

STREAMING

A MEDIA HYDROGRAPHY OF TELEVISUAL FLOWS

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Abstract: This paper situates the metaphor of 'streaming' in contrast to and connection with fluid analogies and metaphors that have been used to describe different models of media transmission. From the early use of aqueous vocabulary that shaped popular and scientific understandings of electricity transmission to the seminal studies of mass communication concerning the flows of information, images of fluidity have long shaped cultural and conceptual understandings of media. Building on the work of media archaeologist Erkki Huhtamo, I approach these metaphors as 'recurrent topoi' in media culture and show that the metaphor of streaming serves to keep the remediation of past media forms hidden while simultaneously revealing certain dominant features of digital culture.

Keywords: digital television, historiography, streaming, media archaeology

I hate this continual flux of London. It is an epitome of us at our worst – eternal formlessness; all the qualities, good, bad, and indifferent, streaming away – streaming, streaming for ever. That's why I dread it so. I mistrust rivers, even in scenery. Now, the sea.

E.M. Forster, *Howards End*

1 Media Hydrography

For the television industry and television audiences alike, the term 'streaming' seems to mark the transition from analogue to digital television and the new types of small-screen consumption that accompany it. The streaming of television shows, for instance, positions 'broadcasting' as the old, analogue counterpart it is replacing. This transition has been the focus of ongoing attention in television studies, but my interest lies in addressing the persistence of some metaphors used in popular, technical, and theoretical discourses to describe mutations in media functions, effects and infrastructures. Streaming is the latest in a long line of aqueous, fluid, and hydrospheric metaphors used to name the relationship between media and audiences: these include the early conduit metaphor behind the linear models of broadcasting; the televisual flow, as described by Williams' seminal work on programming; and mainstream television, one of the central research concerns of cultivation theorists in the 1980s. If the major technological break between mass media and digital media is the format of transmission (analogue versus digital), fluid metaphors still occupy the core of

our understanding of digital media: in the early days of the web, users were invited to *surf* and *navigate* a space described as a *sea* of information; peer-to-peer sharing files are still known as *torrents*, and audiences are *streaming* on-demand television and radio.

Building on media archaeologist Erkki Huhtamo's work,¹ I approach this persistence of hydrospheric metaphors as one of the 'recurring topoi' of media culture. Huhtamo's media archaeology locates what he calls 'topoi' in media history (commentaries, themes, fantasies, formulas, and spectacles) that shape the existence and understanding of media forms. These topoi make up the "building blocks of cultural traditions; they manifest both continuities and transformations in the transmission of ideas."² I argue that the continuity and similarity between current digital media and past analogue media is generally concealed by claims of novelty. Like many media archaeologists, my intent in following the persistence of fluid metaphors in media studies is to challenge the discursive inflation around the 'newness' of new media. In particular, I use the case of the dominant metaphor for digital television – streaming – to explore how, technologically and culturally, it remediates past media economical models, technological forms, and functions as a way to control and capture audiences. This article argues that online streaming marks the grand return of broadcasting media in digital culture. In the first part of the article, I trace a short history of fluid metaphors in media theory to show their continuities in time. Then I address the analogical nature of hydrospheric images for media by looking at the proximity (or gaps) between the discursive operators and technological realities they aim to represent. Finally, I turn to the specific case of the dominant metaphor of 'streaming' in digital culture, and investigate what is concealed and what is revealed by it. I am drawing a media hydrography of sorts, a survey of the flows, streams and currents that make up our cultural narratives and social theories about media.

2 Media Theory and Metaphors

Media theory and media studies abound with hydrospheric and fluid metaphors. Perhaps the reason why these metaphors are so prevalent in media theories is because mediated communication is processual and fluidity provides images par excellence to describe this dynamism. Images of fluidity, motion and transportation in turn translate different conceptual models about media. The use of a specific metaphor orients, guides and sometimes limits our understanding of media by emphasizing some aspects while overlooking others. American media scholar Meyrowitz noted back in 1993 that "the field of media studies [could] be strengthened over the coming years by paying more attention to what is common and different, limiting and liberating, about the various metaphors for media."³

Communication and media scholars who attempt to trace a typology of these metaphors have noted the prevalence of the 'conduit' metaphor to explain what media are and what they do. Krippendorff, for instance, noted how the conduit metaphor was dominant when it came to describe new technologies of communication that emerged in the late 19th century: telegraph, telephone, and radio.⁴ Meyrowitz did a similar survey and found that three major metaphors organised research on media: conduit, language and environment.⁵ In both Meyrowitz's and Krippendorff's typologies, the conceptual model of the 'conduit' metaphor was relegated to a primitive, unsophisticated understanding of media. As a metaphor guiding a theoretical understanding of media transmission, Meyrowitz noted, the conduit portrays the technical means of communication as nothing more than the material (and somewhat neutral) support for the delivery of fluid-like content. This critique is found in most media studies anthologies: the conduit image embodied an outdated, linear, and simplistic model of mass communication; it did not incorporate the active role of the medium in shaping

1 Erkki Huhtamo, 'From Kaleidoscomaniac to Cybernerd: Notes toward an Archaeology of the Media,' *Leonardo*, 30, 3, 1997, 221–224. See also *Illusions in Motion: Media Archaeology of the Moving Panorama and Related Spectacles*, MIT Press, 2013.

2 Huhtamo, 2013, p. 16.

3 Joshua Meyrowitz, 'Images of Media: Hidden Ferment – and Harmony – in the Field,' *Journal of Communication*, 43, 3, 1993, p. 56. It was by using a metaphor – media as an environment – that Meyrowitz framed his own theoretical model that became the organising principle of the media studies paradigm known as "media ecology," see Ursula Heise, 'Unnatural Ecologies: The Metaphor of the Environment in Media Theory,' *Configurations*, 10, 1, 2002, 149–168.

4 Klaus Krippendorff, 'Major Metaphors of Communication and some Constructivist Reflections on their Use,' *Cybernetics & Human Knowing*, 2, 1, 1993, 3–25.

5 Meyrowitz, 1993, 55–66.

information, and was naive in approaching communication from the unique perspective of the signification of content. It is implied that the metaphors that replaced conduit (language, environment and ecology) point to more complex models of media.

3 Flows

Flow is also one of the prevalent liquid metaphors in media theory and was especially useful for scholars to gain a theoretical understanding of television. Beginning in the 1950s, television was technically described with the vocabulary of 'channels,' and scholars started to articulate the image of 'flow' in theories of media, including *The Flow of Information* by De Fleur and Larsen, Lazarsfeld's two-step flow theory, and William's analysis of programming as flow. In most cases, scholars used the fluid *topos* to explain the cultural transmission and circulation of ideas, opinions, and meanings through the media.

Raymond Williams turned to the concept of flow, in particular, to describe the capture of the audience's attention by the television industry.⁶ As an economic model, traditional television was guided by the imperative that something should always be on the air, that channels should constantly be filled, free of interruptions and noise. Williams called this planned programming the 'flow' (a "mobile concept," he notes, rather than the "static" concept of distribution).⁷ Programming can be about the cultural experience of television, with the different televisual genres ritualistically following one another: the news at 6 p.m., the sitcom at 7 p.m., the late-night talk show at 11:30 p.m. Williams complements this definition of programming as he questions it from the perspective of the technological arrangement of television transmission:

In all developed broadcasting systems the characteristic organisation, and therefore the characteristic experience, is one of sequence or flow. This phenomenon, of planned flow, is then perhaps the defining characteristic of broadcasting, simultaneously as a technology and as a cultural form. In all communications systems before broadcasting the essential items were discrete.⁸

The 'flow' metaphor for Williams is the absence of transmission gaps between programmes. This is why one can be 'watching television' or 'listening to radio' without ever making a particular claim about *what* is being consumed. Williams' flow is about the technological arrangement of television, how the medium offers a continuous experience regardless of content. He gives the example of commercial breaks: for viewers, commercials are an interruption (a form of noise, even) of the symbolic experience of televisual content. Technologically speaking, however, commercials respond to this imperative of the flow to leave no interrupted space, to be fully continuous. From the television industry's perspective, it is the main programmes that are the real interruptions between commercials. This view is in tune with what Williams argued: the television flow seeks to keep the audience tuned in "for a whole evening's sequence."⁹ The name of the game for television has always been to keep viewers captive on a specific channel in order to secure audience share. The flow of programming attempts to deter, at all costs, channel surfing.

George Gerbner's concept of 'mainstreaming' (another fluid metaphor) names the ideological and cultural effect of this capture of viewers by television networks. Television, he wrote with co-authors in 1980, "makes specific and measurable contributions to viewers' conceptions of reality."¹⁰ The authors defined 'mainstream' as the "relative commonality of outlooks that television tends to cultivate."¹¹ Certainly for these scholars, the fluidity of mass media is

6 Williams, 1974.

7 Ibid., p. 78.

8 Ibid., p. 86.

9 Ibid., p. 91.

10 Georges Gerbner, Larry Gross, Michael Morgan, and Nancy Signorielli, "The 'Mainstreaming' of America: Violence Profile No. 11," *Journal of Communication* 30,3, 1980, 10–29.

11 Ibid., p. 15.

not a positive metaphor guided by interactivity, freedom of motion, and circular loops. On the contrary, the conceptual models they developed using ‘conduit,’ ‘flow’ and ‘stream’ metaphors all served to describe the relationship between audience and mass media (especially television) in ways that address forms of control or capture. The ‘conduit’ metaphor has been historically linked to the early behavioural models of passive audiences; ‘flow’ attempted to describe the immobilising and hypnotising effects of televisual programming, and the ‘mainstream’ metaphor pointed to the homogenisation, transmission, and reinforcement of values articulated outside the social fabric. In fact, it was precisely this rigidity (and not the fluidity) of mass media that new information and communication technologies started challenging in the 1980s. The computer and the internet became the antidote to mainstream media and their uniform, planned and centralized flows.

4 Conduits, Channels and Tubes

Fluid metaphors were not always directed at a theoretical or conceptual understanding of media. They became metaphoric when scholars attributed them to media *theories*, but the images of conduits, streams and flows originally aimed to capture the material reality of the first electric media. From analogies they only later became metaphors. Derrida described this as *effacement*, a process that all metaphors go through: the “primitive meaning,” what was represented in the first place is slowly and unavoidably concealed as the metaphoric meaning supersedes it.¹² When we toss away, for instance, the ‘conduit’ metaphor as a viable model for media theory, we tend to overlook this initial, analogical relationship between media and fluidity. Arguably, the early understandings of electric communication technologies in the late 19th century were tangled with the scientific and technical discourses available to the then-emerging electrical science, and fluidity was among the dominant explanations of electricity. If McLuhan was right when he stated that, beginning with the electric telegraph, all subsequent media belong to the same family of ‘electric media,’ then we can indeed map a common hydrography of the fluctuating analogical meanings of flows, currents and streams in this history.

Central to the discourse of electrical experts who gave us the electric telegraph and telephone in the late 19th century was the cultural and scientific representation of electricity and magnetism as ‘fluid’ phenomena. We can, of course, trace this relationship back to antiquity, but from the Renaissance onwards it was strengthened. From theories of magnetism about gaseous *effluvia* to the image of ‘fluid mechanics’ used to explain the transmission of electricity between bodies, fluidity and electricity have gone hand in hand since that time.¹³ When electricity was domesticated with the invention of the electric telegraph and its twin technology the electric light, metaphors of fluidity reappeared in technical and vernacular discourses. The taming of the invisible and unpredictable force had been achieved by ‘channelling’ the electric current through a conduit, the metallic wire. The telegraph, the first true electric mass media, was precisely this: the encoding of a message in the form of electrical impulses sent (‘cabled’) along a conductor. Dionysius Lardner’s *The Electric Telegraph Popularized* (1855) illustrates how natural the vocabulary of hydromechanics was for electrical science:

If tubes or pipes could be constructed with sufficient facility and cheapness, through which the subtle fluid could flow, and which would be capable of confining it during its transit, this object would be attained. [...] The construction of such means of transmission has been accomplished by means of the well-known property of the electric fluid, in virtue of which it is capable of passing freely over a certain class of bodies called conductors, while its movement is arrested by another class of bodies called non-conductors or insulators.¹⁴

In the case of the electric telegraph, the ‘conduit’ was not a metaphor; it was an analogy describing a technological apparatus. The telegraphic signals were transmitted by a physical conductor – the electric wire (in turn perhaps the most celebrated cultural artefact of that *fin-de-siècle*). Interestingly enough, this era did not fall short of metaphors to

12 Jacques Derrida, ‘White Mythology: Metaphor in the Text of Philosophy,’ *New Literary History*, 6, 1, 1974, p. 8.

13 For the social meanings of electricity in modernity, see in particular Christoph Asendorf, *Batteries of Life: On the History of Things and Their Perception in Modernity*, University of California Press, 1993; James Delbourgo, *A Most Amazing Scene of Wonders: Electricity and Enlightenment in Early America*, Harvard University Press, 2006; David Nye, *Electrifying America: Social Meanings of a New Technology, 1880–1940*, MIT Press, 1990.

14 Dionysius Lardner, *The Electric Telegraph Popularized*, Walton & Maberly, 1855, n.p.

understand its new media, only they were not that of the conduit. As historians of science have shown, the dominant metaphor for the electric telegraph was biological, the human nervous system.¹⁵

How did the conduit analogy survive the transition from wired telegraphy to wireless and radio? Indeed, are transitions occurring at the technological level preceded, paralleled, or followed by similar transitions in discourse? The rise of radio and television did, in fact, stimulate the emergence of a new metaphor – ‘broadcasting’ – that replaced that of ‘cabling’ and perhaps better captured the end of point-to-point transmission. However, the technical discourse around radio remained full of the fluid lexicon: radio waves, beams, ether wave currents, channels, radio frequency currents, streams, and wavelengths. In the *Wireless Age*, a wireless telegraph operator on a ship recalls receiving “a continual stream of ‘msgs’” reporting ice that lasted two days.¹⁶ The passage from wired to wireless rid communication infrastructures of the material conduit; however, the wire was replaced by yet another fluid medium, the ether, which had been equally central to the cultural and scientific understandings of electrical and magnetic phenomena.¹⁷

The persistence of fluid *topoi* in the long transition from telegraphy to broadcast media is particularly remarkable. Radio and television were tightly bound to the family of marvels that had been the product of the electrical engineering community, and the wavelike, aqueous representations of broadcast transmission were deeply tangled with these scientific discourses. Television channels and electron tubes, electric valves and the flows of radio waves were scientific and technical analogies of physical processes and material apparatuses before they were used as metaphorical models of the linear transmission of messages. This reality is at the heart of the long misunderstanding of Claude Shannon’s mathematical theory of communication: one of technical transmission of data divorced from any concern with the transmission of meanings.¹⁸

5 Remediating Tubes

The hydrospheric analogies found in today’s digital media are caught in the middle of a similar tension between the representation of technological systems and of the transmission of meaning through communication processes. On the one hand, the networked communication of the internet is often described as more fluid because it allows interactive and multidirectional communication. On the other hand, fluid analogies are again remediated to represent the technological infrastructure of digital media, but with some inaccuracies, as I will note later.

In a much-mocked statement he made in 2006 before the United States Senate, Ted Stevens explained to fellow senators how the internet worked. “The internet is not a big truck,” he said, “it’s a series of tubes.”¹⁹ A younger generation of internet users found Stevens’ metaphor laughable and parodied his statement for a few weeks on the web (most ironically on *YouTube*). In any case, the metaphor of the tube may have been a normal response to try to make sense of a new technology by using analogies already well established, something early adopters often do. After all, the ‘tube’ metaphor clearly works within the spirit of the ‘conduit’ metaphor of the telegraph. Perhaps it was also a way to address the economic model of the internet by referring to it as a public utility. Like the words of the telegraphic message or domestic electricity consumption, the personalized ‘bandwidth’ or ‘volume’ of data usage on the internet is monitored and regulated, and thus financially profitable. Netflix and internet service providers (ISPs) want traffic: they do not care what you watch, they are only concerned with how long you watch it. For Netflix, the length of time justifies the

15 See Iwan Rhys Morus, “‘The Nervous System of Britain’: Space, Time and the Electric Telegraph in the Victorian Age,” *The British Journal for the History of Science*, 33, 4, 2000, 455–475.

16 J. Terrence Scott, ‘A Year on A Tramp,’ *The Wireless Age. An Illustrated Monthly, Magazine of Radio*, Marconi Publishing Corporation, 1914, p. 902.

17 See Steven Connor, “Transported Shiver of Bodies’: Weighing the Victorian Ether,” paper presented at the *British Association of Victorian Studies*, University of Keele, September 3, 2004; Joe Milutis, *Ether: The Nothing That Connects Everything*, University of Minnesota Press, 2006; Ghislain Thibault, “Éthérotopies: retour sur des espaces hôtes,” *Intermédialités: Histoire et théorie des arts, des lettres et des techniques*, 15, 2010, 211–229.

18 Claude Shannon, an engineer at Bell labs, worked towards a mathematization of information transmission within communication systems. His “information theory” (also known as the “linear model”) did not attempt to explain the transmission of the semantics of any given message; rather it served to detail the technical steps in the delivery of messages. Shannon’s theory is misunderstood when it is seen as a theory related to the transmission of meaning, see Katherine Hayles, *How We Became Posthuman*, University of Chicago Press, 2014, 50–57.

19 See the original speech [here](#), and the parodies [here](#).

monthly fee; for ISPs it increases the revenues of data consumption. Despite trying to find solutions to manage the high traffic in peak periods, when consumption puts pressure on the infrastructure (as evidenced in the recent Netflix/Comcast controversy²⁰), both business models are based on an ever-increasing volume of consumption at the receiving end. Perhaps this was what Senator Stevens meant with his tube metaphor? Even the Federal Communications Commission, the regulatory body of telecommunications in the United States, voted to classify the internet as a 'public utility' to ensure net neutrality in February 2015. As a response to this vote, US-based telecommunication giant Verizon released a statement in **Morse code** to underline how the representation of the internet as a public utility was an outdated economic model for new media.²¹ If the press release was meant to be cynical, it nevertheless evoked the way models established by telegraphy still linger behind digital infrastructures.

Senator Stevens' maladroit explanation of the internet as tubes is telling about the divergence between the different modes of representation (technological, phenomenological, cultural, and economical) that make up the experience of digital technologies. Whereas most users see and experience the internet as an immaterial medium and thus, are prone to mock anyone who imagines it as having any sort of material embodiment, the senator was at least providing an image that assumed a physical infrastructure for digital networks. Some years later, perhaps as a consolation for the senator, American journalist Andrew Blum took the claim seriously in his book *Tubes: A Journey to the Center of the Internet*²² that precisely attempted to uncover the web's physicality.

6 The Streaming Illusion

The persistence of hydrospheric metaphors as one of the recurring topoi in media studies is most manifest in the popularity of the expression 'streaming.' Streaming is everywhere in digital culture today, and seems to be the central feature of the future of television. In the words of Wolfgang Ernst, however, "in the presence of discrete data, streaming is a metaphorical disguise."²³ He adds, "decisive for digital TV is not the different resolution of the image but merely the fact that the transmission is not one of analog electrical streams but of precisely coded *bits*."²⁴ Indeed, a stream suggests continuous and uninterrupted flow, while the infrastructure of digital communication relies on the transfer of data that has been fragmented and is modular. It was exactly this distinction that prompted William James in *Principles of Psychology* to choose the 'stream' metaphor to describe the experience of subjective reality more than a century ago:

consciousness, then, does not appear to itself as chopped up in bits ... it is nothing joined; it flows. A "river" or a "stream" are the metaphors by which it is most naturally described. In talking of it hereafter, let's call it the stream of thought, consciousness, or subjective life.²⁵

James' use of the term 'bits' as a counter-example to the 'stream' is relevant here, for this is precisely what is at stake in the paradox of online streaming. Analogue television was a true flow, technologically speaking, because it involved transmitting signals of various lengths through the wavelike electromagnetic spectrum. Signal transmission was literally continuous; the signal completely filled up the channel and the order of the data encoded, transmitted, and decoded remained the same. In the case of digital television, the code of the data no longer bears an analogical relationship with its referent and its transport within the digital network is not necessarily contiguous (this was the fundamental innovation of packet switching made by Paul Baran in the 1960s).²⁶ As long as a protocol reassembles

20 See Klint Finley, 'Why the Comcast-Netflix Pact Threatens Our Internet Future,' *Wired*, February 24 2014.

21 Washington Post, 'The FCC approves strong net neutrality rules,' 26 February 2015.

22 Andrew Blum, *Tubes: A Journey to the Center of the Internet*, Ecco, 2014.

23 Wolfgang Ernst, 'Media Archaeography. Method and Machine Versus History and Narrative of Media,' in Erkki Huhtamo and Jussi Parikka, eds, *Media Archaeology: Approaches, Applications, and Implications*, University of California Press, 2011, p. 246.

24 Ibid., p. 109.

25 William James, *The Principles of Psychology*, H. Holt, 1890, p. 239.

26 On Paul Baran's contribution to digital technology and especially for transfer protocols, see Alexander Galloway, 'Protocol,' *Theory Culture Society*, 23, 2006, p. 318.

the content in the correct order on the receiving end, the paths taken by each of the discrete elements of a message can be different.

7 Streams

Wired telegraphy has often been compared with the internet (or vice versa) because both package data discretely. The telegraph system does share several features with the internet: both are text-based and both rely on a binary numerical code requiring a networked, wired infrastructure of transmission.²⁷ As such, the image of conduits transporting and restricting a liquid-like flow could be adequate for both media forms. However, the messages travelling from one telegraph office to another, even fragmented and made discrete by Morse code, were sent in a contiguous manner that respected the order of the sentence. It was generally sent as a whole, if not interrupted, like the particles that make up a stream. In its article on hydromechanics, the 1881 *Encyclopedia Britannica* states that streams

are moving masses of indefinite length, completely or incompletely bounded laterally by solid boundaries. When the solid boundaries are complete, the flow is said to take place in a pipe. When the solid boundary is incomplete and leaves the upper surface of the fluid free, it is termed a stream bed or channel or canal.²⁸

In accordance with this definition, the discrete, encoded streams of telegraphic data had to be sent as a contiguous whole (one that forms at least an acronym, a word, or a full sentence) to be meaningful. The encoding of the signals respected the ordering of the original source (written or oral). It still had an analogical relationship with its referent. The 'stream' metaphor is as much relevant for transmissions in insulation (the telegraphic signal and its conductor/insulator couple) as it is for transmissions through open space (like the physical limits of the electromagnetic spectrum's frequency), but only for *continuous* transmission.

How, then, did we come to use the term 'streaming' for digital television? Part of the answer might be that users experience digital television (almost) as they do analogue television. The re-ordering of the discrete elements of the audiovisual content by protocols is essentially seamless on the screen. Users do not experience the modularity of web content or the numerical nature of online radio and television; they experience it exactly as they do analogue media. Unlike broadcasting, however, where networks could only monitor individual consumption through statistical approximation,²⁹ streaming minutely tracks the volume of data consumed by the users. In this economic sense, then, streaming remediates the telegraph system and the monitoring of the volume of the stream of messages. Telegraph offices had an economic incentive to make efficient use of the 'wires' so that the channel was constantly filled. The introduction of a deferred service by telegraph offices in the 1910s, for instance, embodied this imperative: called the 'night letters' service, it was a cheaper option for sending messages that made use of the infrastructure in times of lower demand. A Western Union spokesperson noted how the company hoped that this service would increase the volume of messages sent by 15%.³⁰ Television streaming seeks a similar optimal utilization of the network. As Ernst puts it, "cyberspace is based on the assumption that unused space is economically wasteful."³¹ Unlike the ether that was a limited resource, the wires and optic fibre making up the internet can proliferate at will.

27 See Katherine Stubbs, 'Telegraphy's Corporeal Fictions,' in Lisa Gitelman and Geoffrey B. Pingree, eds, *New Media 1740-1915*, MIT Press, 2003, 91-111.

28 T.S. Baynes, ed, *The Encyclopaedia Britannica: A Dictionary of Arts, Sciences, and General Literature*, C. Scribner's Sons, 1881, p. 561.

29 See Jérôme Bourdon and Cécile Méadel, eds., *Television Audiences Across the World: Deconstructing the Ratings Machine*, Palgrave MacMillan, 2014.

30 'Restrictions on Telegrams Is Taken Off. Use of Code in Night and Day Letters Is Permitted,' *Piqua Daily Call and Piqua Press Dispatch*, 22 March 1927, p. 9.

31 Ernst, 2013, p. 139.

8 The New Mainstream

The metaphor of streaming hides the remediation of past forms of control and monitoring in mass media. In triumphalist (and marketing) discourses, streaming is portrayed to viewers not only as radically new, but also empowering. Users are depicted as having gained more freedom by migrating their televisual consumption from small screens to tablets and smart television sets. As Netflix and its competitors boast over and over again, everyone can now watch anytime and **anywhere they want**. Isn't this the interactivity we have been waiting for, enabling us to catch up on television shows when we decide to, exiting the patronage of the programmed flow? Weren't YouTubers the 'broadcasters of tomorrow'?³² And weren't prosumers creating new markets and disrupting older ones, and websites promising deeper interactivity? All of these narratives about participatory culture and transmission from the ground up were framed as a general counter-narrative to the passivity of mainstream media audiences. The conceptual models attached to these new digital media were also hydrospheric ones: surfing, exploring and navigating. These were all user-centred representations about what it meant to find, collect and produce online content. The act of channel surfing, or browsing with no intended endpoint, was at the heart of the more 'fluid' experience of the internet.

Despite such an auspicious beginning, streaming does not follow the principles of the positive fluidity in digital networks. On the contrary, streaming marks the return of mainstreaming in digital media. It indicates the persistence of mass media culture in the internet age. The big players in digital television rely heavily on privately run, centralized platforms (apps are the best example) to distribute online content. On-demand internet streaming providers such as Netflix now make up a growing portion of internet traffic: not only do these closed systems populate our interfaces (smartphones and tablets) but they have also migrated now to smart television screens. This turn towards proprietary, locked-in environments formed the heart of a debate in 2010 about the death of 'the web' between Chris Anderson and Michael Wolff published in *Wired*.³³ Both argued that the web was entering a 'post-HTML' phase as it moved towards 'semi-closed platforms' (and this was just a few months after the initial release of the iPad). These semi-closed platforms have since dominated access to online content and shaped the practice of online music listening and television watching.

The early principles of internet culture were constructed around an alternative to the ephemerality of broadcasting. The internet was an archive, a memory medium. Peer-to-peer sharing systems allowed for the circulation of content in a way that involved downloading and storing. Unlike the experience of analogue television, which required physical presence, the sharing of electronic files afforded users greater control over content. Engaging with online content was not just about reception, it was also about production, reproduction, transmission, coding and decoding and in some cases re-appropriation through modification, adaptation or alteration. Streaming suppresses the inscription function of digital media and enhances it, for the most part, as transmission media. As Ernst explains, technically, streaming still implies reproduction for a short moment of time on your hard disk: "It's very ephemeral, it's the most ephemeral archive or short time memory, but technically, it is still a copy."³⁴ This technological detail, he relates, even sparked a debate in Germany over copyright: did streaming need to be subjected to copyright laws? Users, despite these micro-copies, cannot retrieve them on their devices. When we choose to 'stream' rather than download, we restrain the scope of internet usage to that of reception. And from the viewer's perspective there is little difference between watching traditional television and digital television. It is, as Ernst puts it, "a secondary liveness."³⁵

Even if initiated 'on demand,' the moment of reception requires a constant connection with the provider of the feed. Like the flow of traditional television described by Williams, the viewer's presence is needed. The common experience of buffering increases the perception of this connection's vulnerability: there is a latent anxiety of sorts (the same that accompanied radio and television broadcasting) that the connection might be lost and the signal transmission might cease. Internet users have not integrated, culturally, the technological distinction between buffering and channel noise, and as a result tend to experience fluid streaming almost as a stroke of luck. The potentiality of disconnection (which

32 The expression is Burgess and Green's, see Jean Burgess and Joshua Green, 'The Entrepreneurial Vlogger,' in Pelle Snickars and Patrick Vonderau, eds, *The YouTube Reader*, National Library of Sweden, 2009, 89–107.

33 Chris Anderson and Michael Wolff, 'The Web Is Dead. Long Live the Internet,' *Wired*, 17 August 2010, http://www.wired.com/2010/08/ff_webrip/all/, accessed June 8, 2015.

34 Ghislain Thibault, 'What We Used to Call "Media History"'. A Feature Interview with Wolfgang Ernst', *Amodern*, 2015.

35 Ibid.

was not possible when the experience of digital content relied on downloads) governs our habits of reception: we limit channel surfing, foraging, pausing and forwarding, unconsciously convinced that the system will be more stable if left untouched. The result of this latent anxiety is, once again, the return of the cultural experience of the programmed flow and mainstreaming of analogue television: a form of capture by a few selected channels.

Speaking of digital media, flows and attention, danah boyd noted in 2009 this pressure from the industry to go right back to the models of mass media: “the business folks are all trying to turn the Internet into a new broadcast channel.”³⁶ She ended on an enthusiastic note with the statement, “don’t worry, they’re failing.” Perhaps what boyd should have feared most was not the ‘business folks,’ but the ‘normal folks’ like you and I, who collectively demand more and more traditional media content on our devices. According to Sandvine’s biannual *Global Internet Phenomena Report*, Netflix made up 35% of all peak period internet traffic in the United States in 2014 (while YouTube, the star of participatory culture, continued to fall down to 14%).³⁷ Netflix expects to reach 61.4 million subscribers in 2015.³⁸

9 Conclusion

The fluidity of digital media is thus an ambiguous figure of speech. Digital television remediates older features of mass media (economical, cultural and technological) and these remediations are masked by discursive pretences to novelty. As I have shown, using their initial analogical relationship with the technological reality of media, the aqueous images of media have slowly drifted to become metaphors for media theories and social usages. As a result, users know less and less, through the standard metaphors, about technological details. The range of their potential engagement with the media (on this technological level) is increasingly limited, as digital technologies are more and more black-boxed, a phenomenon to which digital streaming apps contribute.

The fluidity of digital networks, then, should not be viewed as a quantitative leap of interactivity, or worse, transparency. As Alexander Galloway argues, the strength of these networks is their capacity to regulate and render invisible the mechanisms of this regulation.

So the assumption ... that networks have the potential to dehierarchize, disrupt and generally dissolve rigid structures of all varieties, must be resolutely resisted. It is not the case that networks produce a general waning of organization and control. In fact, it is the opposite: distributed networks produce an entirely new system of organization and control that, while perhaps incompatible with pyramidal systems of power, is nevertheless just as effective at keeping things in line. This new system of organization and control, protocol, is adept at regulating flows, coding objects, and sculpting life forms.³⁹

The regulation and monitoring of flows is key to understanding what streaming hides behind its enthusiastic discourse about renewed freedom for television audiences. The heart of the economic model of analogue television – audience measurements – was always an approximate venture. The discrete nature of digital information allows for greater individual monitoring and customization, the domain of what Greg Elmer calls ‘profiling machines.’⁴⁰ With the rise of the internet, a dream came true for the television industry: the convergence of computing capacities with television brings together the monitoring and regulating of the telegraphic streams, the mainstreaming and channelling of television, and a programmed flow that can be algorithmically customized for each viewer.

The fluidity of streaming is thus a locked-in one, and it’s not only digital television that reinforces this sudden limitation of functionality for users. We have seen a general migration of computers from storage machines to simple receivers, with

36 danah boyd, ‘**Streams of Content, Limited Attention: The Flow of Information through Social Media.**’ Paper presented at the *Web2.0 Expo*. New York, 17 November 2009.

37 Tod Spangler, ‘**Netflix Remains King of Bandwidth Usage, While YouTube Declines,**’ *Variety*, 14 May 2014; and Todd Spangler, ‘**Netflix Streaming Eats Up 35% of Downstream Internet Traffic: Study,**’ *Variety*, 20 November 2014.

38 Netflix, ‘**Letter to shareholders,**’ 20 January 2015.

39 Galloway, 2006, p. 318.

40 Greg Elmer, *Profiling Machines: Mapping the Personal Information Economy*, MIT Press, 2003.

a definitive move towards cloud computing. This was the lesson users should have learned from radio amateurs in the 1920s: to preserve, at all costs, the bi-directionality of our channels. The new generations of digital media allow for less and less tinkering and storing, remediating the highly centralized transmission model of broadcasting. Online streaming challenges the very values that made up the internet: interactivity, appropriation and production. In the process, the return and persistence of fluid vocabulary in digital culture reproduces the ambiguities concerning what metaphors, in fact, aim to perform, between an analogical relationship with technological reality, or as an individual and social experience of media. Before embracing the discourses of novelty for streaming, let us reconsider carefully what the metaphor conceals as well as what it reveals.

Biography

Ghislain Thibault is Assistant Professor in the Department of Communication at Université de Montréal. His current research project explores the conceptual and material relationships between machines and media in mid twentieth-century theories. His recent work in media archaeology and media theory has appeared in journals such as *Configurations*, *Canadian Literature*, *Amodern* and *Intermédiatités*.