlike the key arguments in classical film theory, the "post-media" arguments rely upon observations about the material traits of digital media devices. Several scholars, for example, have claimed that digital data is communicable only to computers and only when converted by computer software can it be represented in a manner that is perceivable to us. In the case of digital image media, for instance, digital cameras store and process digital meta pictorial information that is itself not visual, and only a computer may re-phenomealize them (to use a term offered by Thomas Levin) in the form of a visual image.[5] Further, it has been argued that given that computers store and process any number of media forms in the same manner – that is, images, sounds, or texts are all treated as discrete numerical data, regardless of how they were created or captured – digital works cannot be considered "visual," "aural" or "textual" as are their analogue counterparts. As new media scholar Mark Hansen puts it, digitization brings about "the de-differentiation of media," which is typified by "variable interfaces for rendering the raw data."[6] Elsewhere, Hansen also writes, "properly computational media involve no direct correlation between technical storage and human sense perception" – and so "arguably for the first time in history the technical infrastructure of media is no longer homologous with its surface appearance."[7] Thus, whether we draw on Lessing's eighteenth-century notions of the limits between different artistic forms or on the modernist tradition of relating a medium's material properties to proper aesthetic uses, the formal characteristics of digital media present novel challenges to the concept of medium specificity and to distinctions between media.

These challenges, in turn, become even more complex given that digital technology's "de-differentiation" among media also makes it possible to represent any given data in any given perceivable form. In other words, computers may represent data about sound in the form of an image, data about text as sound, and so on. To quote theorist Friedrich Kittler's famous declaration,

> The general digitization of channels and information erases the differences
> among individual media. […] Inside the computers themselves everything
> becomes a number: quantity without image, sound or voice. And once optical

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[5] Thomas Y. Levin, "Tones from out of Nowhere: Rudolph Pfenninger and the Archaeology of Synthetic Sound," *Grey Room* 12 (Summer 2003): 32-79.

[6] Mark Hansen, *New Philosophy for New Media* (Cambridge: MIT Press, 2006), 20.

[7] Mark Hansen, "New Media," in W.J.T. Mitchell and Hansen (eds.), *Critical Terms for Media Studies* (Chicago: University of Chicago Press, 2010), 179.

fibre networks turn formerly distinct data flows into a standardized series of digitized numbers, any medium can be translated into any other.[8]

Moving from theory to practices, this trait of digital technology has been exploited by several digital artists whose works represent digital data in different registers, making manifest the aesthetics of "post-media."

In the wake of Kittler's observation and more recent changes in media practices, several theorists in the fields of film studies, media and communication studies, and art history have addressed the significant theoretical challenge that digital technologies pose for our very understanding of media. Addressing the impact of digitization on established notions of medium specificity in cinema, film theorist Mary Ann Doane argues that digital media "effectively annihilate the idea of a medium in one fell swoop of convergence."[9] "The digital seems to move beyond previous media by incorporating them all," she writes, asking "Isn't its specificity, rather, the annihilation of the concept of a medium?"[10] Communication scholars John Durham Peters and Eric Rothenbuhler note in their commentary on the changing notions of phonography that the data on a music CD could be manipulated by a computer "with programs other than those encoded in the chips of our CD player," which would produce results other than playing the music encoded originally on the disc, including "other music, graphics, mathematical equations, puzzles, artwork, or maps of imaginary worlds."[11] D. N. Rodowick, summarizing such claims in his reflection on the future of film theory, concludes, "No medium-specific ontology can fix [the digital arts] in place"[12].

Calling for "Post-Media Aesthetics," new media scholar Lev Manovich notes that the very notion of the medium in our existing media-based typology is no longer valid in the digital era. In the case of digital media art, "If one can make radically different versions of the same art object . . . the traditional strong link between the identity of an art object and its medium becomes broken"[13]. In a later piece he elaborates that it would not be meaningful "to talk about

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[8] Friedrich Kittler, *Gramophone, Film, Typewriter* (Stanford: Stanford University Press, 1997), 1-2.

[9] Mary Ann Doane, "The Indexical and the Concept of Medium Specificity," *Differences* 18, no. 1 (Spring 2007): 130.

[10] Ibid., 142-43.

[11] Eric W. Rothenbuhler and John Durham Peters, "Defining Phonography: An Experiment in Theory," *Musical Quarterly* 81, no. 2 (1997): 245-46.

[12] D.N. Rodowick, *The Virtual Life of Film*, op. cit., 10.

[13] L. Manovich, "Post-Media Aesthetics," op. cit., 4. It is worth mentioning in this context Rosalind Krauss's influential writings on the post-medium condition in art history, which resembles those of Manovich, though her focus is not primarily on technological change. As Erika Balsom writes, in the field of art history "the dialogue is framed in a slightly different, but certainly related, manner… If digital convergence is one reason discussions of medium specificity have receded, another is the term's inevitable invocation of the spectres of modernism, formalism, essentialism, and of Clement Greenberg – perhaps the most influential theorist of medium specificity

unique properties of digital photographs, or electronic texts, or web sites, or digital maps." As he notes,

> Different types of digital content do not have any properties by themselves. *What as users we experience as properties of media content come from software used to create, edit, present, and access this content.*[14]

In this chapter, rather than speculate further on the future of media art or media theory, I aim at evoking ideas from the history of modern media. I wish to offer a reconsideration of the claims about the coming of a digital "post-media" era by tracing the early history of ideas and practices of cross-sensory media and thus explore this feature of so-called "post-media" technologies outside the historical moment of transition from analogue to digital technologies.[15] Specifically, my historical survey of cross-sensory media draws on examples from the earliest speculations on and experimentations with moving image transmission technologies – that is, from the initial phases of what we may regard today as the archaeology of television. In light of recent studies in the field of media archaeology, I wish to revisit particularly those largely unexplored moments in the early history of television, from the period between the 1880s and the 1920s, as a way to stress the significance of early imaginary conceptions of the medium, unrealized ideas, failed experiments, and alternative practices that got lost in oblivion.[16] My ultimate goal, however, is to demonstrate through this archaeological exploration that techniques and practices that presently appear to be novelties that radically alter our very notion of media have been a part of the history of moving image media for over a century.

To be sure, practices of representing music by visual means have an even longer history, which dates back to the pre-phonograph experimentations with the inscription of sound vibrations by Édouard-Léon Scott de Martinville and Ernst Florens Friedrich Chladni.[17] The cross-sensory traits of those early media experiments certainly come close to the "post-media" practices. However, if we consider contemporary media theory's concern with the alleged loss of indexicality in digital media technologies, it becomes clear that there is a salient difference

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of the twentieth century." See Erika Balsom, *Exhibiting Cinema in Contemporary Art* (Amsterdam, Amsterdam University Press, 2013), 70-71.

[14] Lev Manovich, "Media after Software," *Journal of Visual Culture* 12, no. 1 (April 2013): 32.

[15] In this context, I use the term "cross-sensory media" to refer to technological apparatus for the sensory conversion of visual images to sounds or vice versa; I find this to be an apt term for it emphasizes the human senses' engagement with the apparatus, as opposed to the alleged novelty the term "post-media" suggests.

[16] On media archaeology see Erkki Huhtamo and Jussi Parikka, *Media Archaeology: Approaches, Applications, and Implications* (Berkeley: University of California Press, 2011); and Huhtamo's "From Kaleidoscomaniac to Cybernerd: Towards an Archeology of the Media," in Minna Tarkka (ed.), *ISEA '94* (Helsinki: University of Art and Design, 1994), 130-35.

[17] See, for instance, L. Manovich's references to such works in "Media after Software," op. cit.

between the experiments with inscription and transmission media. Namely, while the visual inscriptions in Martinville's and Chladni's experiments are still so-called indexical traces of the original sonic phenomena, electric transmission technologies such as the telegraph, telephone, radio, and television are unique in sharing with new digital practices the fundamental process of encoding sounds and images as signals – which are themselves neither audible nor visible unless a technological apparatus converts them to a perceivable form.

Turning to the early history of televisual moving image transmission technologies in order to inform the study of "post-media" may seem counterintuitive. Indeed, within the field of television studies, most writings on emerging digital technologies and contemporary processes of convergence have not shown much concern with the fundamental definition of media, the stakes of medium specificity, or the correlation between technology and the senses. The scholarship on technological change in television studies focuses primarily on social, textual, and institutional aspects of mass media operation.[18] Yet, I contend that the study of the early history of television – when the medium was still in its speculative and experimental stages, decades before its practical realization and application as a mass medium – is highly relevant to the study of digital media technologies and aesthetics. The very idea of televisual transmission involves the conversion of sounds and images to electric pulses, which may be relayed over distance by wires or wirelessly before being presented again in audiovisual form in a receiving apparatus. Television, in other words, has always been based on the principle of encoding visual and aural phenomena into signals, which are themselves not available to the human senses, before re-phenomealizing them – not unlike the operation of digital devices that are associated today with "post-media" practices.

In the following, therefore, I discuss a selection of diverse early experiments and speculations on moving image transmission media not merely to point to precedents to what is commonly considered today, rightfully or not, a new phenomenon. More than shedding new light on earlier historical moments, the exploration of the predecessors of the digital "post-media" era is valuable for our present understanding of the dynamics of media change because they allow us to revise some key notions about what is actually fundamentally new and specific about digital media. Furthermore, by examining the current theoretical claims against the background of a richer historical account we may also raise new questions about the concerns shaping the current debates in the fields of film and media theory. The four historical case

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[18] Among many others see Lynn Spigel and Jan Olsson (eds.), *Television after TV: Essays on a Medium in Transition* (Durham: Duke University Press, 2004).

studies I present below are accounts of ideas and experiments by pioneering technicians, artists, and thinkers who all recognized, strikingly early in the history of television, the novel aesthetic opportunities made possible by the emergent medium. In all those cases, it is not simply the power of the technology to transmit images to the distance that is put into play, but the ability to convert a visual phenomenon into signals that are in turn represented in audible form (or vice versa), thus announcing the coming of a "post-media" era more than a century before the term was coined.

Paul Nipkow's Word-Images

The genesis of the idea of a cross-modal medium that challenges the definition of visual and aural media altogether could be traced back to the very beginning of the early history of television, in a method devised by one of the pioneers of television, German engineer Paul Nipkow, who is best known for his 1884 invention of the "Nipkow disc," a scanning mechanism that became a key technical feature in the first working prototypes of mechanical television in the 1920s. Nipkow's conception of the televisual apparatus, as has been the case with virtually all other technicians involved in the project of developing moving image transmission technology since the late 1870s, was modelled after the existing non-visual transmission media of telegraphy and telephony. Nipkow designed (but never constructed) his instrument, dubbed "the electric telescope," to transmit images across distances similarly to how the telegraph transmits texts and the telephone transmits sounds – that is, in the form of electric signals. In order to achieve this, the electric telescope was designed to dissect images with a scanning disc into discrete units of light values, convert them to electric current with a selenium cell, and transmit the electric current to a distant receiving mechanism, in which a corresponding scanning disc forms a visual image upon the screen.

In an 1885 essay that addressed further technical challenges of the electric telescope, Nipkow proposed a model in which the problem of controlling the modulation of light in the device's receiving apparatus is resolved by applying a telephone technology.[19] In Nipkow's proposal, which applies an earlier invention of Alexander Graham Bell, the membrane of a telephone's earpiece (the diaphragm that vibrates to re-create the transmitted sound) is coated with a reflective material and is illuminated by a lamp. Constructed next to the electric telescope receiver's scanning disc, this telephonic device receives the electric signals that are sent by

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[19] Paul Nipkow, "Der Telephotograph und das elektrische Teleskop," *Elektrotechnische Zeitschrift* 6 (October 1885): 425. My thanks to Inga Pollamn for her kind help with the translation of this text.

wires from the transmitter apparatus. Thus, the electric signals that carry the visual information of the transmitted images cause a membrane to vibrate and, in so doing, determine the amount of light to reflect upon the receiver's scanning disc to reproduce the transmitted image.

In devising this model, Nipkow attempted to contribute to the ongoing efforts to create practical television. His essay, however, concludes with a comment that goes far beyond the strictly practical to suggest a radically different use of the electric telescope. Nipkow proposed that it would be possible to send the electric signals not from the televisual transmitting device, but rather by using "real telephonic currents" – that is, signals that are generated by a telephone's sound transmitting device. This way, he noted, the receiving televisual apparatus would produce on the screen a visual representation of the transmitted sounds. "It is not unthinkable," he writes,

> that by means of long practice one would get to a point where sounds and
> even words could be recognized in these images . . . one could recognize and
> indeed photograph these images, and here one can speak about word-images
> and a photograph of sounds.[20]

In other words, ten years before the introduction of the cinematograph, and forty years before the first working prototypes of television emerged, the idea of converting sounds to images by means of electric media was not only imaginable, but also appeared technically feasible.

Maximilian Plessner's Visible Thunder

A few years after the publication of Paul Nipkow's pioneering essay, the engineer and former officer in the Prussian military Maximillain Plessner published a brochure entitled *A Look at the Great Discoveries of the Twentieth Century: The Future of Electrical Television*, which describes the prospects of similar electric devices for the conversion of image to sound. Like other late nineteenth-century commentators on the prospects of television, Plessner's 1893 account anticipated that the emergent medium (to which he referred as the telectroscope) would be used for two-way communication, surveillance, and for transmission of stage performances and parliamentary debates. But Plessner also added a surprisingly detailed reflection on other electric audiovisual devices that would emerge as "valuable coincidental discoveries, which can be chronicled as unexpected results of experiments for the solution of the problem of

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[20] Ibid.

electrical television."[21] Among those yet non-existent discoveries Plessner describes the "phono-optograph" and the "optophone." Not unlike Nipkow's proposed model, in Plessner's account the phono-optograph would visualize sounds by means of creating a photographic record of light reflected off a vibrating telephone membrane. The optophone, a counterpart device meant to convert images to sounds, correspondingly consisted, according to Plessner, of a televisual transmitter connected to a telephone receiver.

While Nipkow's concern was with the technological design of his device, Plessner offers in his brochure a greater elaboration on how the conversion apparatus might be put to use. For Plessner, the optophone and phono-optograph were both prosthetic devices and scientific instruments. As he points out, the optophone could convert printed pages to audible sound and thus allow blind people to hear written texts, while the phono-optograph could similarly allow the blind to put speech in writing, in form of hieroglyphic inscription of their voices. Beyond claiming that the devices may compensate for missing sense organs, Plessner also stressed that they may enhance humankind's powers of scientific exploration, celebrating their ability to make available to the senses otherwise hidden aspects the material world:

> What surprises the natural scientist can look forward to if all visible things of the material world can be made audible and all audible phenomena also can be made visible. It will indeed be possible to make thunder phono-optographically visible as a sequence of light appearances, and lightning could be made optophonically audible as a bang.[22]

Although Plessner's brochure is chiefly concerned with audiovisual media technologies, he follows the comments about the properties of the optophone and the phono-optograph with a reference to an earlier scientific article by the German physiologist Emil Du Bois-Reymond entitled "The Limits of Our Knowledge of Nature."[23] As Du Bois-Reymond points out in the article (expanding on his mentor Johannes Müller's doctrine of specific nerve energies), our sense perceptions do not occur in the sense organs themselves, but rather in the action of the nerves. As he writes, the "sense-substances" that are carried from the sense organs to the brain through the nervous system "translate the identical excitation of all the nerves into sense

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[21] Maximilian Plessner, *Ein Blick auf die grossen Erfindungen des zwanzigsten Jahrhunderts I: Die Zukunft des elektrischen Fernsehens* (Berlin: F. Dümmler, 1893). On dating this publication see Nils Klevjer Aas's abstract and commentary on the brochure at http://histv.free.fr/plessner/plessner.pdf; All following quotes from Plessner's brochure are from an unpublished translation by Susanna Rudofsky.
[22] Ibid., 49-50.
[23] Emil Du Bois-Reymond, "The Limits of Our Knowledge of Nature," *Popular Science Monthly* 5 (May 1874): 17-32.

perceptions."[24] In other words, regardless of the nature of a given specific sensation, the sense-substances that communicate all sensations to the brain are identical in all cases. Du Bois-Reymond goes on to discuss the possibility of cross-sensory perception. As he notes, if one could blend different nerve fibres by cutting them across and allowing them to heal together, it would be possible to send the sensation of one sense organ to an area in the brain which produces the perceptions of another sense:

> With the nerves of vision and of hearing severed, and then crossed with each
> other, we should with the eye hear the lightning-flash as a thunder-clap, and
> with the ear we should see the thunder as a series of luminous impressions[25].

By evoking the observations of Du Bois-Reymond, the brochure suggests that Plessner conceived the "post-medial" traits (as we would call it today) of the optophone and phono-optograph in terms closely related to the contemporary understanding of the senses.[26] The nervous system and electric transmission media share, in other words, a basic mode of operation: they both operate by converting external stimuli to charged pulses that communicate various sensations in an essentially identical manner. This similarity, furthermore, highlights the distinction between Plessner's idea of the optophone and phono-optograph and the familiar notion of syneasthetic artistic instruments, such as colour-organs that were indeed prevalent at that time. While such instruments aimed at offering a synaesthetic experience by producing pairings of concurrent and harmonious sounds and colours, the technologies Plessner contemplates are actually meant to emulate the process performed by the mind of the synaesthete – that is, the conversion of distinct sense modalities.

Plessner's discussion of the offshoots of the emergent television technology further engages with the realm of aesthetics, as he argues that of the optophone and phono-optograph would be able not only to represent what is otherwise not available to the human senses but furthermore to reveal hidden artistic principles and confirm ancient aesthetic theories. In Plessner's view, physical laws also govern artistic values. Thus, one work's visual beauty would be manifested in sound, when converted phono-optographically, as if according to an aesthetic variant of the law of conservation of energy. "Should not the pictorially beautiful, when appearing in acoustic form, be perceived as audibly beautiful?" Plessner asks. "Should the ideal

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[24] Ibid., 20. Spelling modified.
[25] Ibid., 19. My emphasis.
[26] For a discussion of the relations between the nervous system and electric media in nineteenth century scientific discourses, see Laura Otis, "The Metaphoric Circuit: Organic and Technological Communication in the Nineteenth Century," *Journal of the History of Ideas* 63, no. 1 (January 2002): 105-28.

figures of an Apollo or an Aphrodite evoke, when transformed, the auditory sense a harmony, and those of a Polyphemus or a Gorgonic Medusa a disharmony?"[27]

Indeed, although the subject of Plessner's speculations is futuristic technology, the aesthetic values he ascribes to nonetheless conform to ancient conceptions. He goes on to claim that the novel electric inventions could prove true the Pythagorean hypothesis of the harmony of the spheres, according to which mathematical correspondences exist between the movements of the planets and the structure of musical harmonies. While Pythagoras speculated that the movements of the various planets produce particular harmonious sounds that are inaudible to us, Plessner holds that phono-optographic conversion could finally make those correspondences apparent by allowing the representation of the visible but not audible celestial movements in the form of sounds. Similarly, Plessner suggests that the new technology could enable a new kind of beauty contest: the classical facades of Greek architecture could be measured against architectural works of later periods – and prove that when converted to sound, the nineteenth century Naturalists sound like bad popular songs compared to the harmonious tones of the classics.

Raoul Hausmann's New Type of Music

While Plessner's discussion of the optophone remained little known (and obviously not realized) in his time, it eventually influenced a later idea that appeared in the markedly different cultural context of Dada art – or, rather, anti-art. Raoul Hausmann, a key figure in the Berlin Dada movement, explored the prospects of the optophone technology following a long ongoing interest in the possibilities of the transformation of visible forms to sonic ones. His famous poem-posters of the late 1910s featured combinations of various different typefaces and sizes. In these works, the typography itself was not only a visual element but also functioned as musical notation of a sort, indicating the aural nature of the poem. For Hausmann, such works exemplified "optophonetic poetry."

In the early 1920s, Hausmann started speculating about the possibility of developing a technological medium to "transform images of luminous induction into sounds with the help of the selenium cell using a microphone in the electrical circuit."[28] He credited a range of modern works on the nature of light and human vision as inspirations for his pursuit, from Thomas

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[27] M. Plessner, *Die Zukunft des elektrischen Fernsehens*, op. cit., 51-52.
[28] Raoul Hausmann, quoted in Jacques Donguy, "Machine Head: Raoul Hausmann and the Optophone," *Leonardo*, vol. 34, nº 3, June 2001, p. 219.

Wilfred's electric light displays to Goethe's theory of colour.[29] But Hausmann was also aware of the nineteenth-century rendition of the optophone concept, and quoted Plessner's early television brochure in one of his essays (although he misspelled Plessner's name).[30] Unlike Plessner, who wrote of the optophone speculatively as a hypothetical future invention, Hausmann considered the realization of such technology perfectly plausible. When he established the initial goals of his project in a 1922 essay entitled "Optophonetik," technologies for the conversion of light to sound using selenium cells had already been successfully demonstrated in early variants of optical sound-on-film techniques, and the development in television technology also showed great progress. Hausmann might also have been aware of the achievements of British physicist Edmund Edward Fournier d'Albe, who in the 1910s constructed a version of the optophone, a mobile electric light-detecting apparatus with an attached headset which a blind person could carry as a device to aid mobility by producing a tone according to the intensity of light falling on it.[31] In an uncharacteristically practical move, Hausmann also attempted to patent the technological scheme for his version of the optophone. However, he was rejected by the Berlin patent office, which allegedly declared that although the device was technically possible, "no sort of pleasant effect, in the usual sense, could come out of that."[32]

But a pleasant effect was by no means Hausmann's goal. Certainly not in the usual sense. For Hausmann, as for other modernist writers and theorists, modern experience had altered the fundamental terms of aesthetic engagement. "Human being in our consciousness has changed entirely," he stated, "not only because we have the telephone and airplane and electrical piano or the revolving lathe engine, but because our entire psychophysis has been changed through the experience."[33]

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[29] Ibid., p. 217.

[30] Raoul Hausmann, "Vom Sprechenden film zur Optophonetik" ["From Sound-film to Optophonetic"], in *Texte bis 1933, vol. 2*, München, Edition Text + Kritik, 1982, pp. 72-74. Unpublished translations by Susanna Rudofsky.

[31] On this model of the optohphone see Edmund Edward Fournier d'Albe, *The Moon Element: An Introduction to the Wonder of Selenium* (New York: D. Appleton and Co., 1924), 94-146; Bruce Elder, *Harmony and Dissent: Film and Avant-garde Art Movements in the Early Twentieth Century* (Waterloo: Wilfrid Laurier University Press, 2008), 66-76; and Cornelius Borck, "Blindness, Seeing, and Envisioning Prosthesis: The Optophone between Science, Technology, and Art," in Dieter Daniels and Barbara Ulrike Schmidt (eds.), *Artists as Inventors – Inventors as Artists* (Ostfildern: Hatje Cantz, 2008), 108-29.

[32] Marcella Lista, "Raoul Hausmann's Optophone: Universal Language and the Intermedia," in Leah Dickerman with Matthew S. Witkovsky (eds.), *The Dada Seminars* (Washington: Center for Advanced Study in the Visual Arts, National Gallery of Art, 2005), 94. In 1934 Hausmann patented a different version of the optophone, which functioned as a calculation device; see also J. Donguy, "Machine Head," op. cit., 217.

[33] Raoul Hausmann, "PREsentismus", *Texte bis 1933* 2, 24-30. Unpublished translations by Susanna Rudofsky.

For Hausmann, painting and music "no longer correspond to our awareness of the world," and thus "the most beautiful past should not obligate us!"[34] In the modern condition, he argues, even the optophonic rendering of natural phenomena that Plessner proposed and the newly invented sound film are "no longer a possibility," since they both put the selenium cell into use which is "based on naturalism."[35]

Seeking an aesthetic path that departed from naturalism, Hausmann saw the optophone as a promising new medium for a new kind of a new art that he considered crucial for the modern era. Borrowing from theories of the ether, and of optics, electromagnetics, and acoustics, he argued that the optophone's ability to convert light to sounds makes manifest the fact that what we perceive as sound and what we perceive as light are – just like electricity itself – essentially the identical phenomena of oscillation in different frequencies.[36] In this view, the optophone is a device for the transformation of different forms of energy to one another; as such, it is a suitable instrument for properly modern artistic creation, as works that are exclusively visual or aural cannot represent such correspondence. "Why stick sentimentally to the old arts of the eye and the ear?" he asked, declaring, "We ask for the expansion and the capturing of all of our senses! We want to disrupt its former borders!"[37]

Indeed, Hausmann offers in his writings on the optophone not only a forecast of a new technological medium, but a new and radically reconfigured mode of vision and of the human senses as a whole. "The luminous image formed by our elliptoid eyes no longer holds any creative power for us," he writes. As he anticipates, the existing mathematical system of optics would be taken over by a "new solar optical system," consisting of the essence of the movement of light – an essence he identified with oscillation, and thus also with sound, electricity, and other forms of energy.[38] With the various phenomena sharing this fundamental characteristic, Hausmann considered that just as the optophone could convert visible light to sound, so can the human sensorium link together different sensations. In the "PREsentismus" manifesto, for instance, Hausmann writes of the haptic sense that it "is mingled with all our senses, or rather that it is the definitive basis of all the senses." According to Arndt Niebisch, in Hausmann's view the optophone is "not simply a synaesthetic apparatus, but also the duplication of a sensory organ," which does not separate seeing from hearing and could be found, as Hausmann notes,

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[34] R. Hausmann, "Vom Sprechenden film zur Optophonetik" and "PREsentismus," op. cit.

[35] R. Hausmann, "Vom Sprechenden film zur Optophonetik," op. cit.

[36] As Arndt Niebisch points out, this claim is not accurate. See Arndt Niebisch, *Media Parasites in the Early Avant-Garde: On the Abuse of Technology and Communication* (New York: Palgrave MacMillan, 2012), 168.

[37] R. Hausmann, "PREsentismus," op. cit.

[38] R. Hausmann, "Optophonetics," in *La sensorialité excentrique* (Paris: Éditions Allia, 2005), 64.

in bees.[39] The optophone, therefore, appears to be more than an artistic medium that opens new aesthetic possibilities; as sensory organ duplication, it also opens new means of sensation.

Cornelius Borck's discussion of the optophone as a prosthetic technology demonstrates that the instrument emerged out of Hausmann's modernist motivation to overcome a certain lack, a haptic-perceptual limitation, by technological means. In Borck's view, the optophone answered the particularly modern "need to develop the human body beyond its natural design in order to understand nature and to come to terms with the powers of modern technology."[40] In this light, the optophonic cross-sensory conversion may be seen as the synthetic haptic sense's artistic counterpart. As Hausmann's "PREsentismus" manifesto reads, "We see no reason why this most important of our apperceptions should not be made into a new art." Returning to the initial inspiration derived from the advent of television, he calls for new haptic transmission stations, adding "Through electricity we are able to convert our haptic emanations into mobile colours, into noises, into a new type of music."[41]

In concert with the Dadaist sentiments, the new art of haptic emanations not only offers an aesthetic experience previously unavailable in traditional artistic media – it also obliterates them. "Dear musicians, dear painters: you will see with your ears and you will hear with your eyes and you will run mad!" wrote Hausmann in 1931, threatening that the optophone would render obsolete the old notions of sound, colour, and shape: "of all your arts there remains nothing."[42]

John Logie Baird's Sounds of Faces

Shortly after the publication of Hausmann's radical ideas of optophonic conversion, an operating model of an electric apparatus that performs such conversion of images to sounds with the aid of a photoelectric cell was unveiled in the United Kingdom. But unlike the utopian and hyperbolic plans of the Dada artist, the realized apparatus was presented in some of the earliest public demonstrations of television. As early as 1926, television pioneer John Logie Baird's exhibitions of the first working prototypes of his mechanical television for professional

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[39] A. Niebisch, *Media Parasites in the Early Avant-Garde*, op. cit., 169.

[40] Cornelius Borck, "Sound Work and Visionary Prosthetics: Artistic Experiments in Raoul Hausmann," *Papers of Surrealism* 4 (2005): 20. See also his "Blindness*,* Seeing, and Envisioning Prosthesis: The Optophone between Science, Technology, and Art," in Dieter Daniels and Barbara U. Schmidt (eds.), *Artists as Inventors – Inventors as Artists*, op. cit., 108-29.

[41] R. Hausmann, "PREsentismus," op. cit.

[42] R. Hausmann, "Die uber-zuchteten Kunste: Die neuen Elemente der Malerei und der Musik," *Gegner* 1 (15 June 1931): 17. Quoted in M. Lista, "Raoul Hausmann's Optophone," op. cit., 94. In this text, Hausmann refers to the conversion technology as "spektrophone." In a later text, however, he clarified that this statement indeed concerned the Optophone (see J. Donguy, "Machine Head," op. cit.).

societies and the press included not only "proper" television transmission, but also a demonstration of the new technology's ability to convert signals that represent images into audible sounds. Baird utilized a fairly simple technique in those demonstrations. He connected a televisual transmitter to a telephone or a sound radio apparatus to create sounds that corresponded to the captured images. In this, although probably unknowingly, Baird came very close to Nipkow's proposed design of the electric telescope forty years earlier. Symbolically, the technological history of television had come full circle.

The demonstration of television's ability to convert images to sounds could be best understood as an attraction. It was a display of a technical feature that goes beyond the dominant deployment of the medium in order to raise curiosity (in this sense, it may be seen as an equivalent of the early Lumière brothers' screenings that started with a projected still image which was then put in motion[43]). Numerous early books and newspaper reports on the introduction of television confirm that the curious demonstrations were indeed met with great interest, as they describe in detail how the novel technological capacity defied common categories of visual and sound media. For example, a New York Times report entitled "Television Images Recognized by Sound" claimed:

> the picture of a hand makes a rattling sound; a face gives a softer note, and it
> is possible to recognize objects by their image sounds. Each face has its
> characteristic noise, and every movement causes the note to change in pitch.[44]

Another report, entitled *Glasgow Listens to the Sound of Faces*, describes how Baird demonstrated in his home country that "Scotch plaid sounds as distinctive as it looks. A derby hat also discourses sweetly. Even Scottish faces talked."[45] Some commentators even conveyed in their reports what the sounds heard through Barid's television were, writing passages such as "one man's face often used in the experiments across London makes a humming 'rip-rip-rip' and another 'zur-zur-zur'," or, "A face looking straight sends out a series of sounds something like 'Brump, brump, brump,' but when turned sideways the profile gives out a note like 'Perahh, perahh, perahh'."[46]

It is perhaps not surprising that in the particular case of such demonstrations, reports of technological novelties read a lot like Dada phonetic poetry. Beyond that, however, the

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[43] Tom Gunning discusses those screenings in "An Aesthetic of Astonishment: Early Film and the (In)Credulous Spectator," *Art & Text* 34 (Autumn 1989): 31-45.

[44] "Television Images Recognized by Sound," *New York Times*, 24 October 1926, 19.

[45] "Glasgow Listens to the Sound of Faces," *New York Times*, 4 February 1927, 6.

[46] "Television Images Recognized by Sound," 19; Alfred Dinsdale, *Television: Seeing by Wireless* (London: W.S. Caines, 1926), 54.

published responses to Baird's demonstrations also suggest that for the public who first witnessed television, the new medium seemed to possess revelatory powers. Baird presented his invention not only as a telecommunication medium, but also as a new means to make accessible to the senses what otherwise remains latent in objects and persons. The sounds produced by the television were considered to be inherent in the images themselves, and made manifest only with the mediation of the technology (the face "makes" a hum, and now this hum is made audible). In light of the cultural responses – and despite the obvious vast differences in the cultural contexts – the demonstrations of early television's capabilities could be seen not only as a technological pioneering achievement, but also as a realization of the radical modernist aspirations of Hausmann and the idealist aesthetics speculations of Plessner.

End Points and Blind Spots

Several conclusions may be drawn from the archaeology of the concept of televisual image and sound conceptions. First and foremost, the various speculations and experiments of the late nineteenth and early twentieth century prove that the fascination with cross-sensory media technology is a cyclical phenomenon. As Erkki Huhtamo describes in his formulation of the media archaeological approach, such tropes that emerge as cultural responses to media often appear, disappear, and reappear again with the introduction of new technologies.[47]

It would therefore be wrong to consider the ability to represent raw data in various different registers as a specific trait of digital devices. Ever since it was technologically possible to transmit texts, sounds, and images by analogue media like the telegraph, telephone, and television, it was also feasible to manifest given electric signals in various different forms. By this I am not suggesting that there are no differences between analogue and digital technologies. In electric telecommunication apparatuses it is continuous varying electric current that is relayed through wires, which is a fundamentally different process from the digital storage and transmission of discrete signals of coded numerical data that are processed by a computer. Yet, the scholarly debate about the current "post-media" era often revolves around aspects that are not exclusive to digital technologies.

Additionally, declarations about the demise of the concept of media specificity might also appear exaggerated given that media technologies that convey electric charges that are communicable only to machines and may be represented in various forms have been common for over a century. Once again, what is significant here is not only that the ideas and

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[47] See E. Huhtamo, "From Kaleidoscomaniac to Cybernerd," op. cit.

technological capacity that are associated today with the notion of "post-media" are not new. More important is to point out that throughout its history the existing concepts of cross-sensory media practices did not trouble the prevalence of medium specific theorization. While we may only speculate on the reasons for this, it seems only fair to assume that the emergence of the dominant practice of television broadcasts and the mass-produced television receivers, which did not allow much place for experimentation with the medium, quickly made the ideas of converting visual signals to audible sounds an uncommon curiosity anomaly.

Beyond these explanations, however, it is also clear that there are disciplinary reasons for why media technologies that break from ideas of indexicality have emerged as a serious concern for media scholars only relatively late, their long history having remained in some historical blind spot. Thomas Elsaesser was early to address this question, writing in the context of debates on digital media that the case of television "put[s] the digital in perspective," since while television has also "broken with the indexicality of the photographic image," it did not provoke a similar crisis of faith in the truth-value of the image, as has been the case with digital media. Elsaesser explains this by pointing out that more often than not,

> Television, rather than being examined around essentialist assumptions derived from its "apparatus" [...] is mostly understood according to the ideology of its institutional structures, by studying the uses people make of programmes in their everyday lives or how the television-set figures in the "gender politics" of the living room.[48]

Following Elsaesser's observation, it is possible to argue that if the "post-media" concepts and practices of the digital era are considered today as radical novelties, it is not only due to digital media's unique ontology but also due to broader changes in the norms and procedures of contemporary media production, distribution, ownership, and consumption, which came to impose a new set of concerns on the modernist tradition of media studies.

The exploration of the "post-media" idea within a broader historical scope may also allow us to revise two conceptions that have become associated with cross-sensory media practices. First, the very periodization implied by the term, which suggests a moment that divides media history into "pre" and "post," may be challenged. Kittler prefaces his declaration that "the general digitization of channels and information erases the differences among individual

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[48] Thomas Elsaesser, "Digital Cinema: Delivery, Event, Time," in Elsaesser and Kay Hoffmann (eds.), *Cinema Futures: Cain, Abel or Cable?* (Amsterdam: Amsterdam University Press, 1998), 209.

media" with the observation that "something is coming to an end."[49] Yet, as the writings of Plessner and Hausmann indicate, a cross-sensory medium such as the optophone could be seen as opening new aesthetic possibilities as well as celebrating old ones. Indeed Hausmann intended the optophone to usher in a new post-medium, post-painting, post-music era; but Plessner, writing on an essentially identical technology, related it rather to some of the most ancient conceptions in Western aesthetics and considered it a new means to affirm the superiority of classical art works. Thus, the "post-media" traits of the optophone could partake in a wide range of aesthetic traditions – and nothing in the new possibilities it offered inherently announced the end of traditional aesthetic media.

Finally, the survey presented here also highlights the importance of historical conceptions about the body and human senses to the origins of cross-sensory media. "Post-media" debates often involve claims about digital technology's supposed disengagement with the body. Highlighting the inaccessibility of digital data to the senses and the ability of digital devices to manifest the same information for various different sense modalities, commentators have suggested that new media forms no longer correspond to the human senses. Yet, the late nineteenth- and early twentieth-century writings on the prospects of cross-sensory media demonstrate their indebtedness to contemporary ideas of the body and the senses. The citing of physiological ideas about the nervous system in Plessner's text and the modernist theory of perception to which Hausmann enthusiastically ascribes indicate that their projects were informed by a particular modern understanding of the human senses. Moreover, their respective original views of cross-sensory media emerged not as an attempt to break from the embodied perception, but indeed – as counterintuitive as it might appear today – to mimic it. Plessner found parallels between phenomena in nature and the arts and the function of the human senses; Hausmann's desire to depart from the aesthetics of traditional art forms is driven precisely by the notions that the old forms are not adequate for the characteristic of human perception. Similarly, Nipkow's and Baird's ideas of identifying words in photographs or hearing different shapes – while of course not explicitly voiced as modernist utopian experiments – could similarly be understood as attempts to alter the fundamental economy of the senses and open new different perceptual possibilities for the human body.

In conclusion, this history of early speculations and experimentations with television, which gave rise to ideas of cross-sensory media long before the digital, might be just one of

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[49] F. Kittler, *Gramophone, Film, Typewriter*, op. cit., 1.

many historical lineages that lead to contemporary notions of "post-media." Certainly, more work in the history and archaeology of modern media might reveal other precursors and even alternative conceptions. But if we accept today's claims that digital technologies erase the distinctions between media, we should also be ready to admit that the emergence of nineteenth-century electric transmission media already sowed the seeds of medium specificity's own destruction.