

The Delayed  
Present:  
Media-Induced  
Tempor(e)alities &  
Techno-traumatic  
Irritations of “the  
Contemporary”

Wolfgang Ernst

## IRRITATIONS OF THE PRESENT (INTRODUCTORY REMARKS)

Contemporary media culture, on the level of its technological operativity, experiences an implosion of the phenomenological sense of the present into a myriad of differential timing processes. In current humanities and cultural discourse, a couple of terms referring to time-procedures are borrowed from electro-engineering and computing science; there they are not just used as philosophical metaphors. Technical expressions for processual, dynamic events in signal transduction and processing such as “delay line” or “real time” replace the general concept of the “present” with more precise descriptions of technical tempor(e)alities. The Asynchronous Transfer Mode (ATM) allows for a different timing of Internet data traffic, but is a highly orchestrated time-critical calculation of information units transfer — which makes it much less tolerant than the liberal co-existence of different times in cultural and aesthetic discourse.<sup>1</sup> As indicated by current avant-garde topics like “the postcontemporary,”<sup>2</sup> new chronopoetical practices not only emerge on a microtechnical level but increasingly spread into everyday practices of the techno-logical regime.

The symbolic ordering of time into past, present and future is ever more compressed into one dense time-window of the extended present. In that sense, the current condition is literally con-temporary, an interlacing of temporalizing gestures: on the one hand, there is an instant *archiving the present* in digital data processing, while on the other hand

1. See Paul Dourish, “Protocols, Packets, and Proximity: The Materiality of Internet Routing,” in *Signal Traffic: Critical Studies of Media Infrastructures*, ed. Lisa Parks and Nicole Starosielski (Urbana: University of Illinois Press, 2015), 183–204. On the latencies, delays and the “aesthetics of lag” in time-sensitive applications like

streaming video transmission, see Nicole Starosielski, “Fixed Flow: Undersea Cables as Media Infrastructure,” in *Signal Traffic*, ed. Parks and Starosielski, 53–70 (esp. 60).

2. Armen Avanessian and Suhail Malik, eds., *Der Zeitkomplex: Postcontemporary* (Berlin: Merve Verlag, 2016).

the past is immediately coupled with the actual present in online communication: *re-presencing the archive*. Even the immanent future is already pre-calculated in real-time: *futurum exactum*. The grammar of language allows the expression of this shift. The past is not “imperfect” any more, but becomes “historical perfect,” residually enduring within the present.<sup>3</sup> The future is not simply what is to come, but can be preemptively anticipated, a “future-in-the-past” (*futurum exactum*). In communication engineering, such temporal forms can be formulated in terms of the chrono-technical channel, as the *delayed present*.

3. The “residual” is still active, “not at all as an element of the past, but as an effective element of the present.” Raymond Williams, *Marxism and Literature* (New York: Oxford University Press, 1977), 122. See also Shannon Mattern, “Deep Time of Media Infrastructure,” in *Signal Traffic*, eds., Parks and Starosielski, 71–93.

## I. TEMPORALIZING THE PRESENT (DIFFERENTIAL DELAY)

There is an increasing unease with the traditional notion of coherent time. Since delicate measuring technologies like Hipp’s chronoscope in the nineteenth century allowed for the registering of micro-temporal signals within the human nervous system by machines, the telescopic time lens has been replaced by the microscopic one. Temporalizing the present takes place on different levels, ranging from real signal processing within humans and machines, across the symbolic order of alphabetic writing (the “archive”), and finally in the imaginary (historical discourse). The media archaeological approach primarily identifies technological chronopoetics and only in a second step correlates it with phenomenological time perception within humans. In technologies, there is no present at all—rather differential tempor(e)alities.

Technologically induced timing suspends the traditional categories of temporal order extending between past, present and future, in favor of ecstatic temporality. The shift of focus from historical and cultural time to micro-temporalities culminates in the electric spark itself, the lightning of electric technologies. When William Thomson derived his mathematical equations in “On Transient Electric Currents” (1853), it was still unclear if the nature of the electric spark, which happens when short-circuiting a condenser, is a momentary, punctual “now.” Berend Wilhelm Feddersen in the mid-nineteenth century invented a laboratory mechanism to delay and register this electric moment: reflecting the spark in a revolving, photo-sensitive mirror whose speed was synchronized with the spark itself.<sup>4</sup>

4. See Martin Henke, “Das Innere des elektrischen Funkens: Über den Nachweis von elektrischen Schwingungen durch Wilhelm Berend Feddersen,” in

*Instrument — Experiment: Historische Studien*, ed. Christoph Meinel (Berlin: Diepholz, 2000), 369–375.

What had been a proverbial equivalent to the “present now” so far, the electric spark, turned out to be a high-frequency oscillation, causing electro-magnetic waves as implicit “radio.” The apparent “now” is not punctual anymore but dynamic. A century later, digital “real time computing” started to replace the analog oscillations with computational procedures.

But here a semantic *lag* opens; humans and machines radically differ in their chronopoetics. Different from media art and the phenomenological perspective with its focus on the human embodiment of algo-rhythmic effects,<sup>5</sup> media archaeological analysis concentrates on the time-critical procedures unfolding within technical collectives themselves. It is in this media theater that times-as-events actually happen. While humans still continue to express their inner time consciousness in terms of past, present and future (respectively “just,” “now,” “soon”) — a vocabulary which derives from a narrative ordering of time — high frequency media actually operate in different temporal modes which dominate our contemporary condition, resulting in techno-traumatic incidents like the “flash crash” in algorithmicized financial trading.<sup>6</sup> The focus of time-critical media archaeology is on such micro- or supra-contemporary events unfolding within technology, where the temporal *momentum* is decisive (“critical” in the ancient Greek sense) for signal events and electronic communication to succeed at all. Human physiology and neuronal cognition are affected by such signal processing and signal transmitting technologies. In subliminal perception, there are tempo-real traumata which do not stem from individual or social interaction but are induced by the media shock of technological timings itself.

5. See Eleni Ikonidou, *The Rhythmic Event* (Cambridge, MA: MIT Press, 2014).

6. See Ralph and Stefan Heidenreich, “Verkaufte Zukunft,” in *Absolute Gegenwart*, ed. Marcus Quent (Berlin: Merve Verlag, 2016) 113–121 (118 f).

### The Reverberating Present: “Echo”

In early digital computing, Mercury Delay Lines served as a central electro-physical unit for short-time data storage by letting “words” of electric bit strings be transduced into ultra-sound pulses to circulate and be refreshed.<sup>7</sup> The delayed present, which is experienced by speech in room acoustics, has been micro-technologically mirrored — with no more human ears to listen, and no more neuronal brain to phenomenologically register such presence. Such functional acoustics anticipate Alvin Lucier’s famous magnetic tape-looped voice installation *I Am Sitting in a Room* (1969) in which he recorded his own speech and repeatedly played the recording back into the space where it was recorded. While “echo” results from a single acoustic event, reverberation is continuous sonic oscillation.<sup>8</sup> In architectural acoustics, reverberation time is the temporal interval required for a reverberant sound in a room to decrease into inaudibility. Alan Turing literally experimented with reverberative acoustic signals, captured by a microphone and emitted via loudspeaker, in a closed room as a basic principle for impulse delay lines in digital computation, re-generating the signal with an amplifier as known from electronic music.<sup>9</sup>

There is actually no present moment in sound perception, since there is no punctual acoustic signal but always successive oscillations and therefore already a delayed present, a  $\Delta-t$  which is the physical expression for a parametric interval. Not only does it take “retention” and “protention” for humans to identify the temporal shape of a musical melody (as emphasized by Edmund Husserl and Henri Bergson); in late medieval times Nicole Oresme already sharply argued in his scholastic

7. See T. Kite Sharpless, “Mercury Delay Lines as a Memory Unit,” in *Proceedings of a Symposium on Large-Scale Digital Calculating Machinery* (Cambridge, MA: Harvard University Press, 1948), 103–109.

Is Fired Unheard: Sigmund Exner and the Physiology of Reverberation,” in *Grey Room* 60 (Summer 2015): 66–81.

9. See chapter 6, Andrew Hodges, *Alan Turing: The Enigma* (London: Burnett Books, 1983).

8. On the notion of “auditory after-images,” see Viktoria Tkaczyk, “The Shot

*Quaestiones de anima: If an animal did not have short-term-memory and could only sense the present (si esset aliquod animal quod nullo haberet retentivam et non sentiret nisi in praesentio [sic]), it could not perceive any sound, since the sonus itself is always already "in motion" (a res successiva) which requires derivation from the immediate past (recolere de praeterito).*<sup>10</sup> Therefore a short-time memory is required to identify a present sound, just like the uncertainty equation in sound analysis: A temporal extension is required to derive its frequency, and therefore its momentary position can never be exactly defined.

Retention in tonal perception is the time-critical condition for experiencing a succession of acoustic signals as melody, which extends beyond the present "now;" neuroscience significantly names it "echoic memory." Sonic perception, different from time-discrete "punctual" typographic reading, is always a delayed present by nature. This  $\Delta-t$  marks the epistemic transformation from the *present* to *presence*. What Joseph Fourier and Hermann von Helmholtz have analyzed as time/frequency uncertainty of the acoustic "contemporary," Husserl describes phenomenologically. But finally, "retention" has become a term in the engineering of electronic memory, such as the Williams/Kilburn Cathode Ray Tube random-access-memory in early computing: "The retention of a stored charge pattern for a period of time [...]"<sup>11</sup> The delayed present does not exclusively take place within human cognition anymore but has also entered into non-human technological existence.

The voice is literally the logo-centrist scene of human self-experience of presence. In room acoustics, the amplification of vocal expression leads to a spatio-temporalization of the

10. Quoted in the chapter "Lebt unser Bewusstsein in der Vergangenheit?," in Ulrich Taschow, *Nicole Oresme und der Frühling der Moderne*, vol. 2 (Halle: Avox, 2003), 673.

11. Max Knoll and Benjamin Kazan, *Storage Tubes and Their Basic Principles* (London: Chapman & Hall, 1952), 20.

present moment. While acoustic reverberation is still perceived as "augmented presence" in human cognition, its extension to echo triggers notions of the immediate past. Resulting from a reflection on solid matter, the echo reminds us that the air acts as a channel of oral communication. Where does "liveness" stop and "delayspace"<sup>12</sup> start? Compared to the "radio" transmission of signals by electro-magnetic waves close to the speed of light, the acoustic crossing of distance in air is so slow (around 330 meters per second) that it already constitutes a short-time "echoic" memory of the present.

While the use of echo and reverb in ancient theater acoustics has been an active cultural technique for amplifying the actor's voice for aesthetic reasons, its functional application in technology escapes human perception altogether. In Active Sound Navigation and Ranging (SONAR), ultra-sonic pulses, generated by piezo-electric transducers (quartz crystal slices which vibrate when subject to alternating current), calculate spatial distance by the very temporal delay—"electrical echoes," first developed in 1938 by William S. Percival at Electric and Musical Industries Ltd. (EMI) in England.<sup>13</sup> Today, the software Sonar Power Manager allows for a personal notebook to check the user's presence, and respectively absence, to trigger the energy-saving mode.<sup>14</sup> Such user presence detection is based on the time-delayed acoustic signal ( $\Delta-t$ ) itself. The present becomes a function of media-active time signal processing.

In the late nineteenth century, Auguste Villiers de l'Isle-Adam called Thomas Alva Edison "l'homme qui a fait prisonnier

12. See Marcus Bastos' media theater performance *delayscapes* (2014); <http://www.eventualidades.net/delayscapes> (accessed February 22, 2017).

13. David Link, "There Must Be an Angel: On the Beginnings of the Arithmetics of Rays," in *Variatology 2: On Deep Time Relations of Arts, Sciences and Technologies*, ed. Siegfried Zielinski and David Link

(Cologne: Walther König, 2006), 15–42 (esp. 28).

14. See Stephen P. Tarzia et al., *Sonar-Based Measurement of User Presence and Attention* (2009); <https://stevetarzia.com/sonar> (accessed February 22, 2017).

l'écho."<sup>15</sup> But in fact the Edison phonograph did not arise from the desire for a memory medium; rather it unintentionally resulted from Edison's experiments in speeding up transmission of telegraphic signals, recording the Morse code dots and dashes on an intermediary storage device (the embossed telegraph with rotating discs)<sup>16</sup> for an accelerated transmission in the condensed present.

Echo as a reversal of the relation between actual being and the time arrow is an archaic form of the delayed present, a first time-critical metaphor, "a temporal order prior to existence as such."<sup>17</sup> The acousmatic voice from its beginnings<sup>18</sup> has contained both spatial and temporal qualities of the delayed present. But this anthropocentric situation escalates when the scenery shifts into the operative media theater. An analog magnetic tape delay (familiar from electro-acoustic studio production) is still echo manipulation,<sup>19</sup> but in real-time calculation the passive auditory experience of echo becomes media-active as "time-reversed acoustics."<sup>20</sup>

In 1897, Wallace Sabine developed an equation to calculate the acoustic reverberation time of a closed architectural space arithmetically. For testing the ultimate present moment in electronics, there is an even more radical class of the temporal *in-between*: the Dirac-impulse as momentary interruption, approaching the ideal time of the "real." Once acoustic space has been analyzed mathematically, it can be

15. Auguste Villiers de l'Isle-Adam, in his novel *L'Ève future*, published in 1886 (Lausanne: L'Age d'Homme, 1979), 31.

16. "A repeater that would store words without the labor of the human hand," as quoted in John Durham Peters, "Helmholtz, Edison, and Sound History," in *Memory Bytes: History, Technology, and Digital Culture*, ed. Lauren Rabinovitz and Abraham Geil (Durham, NC: Duke University Press, 2004), 177–198 (esp. 188).

17. E-mail communication with Amit Pinchevski (Hebrew University, Jerusalem), April 20, 2013.

18. See Michel Chion, *Audio-Vision: Sound on Screen* (New York: Columbia University Press, 1990).

19. For an audio-visual demonstration of the Wem Copicat Solid State Tape Echo, see <https://www.youtube.com/watch?v=FtL0efmtFSk> (accessed December 1, 2016).

20. See Mathias Fink, "Time-Reversed Acoustics," in *Scientific American* 281 (November 1999): 91–97.

technically synthesized, even simulated for time-shifting: By software-based audification, humans can hear voices even from a room in the past.<sup>21</sup>

The ways of dealing with the delayed present (the Delta-*t* interval) divides between analog and digital media. Analog media are manipulating image and sound signals; even storage is rather a kind of echo held back. Symbolic mathematical procedures, far from being passive or simply modulating media, can become echo-active themselves. Echo physics is *not* the acoustic equivalent to delayed e-mail communication, which is rather asynchronous. The "delayed present" splits into two tempor(e)alities: the linear time shift and the pulsed, "coded" sequence. Even in human signal perception, "the representation of sounds stored in echoic memory is believed to be analog, whereas many representations of sounds processed through long-term memory are encoded."<sup>22</sup> Today, the most obvious effect of digitization in audio-visual memory is its becoming "online" *via* the Internet. Such immediate accessibility leads to de-archivization and re-ligation of memory to the present. Digitally-sampled human voices and video recordings result in an ongoing irritation of the present, since the actually perceived evidence is always re-generated in the "now," even if it comes from storage (*alias* "the past").

As a zone of uncertainty between the delayed present and the immediate past, acoustic echo is located between transmission and recording in air, a prolongation of the actual present which temporally mirrors the notion of a pure, non-differential *now*, as a different temporality within the present itself. The delayed presence of the voice has triggered a

21. See Stefan Weinzierl, Paolo Sanvito, Frank Schultz and Clemens Büttner, "The Acoustics of Renaissance Theatres in Italy," in *Acta Acustica united with Acustica*, vol. 101, no. 3 (June 2015): 632–641.

22. Robert Snyder, *Music and Memory: An Introduction* (Cambridge, MA: MIT Press, 2001), see glossary entry "analog."



number of cultural reflections; this escalated in electronic devices like the acceleration of tape speed (the Mickey Mouse effect) and the distinct effect of Elvis Presley's studio voice in Sam Phillips' Sun Records studio, which is a function of magnetophonic slapback delay,<sup>23</sup> irritating the singer's presence from within his present articulation. In Ovid's poem *Metamorphoses*, the echo of Narcissus' words is not his own voice but the vocal return by a nymph.<sup>24</sup> What has been a cultural imaginary so far, is fundamentally re-negotiated in technological terms today which not only *displaces* but actually *replaces* the former phantasmagoric epistemology.<sup>25</sup> By digital signal processing, the harmonizer for pitch shifting *transposes* male voices into female ones in real-time indeed, by computationally recalculating the frequencies. Karlheinz Stockhausen started his micro-tonal compositions by phase-shifting of electric signals in the sonic "time field."<sup>26</sup>

### The Techno-traumatical Contemporary: Electronical Distortion and "Re-presencing" of the Distant Present

Electronic tele-presence transforms the con-temporary into rigid signal synchronization. In terms of engineering, the electric *resonant circuit* enables radio communication, and only time-critical, exact synchronization of "live" television signal transmission and reception creates the impression of a steady image for the human eye. Only in the cosmic

23. See Trevor Cox, *The Sound Book: The Science of the Sonic Wonders of the World* (New York: W. W. Norton & Company, 2014), 124.

24. See Christoph Borbach, "Siren Songs and Echo's Response: Towards a Media Theory of the Voice in the Light of Speech Synthesis," in *On Culture: The Open Journal for the Study of Culture 2* (November 2016); <http://geb.uni-giessen.de/geb/volltexte/2016/12354> (accessed December 2016). Borbach's forthcoming

dissertation at University of Siegen is entitled *Time Channels/Channel Times: A Media History of Delta-t*.

25. See Mladen Dolar, *A Voice and Nothing More* (Cambridge, MA: MIT Press, 2006).

26. Karlheinz Stockhausen, "... wie die Zeit vergeht ...," in *Die Reihe: Information über serielle Musik*, no. 3 (1957): 13–42.

dimension, electro-magnetic signal delay becomes visible in the distortion of *moving* targets like astronauts in Slow Scan Television transmission.

Whereas the *aura*, as defined by Walter Benjamin, of a material work of art depends on its being uniquely "here and now," operative technology is *tempaural*; specifically its sonic articulations culminate in the archetype of a displaced present. The electrified voice, in its media-temporality, can be uncanny, when signal-based telepresence unfolds between the spatio-temporal distant and the present. The media-specificity of radio-aurality became transparent in a case of "broken presence": the Christmas *Ringsendung* broadcast from war front by German national radio, which sounded absent even in the present moment of reception. The electrified voices<sup>27</sup> of distant soldiers do not simply refer to the bodily voice source but indexically embody the transmission technology itself. The recording of the radiophonic Christmas-greetings from several locations at the war front, broadcast (oxymoronically) "live on tape" by the German Großdeutscher Rundfunk on December 24, 1942,<sup>28</sup> is a case of traumatically distorted forms of sonic articulation.

When Claude Shannon developed his techno-mathematical communication theory in the Bell Laboratories during World War II, he was confronted with transmission problems in telegraph and telephone lines; communication in the *presence* of noise was always contemporary to the intended signal and a co-expression of the transmitting technology itself. Signal

27. See Dmitri Zakharine and Nils Meise, ed. *Electrified Voices* (Konstanz: V&R Unipress, 2012).

28. "Weihnachtssendung des Großdeutschen Rundfunks von allen Fronten vom 24. Dezember 1942," available on compact disc (with academic booklet), *Dokumentation Obersalzberg. Tandokumente: Täter – Gegner – Opfer*, ed. Albert A. Feiber and Volker Dahm

(München/Berlin: Institut für Zeitgeschichte, 2003), track 17. See Dominik Schrage, "'Singt alle mit uns gemeinsam in dieser Minute': Sound als Politik in der Weihnachtsringsendung 1942," in *Politiken der Medien*, ed. Daniel Gethmann and Markus Stauff (Zurich: diaphanes, 2005), 267–285.

distortions and noise serve as an index of authenticity for a radio live transmission across long distances; the auditory short-cut between soldiers at the war front and their families at home took place in the radio-sphere. While this was meant to have a comforting effect of synchronicity between relatives, sensation at home was at the same time irritated by the technical reminder of a spatial gap. The shock of absence was incorporated within the apparent temporal immediacy. The present blurs into presence. Noisy presence in sound had been an essential feature of phonographic recordings already.<sup>29</sup> The Freudian “It” expresses itself as a media-induced *momentum*. Since there is a bandwidth limit in technical signal transmission (be it “live” or pre-recorded for an anticipated present), the spectral distortions and filters result in an affect of distance. Such a present is already distanced to itself, while at the same time, in the case of the *Ringsendung*, letting the singing of *Stille Nacht* shine through, as a most intimate cultural signifier of the German soul.

Whereas audio engineers usually lament about such distortions, which stem from radiophonic interference, in media archaeological perspective it is exactly such “noise,” which reminds and insists that voice transmission across distances is by no means within the present anymore but within the electro-magnetic field. Radio waves, which unfold their invisible empire more powerfully than ever in today’s wireless LANs, represent a “spectral” presence in a precise and metaphorical sense. Electromagnetic waves as such are inaudible to human ears and visible only in the small spectrum perceived as “light”; the immateriality of voice transmission by radio waves makes it a ghostly presence.

Radio transmission results in signals from afar that still immediately touch the human sense of the present. While

29. Ferdinand Trendelenburg, *Klänge und Geräusche: Methoden und Ergebnisse der Klangforschung. Schallwahrnehmung,*

*grundlegende Fragen der Klangübertragung* (Berlin: Julius Springer, 1935), 51.

this applies to electronic communication media in general, “radio constitutes a distinctive configuration of presence-at-a-distance through the separation of body and voice and the reconstruction of a disembodied voice [...] the body cannot endure transmission, whereas the voice can.”<sup>30</sup> The split between a corporeal sound and its electroacoustic display results in what R. Murray Schafer called “schizophrenia,” a split sonic contemporaneity.<sup>31</sup> Such a traumatic present derives from technologically-induced shocks of sensation. In “acoustic space” (Marshall McLuhan<sup>32</sup>), a different tempor(e)ality reigns which allows for a rather synchronous and “symphonic” resonance between the past and the present, finding its technical correlation in the “resonant circuit” in electronics. The fact that even generations later the recording of an acoustic transmission of an event can still be “re-presented” (Vivian Sobchack), proves the impact of the acoustic “real” which irritates and micro-traumatically deconstructs the familiar, chrono-ontological dichotomy of historical distance *versus* the immediate present. The technical voice, in replay, does not communicate (and does not even know) the difference between the past and the present, between recording and transmission. For the human sense of the present, there is an impossibility of experiencing the past as historical in media signal time, resulting rather in a radical con-temporaneity of media times. “I can be touched, *presently*, by the recorded speech of someone who is dead. I can, *here and now*, be affected by a voice beyond the grave.”<sup>33</sup>

30. Amit Pinchevski and Tamar Liebes, “Severed Voices: Radio and the Mediation of Trauma in the Eichmann Trial,” in *Public Culture* 22:2 (2010): 265–291 (esp. 271).

31. Schizophrenia describes the splitting of an original sound and its electroacoustic reproduction: R. Murray Schafer, *The New Soundscape: A Handbook for the Modern Music Teacher* (Toronto: Bernadol Music Limited, 1969), 43–47.

32. See Edmund Carpenter and Marshall McLuhan, “Acoustic Space,” in *Explorations in Communication*, ed. Edmund Carpenter and Marshall McLuhan (Boston: Beacon, 1960).

33. Jacques Derrida, “Above All, No Journalism,” in *Religion and Media*, ed. Hent de Vries and Samuel Weber (Stanford, CA: Stanford University Press, 2001), 56–94 (esp. 71).



Delayed Present in the Visual Field:  
After-Images

The neuro-physiological transition between an extended buffering or caching of the present moment and its cognitive identification as “past” is measurable in milliseconds. This gap has become electro-technically calculable in so-called real-time, resulting in what Jacques Derrida calls the *plusquam presence* — such as the “live” transmission of images of the American bombing of Baghdad during the Iraq war in the 1990s by the TV channel CNN: “indissociable d’une nouvelle temporalité de la technique d’une autre rythme.”<sup>34</sup>

Phosphor “memorizes” light traces for some time; this temporal phenomenon is known from the conventional television tube as a condition for the impression of a coherent image. For the exhibition of “Rhythmogramme: das gestimmte Bild” at Galerie Petra Rietz, Berlin, April to July 2014, Benjamin Heidersberger applied a double-suspended pendulum with strong LED light to “draw” Lissajous figures on light-sensitive plates below. Such a fading away of literal *photo-graphy* evokes G. W. F. Hegel’s definition of the “tone” in its ephemeral existence, passing into the past. The present moment turns into a transitive event once it is conceived as a (communicational) time *signal*. To avoid a premature discussion of the augmented present in metaphysical terms, media archaeology turns attention to applied electro-acoustics. In medical ultrasound sonography, “echography” becomes an effective operation exactly because it cannot be affectively heard as a differential acoustic performance interacting with the human body. The resulting *imaging technique* is implicit sonicity.

In visual perception, such a *différance* leads to after-image effects such as optical traces in a dead man’s eye.<sup>35</sup> From

34. Jacques Derrida and Bernard Stiegler, *Échographies de la télévision: Entretiens filmés* (Paris: Galilée, 1996), 83.

35. See Arthur B. Evans, “Optograms and Fiction: Photo in a Dead Man’s Eye,”

*Science-Fiction Studies* vol. 20, no. 61 (November 1993): 341–361; <http://jv.gilead.org.il/evans/optogram.html> (accessed February 22, 2017).

the long tradition of apparatus-induced comparison between the *camera obscura* and the human eye necessarily arose the hypothesis that, just like Daguerre and Talbot were able to fix such *camera obscura* images photo-chemically, the human retina retains optical impressions as well. Such photo-chemical optograms were later electronically detected as “brain images.” But these residual present impressions, squeezed between the indented wheels of past and future, are not *archiving*; the after-image is rather delayed transfer.

Vintage video art has creatively experimented with the irritation of the visual sense of the present by electronic imagery.<sup>36</sup> In Dan Graham’s video installations *Time Delay Room* and *Present Continuous Past(s)* (both 1974), video cameras captured the movements of visitors and displayed them with a perceptible delay time on a monitor in an adjacent gallery room. The delay time corresponds with the limit of the human window of perceiving the present, interlacing his presence with the image of his immediate past: “On Monitor 1 a spectator from audience A can see himself only after an 8 second delay. While he views audience B (in the other room) on Monitor 2, this audience sees him live on the Monitor whose image can also be seen by audience A. [...] As 8 seconds have passed, the composition of the continuum which makes up audience B, has shifted as a function of time.”<sup>37</sup>

Re-presentation here becomes a function of electronic video tape delay. The technical theory of recording corresponds with this act of micro-storing the perceptual present. In a section of Nam June Paik’s scenario *Good Morning Mr. Orwell* (1984), Merce Cunningham has been dancing

36. See chapter 5 in Ina Blom, *The Autobiography of Video: The Life and Times of a Memory Technology* (Berlin: Sternberg Press, 2016).

37. Dan Graham, *Video – Architecture – Television*, ed. Benjamin H. D. Buchloh (Halifax: Nova Scotia College of Art and Design Press: 1979), 11.

with his own satellite-delayed image.<sup>38</sup> Correlating with such time-based media theater is the time-management of former “live” broadcast media. Time shifting has been applied in analog radio and television recording on the studio production side first, and by consumers later. Beyond artistic experimentation of the present, private home video has been “overwhelmingly used as a ‘time shift’ phenomenon, moving a particular broadcast programme to a point where it is convenient to watch it.”<sup>39</sup> When time-dilated monitoring of electronic imagery became technically possible, its temporal authenticity<sup>40</sup> got lost — not only as micro-temporal manipulations in subliminal perception, but on the cognitive conscious level as well, like the instant re-play of scenes recorded “live on tape” common in television broadcasting of sporting events. Unlike motion picture film, videotape does not require chemical development, and so may be monitored immediately. But this instantaneity always already involved a minimal signal delay. The Ampex editing table for two-inch tapes enabled cutting the electronic image sequence with respect to the co-recorded vertical synchronization impulse: “counting” and slicing the present. Later, the Ampex magnetic disc enabled image sequence replay up to 30 seconds and slow motion of crucial televisual moments. Once the present moment can be electronically delayed by temporary storage, it can be re-iterated as well.

38. Nam June Paik, *Good Morning Mr. Orwell* (1984), Medienkunstnetz. Accessed October 24, 2016. <http://www.medienkunstnetz.de/works/goog-morning/images/1/>.

39. John Ellis, *Visible Fictions: Cinema – Television – Video*, revised ed. (London: Routledge, 1992), 112.

40. As expressed by Thomas Y. Levin, “Rhetoric of the Temporal Index: Surveillant Narration and the Cinema of ‘Real Time,’” in *CTRL [Space]: Rhetorics of Surveillance from Bentham to Big Brother*, ed. Thomas Y. Levin, Ursula Frohne and Peter Weibel (Karlsruhe: ZKM Center for Art and Media, 2002), 578–593.

## II. DIGITAL CULTURE: A MICRO-ARCHIVAL PRESENT

### Media Archaeology of the Present

Media archaeological analysis starts with the present itself; in algorithmicized cultural practice, the present is immediately quantized, “sampled and held,” which is the electronic pre-condition for real-time digital signal processing. The audio-visual and textual present is being temporarily stored, or even archived, as soon as it happens — from Twitter messages and instant photography to sound recording. Even more dramatically undoing the traditional order of times, big data analytics algorithmically predicts the immanent future already as future-in-the-past (*futurum exactum*). Never has a culture been more dynamically “archival” than the present epoch. By chronotechnical immersion, media archaeology aims at co-analyzing such conditions as they happen — different from the traditional claim of historicist humanities that critical observation is possible only from a temporal distance (a time lag).

Different from analog “live” transmission, what changes with computational electronic media is the intervention of micro-storing procedures.<sup>41</sup> There is an ongoing sublime micro-archiving of the present moment in digital media; the “micro” does not only refer to the scale of integrated circuits, but to the ephemeral, transient temporality of operations with intermediary short-time storage of data for transmission and processing. The traditional, logocentric notion of the present as a punctual “now” is irritated by such temporal disruptions.<sup>42</sup>

41. See Wolfgang Ernst, “Temporary Storage,” in *AnArchive(s): Eine minimale Enzyklopädie zur Archäologie und Variantologie der Künste und Medien*, ed. Claudia Giannetti (Oldenburg: Edith-Russ-Haus für Medienkunst, 2014), 175 f.

42. See Wolfgang Ernst, “Temporalizing Presence and ‘Re-presencing’ the Past: The Techno-traumatic Affect,” in *Timing Affect*, ed. Marie-Luise Angerer and Michaela Ott (Zürich: diaphanes, 2014), 145–149.

Temporary electronic storage is quite the opposite of the non-rewritable storage medium of the printed text; this is apparent in the up-date frequency of entries in the *online* encyclopedia Wikipedia.

Digital communication is a system of well-defined discrete, logical and sequential micro-states called data processing. It is permanently *archiving* the present—but not in the precise sense of archival terminology. While the spatial archive “presents us with multiple durations simultaneously,”<sup>43</sup> the digital “archive” is essentially processual in terms of the Turing Machine. Epistemologically this is more dramatic than just the technological precision of Derrida’s neographism *différance*.<sup>44</sup> The “archive” itself transforms from its formerly almost frozen temporality into an immediate extension of the algorithmicized present. Contemporary time technologies therefore result in redefinitions of the archive. Electronic signal recording differs from previous archival records by its technical latency. The replay (like a musical performance) “does not represent anything anymore but pure presence,”<sup>45</sup> different from reading archival documents of the symbolically registered past which needs to be *decoded* in terms of historical context.

For media culture, the essential scene of re-presentation is the electro-magnetic field. Early analog television broadcasting just knew “live” transmission. Even when documentary film footage from the archives is displayed on the History Channel of BBC television, the temporal message of the medium is the radical present of *live* transmission with the speed of light, different from the rhythm of *online* immediacy in the World

43. Timothy Scott Barker, *Time and the Digital: Connecting Technology, Aesthetics, and a Process Philosophy of Time* (Hannover, NH: Dartmouth College Press, 2012), 181.

44. Jonathan Culler, *On Deconstruction: Theory and Criticism after Structuralism* (Ithaca, NY: Cornell University Press, 1982), 95.

45. Rainer Guldin, “‘To make music with visionary power’: On the Relationship of Music and Mathematics in Vilém Flusser’s Work,” in *Flusser Studies* 17 (June 2014); <http://www.flusserstudies.net/archive/flusser-studies-17-double-issue> (accessed February 22, 2017).

Wide Web with its “randomization” of knowledge about the historical past by search engines,<sup>46</sup> and “digital histories”<sup>47</sup> in computer games.<sup>48</sup> In the social media portal Facebook, a timeline runs across the individual profile, moving from date of birth to the present day, “continually updated and updatable.”<sup>49</sup> But within the digital computer, the timing of the UNIX operating systems (so-called UNIX-Time) counts the number of seconds that have elapsed since 00:00:00 Coordinated Universal Time (UTC) on January 1, 1970. Any algorithmic procedure based on that time-base could be, by numerical extrapolation, time-shifted into the future. Aristotle’s definition of time as coming into existence by numerical measuring becomes operational in digital computing.

In their worldly, physical existence, both mechanical and electronic storage devices, which allow for time-invariant replay of audio signals, are themselves increasingly subject to macro-temporal decay over time such as the material deterioration of Edison cylinders or magnetic tapes. But once the signal has been digitized, at least in terms of information theory, it becomes timeless.

The technical recording of the present has been a general phenomenon of media culture since the shrinking exposure times of classical photography, before electromagnetic waves were applied to transmit signals with the speed of light. But different from “live” transmission in previous times of analog electronic radio and television, digital communication happens in “real-time” which suggests instantaneity. Viewed under a time lens this is a process of constant micro-archiving of data for further processing. In contemporary culture, for the first time,

46. Steve E. Anderson, *Technologies of History: Visual Media and the Eccentricity of the Past* (Hannover, NH: Dartmouth College Press, 2011), 125.

47. Anderson, *Technologies of History*, 123.

48. See Stefan Höltgen and Jan Claas van Treeck, eds., *Time to Play: Zeit und*

*Computerspiel*, (Glückstadt: vvh-Verlag Werner Hülsbusch, 2016).

49. Angela Maiello, “Post-production Practices and Interactive Mass-mediated Communities: The Question of Memory,” (typescript of lecture at “Cinematic Diasporas: New Media Cultures & Experiences,” University of Chicago, April 14, 2012).

we are really living in an archive culture — not in its institutional sense but in terms of micro-storage acts which characterize digital data processing within the heart (ALU — arithmetic logic unit) of computing.

### Cinematographic “Sampling” of the Visual Present and the “Moving Still”

The human sense of the present is kinetically affected by the “moving still.” As technical event (the intermittent stepwise transport of the film reel), there is the “moving still,” which the experimental genre of the “photo film” evokes as a re-entry on the media-dramaturgical level. Film once irritated the notion of pastness as distinct from the present; the mechanically re-animated celluloid stripe as chrono-photographic sequence of still frames induces the impression of continuous movement in the mind of the spectator.<sup>50</sup> Cinematography blurs the difference between present and past, and thereby evokes the notion of the *undead*, just like the stationary shot (or fixed frame camera setup) dissolves the dichotomy “still” *versus* “moving.”<sup>51</sup> David Claerbout’s visual installations unfolded this in his 1997 single channel black and white video projection *Kindergarten Antonio Sant’Elia, 1932*, which shows slowly moving leaves of a tree within the otherwise frozen photograph.<sup>52</sup>

Technical and electronic signal recording, signal transfer and signal reproduction affect both the perception of *the present* (in German, *Gegenwart*) and the aesthetics of *presence* (with its German equivalent *Anwesenheit*) in the chrono-technical sense. This situation has been described by

50. As expressed in the exhibition title “still (not) moving,” gallery EIGEN + ART Lab, Berlin (January/February 2014).

51. See Jon Inge Faldalen, “Still Einstellung: Stillmoving Imagenesis,” *Discourse: Journal for Theoretical Studies in Media and Culture*, vol. 35, no. 2 (2013).

52. See Timothy S. Barker, “The Past in the Present: Understanding David Claerbout’s Temporal Aesthetics,” *Time and Society* vol. 20 no. 3 (2010): 286–303 (esp. 288).

Benjamin (referring to cinema) more acutely as a shock for sensation; it irritates the sense of the temporal now. Digital culture consists of discrete computational states — which do not only refer to computed images, but to the discrete stepping of the cinematographic apparatus already. In an anatomy of the techno-contemporary condition into its time-critical ingredients, such operations of the machine do no longer recede behind a referential effect. Therefore, archaeological media analysis requires close knowledge of material and logical apparatuses. It is the intermittent drive which is the condition of possibility (*arché*) of the cinematographic effect resulting in a subliminal micro-temporal affect, the “present shock.”<sup>53</sup>

Chrono-photography in traditional media historiography is treated as the immediate forerunner of the moving image. This non-linear time analysis occurs within the cinematographic apparatus itself: dis/continuity (with the slash signifying the cinemato-graphic cut itself) is the very essence of the mechanical movie apparatus, of its dialectic of movement and stillness,<sup>54</sup> halting the single frames of the continuous celluloid reel for a moment in order to evoke the physiological after-image and neuronal image-blending within the observer. For Bergson, cinematography is nothing but a false simulacrum of movement, since what is un-rolled are frozen momentary images.<sup>55</sup> True movement is rather *between* static states and is not their simple accumulation: “Hence, for Bergson, there is no such thing as the present.”<sup>56</sup> According to Gilles Deleuze, the chrono-photographic cinema aesthetics of the *image-movement* has been dramatically replaced (while being technologically

53. Douglas Rushkoff, *Present Shock: When Everything Happens Now* (New York: Penguin, 2013).

54. See Laura Mulvey, *Death 24x a Second: Stillness and the Moving Image* (London: Reaktion Books, 2006), 12 (on Dziga Vertov).

55. Henri Bergson, *Évolution créatrice* (Paris: Alcan, 1907), chapter 4.

56. Mary Ann Doane, “Has Time Become Space?,” in *Thinking Media Aesthetics: Media Studies, Film Studies and the Arts*, ed. Liv Hausken (Frankfurt: Peter Lang, 2013), 89–108 (esp. 94).

unchanged) by the *time-image*.<sup>57</sup> But the real agency behind that transubstantiation is the message of electronic television where there is no more present moment which can be mechanically arrested, but a time signal re-generating of the “image” from within. Electric voltage displaces the present moment.<sup>58</sup>

Bergson describes the delusion of cinematographic movement in terms of the clock mechanism; in the Brothers Lumière camera-projector the perforated film is driven by an intermittent mechanism indeed. But within technologically-embedded algorithmic computing, the central system “clock” is just the provider for electronic impulses which are subsequently broken into sequential units—with the delimiting time-critical factor of “dead time” switching between “zero” and “one” voltage levels. In data processing, a complex drama of synchronous and asynchronous cycling and phase shifting occurs. Implemented as material machine, temporalities are suddenly embodied in the regime of the symbolic.<sup>59</sup> In Turing’s definition of digital computation, this introduces discreteness into movement and at the same time *smears* the present.

In the analysis of co-existent temporalities, media archaeological research is not about the “true” nature of time but rather unfolds the operative processualities of technical media in combination with neurological signal processing within humans, which result in phenomenological perceptions of “the present.”

Humans experience the present always already as temporal simulacrum: “Practically, we perceive only the past, the pure present being the invisible progress of the past gnawing into the future”<sup>60</sup>—a sensational “cache” (in the

57. Gilles Deleuze, *Cinema II: The Time-Image* (London: Continuum, 2005 [1985]).

58. See Maurizio Lazzarato, *Videophilosophie: Zeitwahrnehmung im Postfordismus* (Berlin: b-books, 2002).

59. See Friedrich Kittler, *Die Welt des Symbolischen — eine Welt der Maschine*, in *Draculas Vermächtnis. Technische Schriften* (Leipzig: Reclam, 1991), 58–80.

60. Henri Bergson, *Matter and Memory*, trans. N. M. Paul and W. S. Palmer (New York: Zone, 1991), 150.

full sense of the intermediary storage device in the Central Processing Unit of high-speed digital computers). What the human mind conceptually terms “the present” is rather an inner delusion of actual temporal realities. The present (just like “the continuous”) is not a case in the sense of physical reality but itself metaphysics when compared to what actually happens: microtime-delayed, or taking place in discretely calculated pulses. In digitally coded transmission of signals, the channel-induced temporal delay is undone by mathematically intelligent compression and channel coding, reminiscent of Grimm Brothers’ tale of “Hare and Hedgehog.”<sup>61</sup> Here, the difference of “time-tunneling” within the analog and the digital transmission becomes crucial.

#### “Pre-recording” the Present Moment and the Aesthetics of “Instant Replay”

Whereas analog broadcasting (radio, television) has been “live” signal transmission in principle, digital signal transfer requires intermediary computation in “real-time.” Digital media culture is micro-archival by its very process-oriented algorithmic ontology. There is “dead-time in such a spacing or temporal non-identity within the computational present.”<sup>62</sup> In engineering, such negative signal events are not metaphysical terms, due to Norbert Wiener’s rather chrono-poetic notion of a “time of non-reality” for the moment switching between the binary states (“on” and “off”).<sup>63</sup> Such a moment (in German, *Augenblick*) corresponds with the “ecstatic now.”<sup>64</sup>

61. See Bernhard Vief, “Die Inflation der Igel: Versuch über die Medien,” in *McLuhan neu lesen: Kritische Analysen zu Medien und Kultur im 21. Jahrhundert*, ed. Derrick de Kerckhove, Martina Leeker, Kerstin Schmidt (Bielefeld: transcript, 2008): 213–232.

62. See Adrian Mackenzie, “The Mortality of the Virtual. Real-Time, Archive and Dead-Time in Information Networks,” in *Convergence* 3, no. 2 (1997): 59–71 (esp. 67).

63. See Claus Pias, “Time of Non-Reality: Miszellen zum Thema Zeit und Auflösung,” in *Zeitkritische Medien*, ed. Axel Volmar (Berlin: Kulturverlag Kadmos, 2009), 267–279.

64. Paddy Scannell, *Television and the Meaning of Life* (Cambridge: Polity, 2014), 188. Martin Heidegger separates what he calls “ecstatic” temporality from the “vulgar,” clock-driven time as mathematical succession.



Wireless “live” transmission of television — with the speed of light as electro-magnetic waves — has been achieved by sensitive electronic cameras. Light conditions in early days of television, though, caused delayed image representation. Due to the low light sensitivity of early electronic TV cameras, in the Paramount Intermediate Film System, “a television image was recorded on motion picture film, then processed and projected immediately (the delay from reception to projection was 66 seconds. [...] Although the content shown derives from a television signal, the actual perceptual experience is of a filmed image, not a televisual one.”<sup>65</sup>

Instant replay became perceptible in the relatively slow audio signal processing first: SONY declared its digital IC Recorder ICD-SX733 (and other models) under the heading “Recording a few seconds in advance — the pre-recording function.” This function allows for recording sound sources for approximately five seconds prior to the moment of pressing the REC/PAUSE button. “This is useful for recording during interview or when making an open-air recording so that you will not miss an opportunity to start recording;”<sup>66</sup> resulting in an extended time-window of the present as defined in Edmund Husserl’s *Phenomenology of Internal Time Consciousness* (German original 1927), now returning (or being systematically replaced) in technical acts of retention and protention like the cybernetic concept of the feedback system (derived from anti-aircraft prediction in the Second World War). As has been defined by Wiener and Julian Bigelow, in such a communication within the extended window of the present, “it is extremely important to shoot the missile not at the target, but in such a way that missile and target may come together in space at some time in the future.”<sup>67</sup>

65. Philip Auslander, *Liveness: Performance in a Mediatized Culture* (London/New York: Routledge, 1999), 14.

66. Manuals for SONY digital IC recorders, [http://www.sony-asia.com/microsite/recorders\\_\\_imanuals/ICD-SX1000/gb/contents/TP0000019455.html](http://www.sony-asia.com/microsite/recorders__imanuals/ICD-SX1000/gb/contents/TP0000019455.html) (accessed February 22, 2017).

The “missing half-second” (Herta Sturm) that occurs in watching television, where the abrupt cuts of single shots do not allow for the minimal delay which human cognition needs to digest immediate impressions,<sup>68</sup> is kept in latency here, enabled by the digital cache memory. The secret of this irritation of the present is a dynamic storage function: “Sounds for 5 seconds are buffered in the memory,” almost phonographical “engrams” (in Richard Semon’s sense)<sup>69</sup> and “short-time memory” in current neuroscience.

The condition of possibility of “irritating the present,” here (once more), is micro-storage. The system offers an additional twenty-four photos to the one actually shot — which is, maybe not by coincidence, just a “cinematographic” second of twenty-four frames. Today, in the age of almost unlimited storage capacities for digital data, the pre-recording mode is increasingly replaced by continuous recording: the real-time archive. Pro-active archiving here replaces the traditional repository for records emanating from the past.

Short-time storage does not build up to emphatic memory but is an extended present, blurring the borderlines between the contemporary and the past. Intermediary storage here generates a delayed present. Google Glass is a real-time recording device consisting of a mini-camera, a mini-microphone, and a compass integrated into a pair of glasses, including a display in the corner for orientation which is directed by head movements and speech input. “Immediately” the present is recorded; but this immediacy is not a *temporeal* one since a technological medium intervenes. A slight *différance* occurs — the intermediary storage moments, which define

67. Norbert Wiener, *Cybernetics: Or Control and Communication in the Animal and the Machine* (Paris: Technology Press, 1948), 11.

68. See Herta Sturm, “Wahrnehmung und Fernsehen: Die fehlende Halbsekunde. Plädoyer für eine zuschauerfreundliche

Mediendramaturgie,” in *Media Perspektiven* 1 (1984): 58–65.

69. Richard Semon, *Die Mneme als erhaltendes Prinzip im Wechsel des organischen Geschehens*, 4th ed. (Leipzig: Engelmann, 1920).



any digital and algorithmic calculation. Every if/then branching or loop in a source code results in minimal temporal deferrals which can visually be identified by the electronic Logic Analyzer. Every return to data storage (“addressing”) in computer memory takes a minimum of access time. Digital temporalities actually change according to the timing of the operating system that executes given software.

#### Instant Recording of the Present

Digital Signal Processing is the actual modality of translating the physical world into algorithmic space. In web-based formats for so-called “streaming media,” the old metaphor for the flux of time dissimulates the radically bit-discrete character and time-consuming complex calculation. After the death of analog TV in the U.S. on February 17, 2009, streaming television over the Internet (rather from cable) feels more like delayed liveness.<sup>70</sup> Big data collected from the Internet are analyzed at a velocity that is increasingly approaching real time, including users’ online activities as they interact with web pages and the GPS data from their mobile devices. Not only intelligence services are increasingly demanding such instant data analytics.

Translating the analog physical world to digital computing (A/D transformation) conceptually and technologically implies the real-time processing of signals, a time-discrete sampling and quantizing of the continuous signal event. Such punctualizing and mathematizing requires intermediary short-time storage of data, down to the electronic equivalents of “zero” and “one” in micro-processor registers and flags, up to time axis manipulations after the digital sampling of recorded signals. Techno-mathematical media not only allow for re-play of recorded sound and vision but as well for interaction.

70. See Hollis Griffin on the temporality of streaming television: “Liveness with a Lag: Temporality & Streaming Television [Part 2],” *Antenna* (August 13, 2012).

Accessed December 2016. <http://blog.commart.wisc.edu/2012/08/13/liveness-with-a-lag-temporality-streaming-television-part-2/>.

The concept of real-time and “interrupt” for user input in computing dislocates the metaphysics of the pure present to a micro-deferred now, involving intermediary storage operations.

Internet “streaming” news radio formats are based on no traditional “channel” anymore but on data package bandwidth. As opposed to former live transmission, it performs an instant buffering of the present. In “Inforadio” (rbb-online, Berlin-Brandenburg), errors frequently occur in (re)play. If by mistake a news editor pushes the wrong button on the digital control panel, a message just spoken is repeated. The con-temporary authenticity contract between listener and radio station is shocked when it becomes apparent that there is not live transmission any more, just digitally stored data files — a present which is “archived” already. The event and its storage merge into one with increasing digital recording including its time-coded snapshots. “One bit at a time” is the core law of processuality in stored-program computing in both its technological and time-phenomenological sense. With instant photography from portable digital devices such as smartphones, the continuous present is divided into time-discrete snapshots which themselves are algorithmically re-arranged almost immediately, different from the traditional photo album which was always post-productional. “Archiving the present” starts immediately. The present becomes re-windable,<sup>71</sup> as expressed in cinematographic transformations of space into the time axis.<sup>72</sup>

As conveyed in St. Augustine’s *Confessions* (book XI), the present moment has been considered for the longest time as non-extensional between the “not yet” and the “no more.” The Aristotelean approach of numerical time-definition (culminating in Zenon’s paradox of momentary capture of

71. Alexander Galloway and Eugene Thacker, *The Exploit: A Theory of Networks* (Minneapolis: University of Minnesota Press, 2007), 132.

72. See the film *tx-transform* (Austria, 1998, 35 mm, Cinemascope, 5 min), created by Martin Reinhardt and Virgil Widrich.

the flying arrow) is discrete, actually sampling the present. The epistemological gap between the phenomenological and the techno-mathematical conception of time is undone when calculation in electric speed emulates human time perception itself. What at first sight results in a happy convergence between the neuro-phenomenological and high frequency technological processing of the present moment is in fact a dramatic replacement and displacement — just like in Internet communication, a letter is not transmitted intact any more but fragmented by packet switching. Gottfried Wilhelm Leibniz and Isaac Newton's mathematical tools for infinitesimally approaching the volatile temporal moment by discrete calculation resulted in a shocking chrono-epistemic *momentum*. Bergson criticized the "mathematical" sequencing of movement in chronophotography. The proverbial photographic snap-shot has always been a paradox: In the moment of the photographic recording (which, in itself, at close reading, is never punctual but a shrinking interval), this present is transformed into endurance. Such instant recording is nowadays matched by the "thickening of the present moment" in digital systems<sup>73</sup> — a kind of micro-archival bubble. This present-as-archive is familiar from analog broadcast media as well, since most of the radio and television programs received have been playbacks from recordings (especially the musical interplays).

With its instant digital recording, the present becomes almost immediately addressable and thus a sublime archival structure. In real-time, the present loses its logocentric uniqueness. The present no longer has time to take place.

73. Barker, *Time and the Digital*, 194.

### MPEG and Codecs: Disruptions of the Present Preserved by and Generated from within Technological Media

Digital video recording is a dialectic interlacing of time-discrete cinematography and electronic live image transmission "where time passed becomes constantly accessible for the future. Reality's duration seems to have become a continuous stream of information potentially open for another time."<sup>74</sup>

Such a differential present undermines the linear concept of the "flux" of time. Expressions like the "thick now"<sup>75</sup> evoke Husserl's notion of a present which diagrammatically unfolds between temporal retention and protention: The mind retains an auditive or visual impression as present even if it has just passed while protention is the immediately anticipated future.<sup>76</sup> Surface effects of such tempor(e)alities in current media culture are frequently (mis)used to trigger philosophical speculations on the "thick now," by describing digital MPEG compression of video as a technological materialization of such phenomena, for instance. In such a reading, re- and protention would correlate with the bidirectional predictive frames (B-frames) and the "now" with intra frames (I-frames).<sup>77</sup> Media archaeological analysis inductively starts with such actual techno-logical situations in their *a priori* independence from discursive conceptualization.<sup>78</sup>

74. Markos Hadjioannou, *From Light to Byte: Toward an Ethics of Digital Cinema* (Minneapolis: University of Minnesota Press, 2012), 174.

75. See W. J. T. Mitchell and Mark B. N. Hansen, eds., *Critical Terms for Media Studies* (Chicago: University of Chicago Press, 2010).

76. See Edmund Husserl, *Phenomenology of Internal Time Consciousness*, trans. John Barnett Brough (Dordrecht: Kluwer Academic Publishing, 1991), 219.

77. For a precise description of this compression algorithm, see Trond Lundemo, "In the Kingdom of Shadows: Cinematic Movement and Its Digital Ghost," in *The YouTube Reader*, ed. Pelle Snickars and Patrick Vonderau (Stockholm: National Library of Sweden, 2008), 314–329 (esp. 316 f.).

78. See Adrian Mackenzie's entry "Codecs," in *Software Studies: A Lexicon*, ed. Matthew Fuller (Cambridge, MA: MIT Press, 2008), 48–55.

From Post-production to Instagram:  
the *Tempaural* Moment

Post-production as editorial work is preceded on the micro-electronic level already. If a VGA monitor (video graphics array) is linked to the processors by a VGA cable, the image content is first “written” into an intermediary storage (Frame Buffer), micro-memorizing the present, which is subsequently “read” sixty to eighty times per second, by “analyzing” pixel by pixel in the Frame Buffer (an operation based on the photo-electric logic of the CCD chip) and transforming it into an analog currency. The transmission in digital image processing therefore is still analog and thus generates electro-magnetic emission, which forms an “analogy” to the (latent) electronic image, comparable to the “latent” electrostatic image in Xerox copying machines (which is obliterated in so-called Copy Art). Magnetic remanence challenges the positivism of the phenomenological “present.”

Different from a direct addressing of the Flat Pixel Display pixel by pixel, the Digital Visual Interface still “writes” the electronic image. In practice, only a few rows of pixel lines are buffered and line-wise read out like picking up the phonographic groove.

Today, the everyday experience is recorded with the algorithmic speed of real-time data processing. Post-production procedures in the manipulation of audio-visual media content has been a driving force in modernist film, television, radio and video art, as the *a posteriori* set of processes applied to the recorded material such as montage, the inclusion of other visual or audio sources, subtitling, voice-overs and special effects.<sup>79</sup> But the post-production aesthetics is increasingly replaced by real-time editing processes. With binary discretization (CCD technology) a digital sampling of present moments correlates. Countless “photographies” (which are rather digital samples

79. See Nicolas Bourriaud, *Postproduction: Culture as Screenplay*.

*How Art Reprograms the World* (New York: Lukas & Sternberg, 2002).

of present moments) are being uploaded daily to Facebook, after having been manipulated by filters in online platforms like Instagram which might let them appear like retro Polaroids. The present itself not only becomes instantly archived once recorded by devices like smartphones, but processed as well. As a continuously updated “dynamic” archive, in cybernetic terms, the traditionally unprocessed event (prior to its “historiographical” re-writing) gets replaced by an always already historicized present in non-linear, discrete temporal jumps, leading to an equitemporality (in German, *Gleichursprünglichkeit*) of past, present and future in Husserl’s sense of retention and protention.

The difference between “live transmission” in radio and television broadcasting as present mode, and the immediate transmission of Polaroid-like snapshots from smartphones over web portals like Facebook, lies in the punctual, non-linear, discrete moment. Digital topologies replace processual time and the linear eventuality of the analog “live” stream. Instant photography as temporal affect, coupled with the web platform Instagram, replaces the Barthean notion of *ça a été*—which is rooted in the actual past of a photo-chemical event—by the electro-digitally actual *punctum* of the CCD chip: the two-dimensional matrix instead of linear time, processed sequentially by the Turing machine tape and not continuously like the analog television signal anymore.<sup>80</sup>

The *message* of the digital snapshot is not iconic anymore but time-critical (instantaneity), even if its *content* is still an image. The electronic “Nu” (Benjamin) replaces the emphatic storage function of digital photography.

80. See Wolfgang Ullrich, “Instant-Glück mit Instagram: Die Rückkehr der Aura in der Handy-Fotografie,” in *Neue Bücher Zeitung* (June 10, 2013); [www.nzz.ch/aktuell/feuilleton/uebersicht/instant-glueck-mit-instagram-1.18096066](http://www.nzz.ch/aktuell/feuilleton/uebersicht/instant-glueck-mit-instagram-1.18096066) (accessed May 15, 2014). On the temporal gap between analog and digital photography,

see Wolfgang Hagen, “Die Entropie der Fotografie: Skizzen zur einer Genealogie der digital-elektronischen Bildaufzeichnung,” in *Paradigma Fotografie. Fotokritik am Ende des fotografischen Zeitalters*, ed. Herta Wolf (Frankfurt am Main: Suhrkamp, 2002), 195–235.

The joy of instant participation in the temporal realm (the tempoReal) is time-critical communication. The shrinking of the temporal interval of processing a photographic negative into digital instantaneity affects the familiar sense of unfolding events as well: no more *developing*. With instant photography as mode of production and communication in the user-generated web, the time of delay shrinks towards zero ( $\Delta t > 0$ )—both on the level of memory as transcendent reference and of processuality on the level of the material media signifier of the temporal interval.

With the immediacy of digital, web-connected photography, its temporal *noema*<sup>81</sup> shifts from past (“this has been”) to the deferred present (“this has just been”) which does not even recede into the past. Benjamin still defined the “aura” as a temporal form, such as watching the shadow of a tree branch passing by in the progressive sunlight,<sup>82</sup> like the *gnomon* of a sundial which is an analog time measuring device *par excellence*—an adaptive temporal index. This is exactly what the long exposure time of the photographic image in its incubation time captured by necessity. “Instant” photography does not simply result in *auraless* communication of present moments, but a new kind of *contemporality*.

81. As defined by Roland Barthes, *La chambre claire: Note sur la photographie* (Paris: Gallimard, 1980).

82. Walter Benjamin, “Kleine Geschichte der Photographie,” in *Walter Benjamin: Medienästhetische Schriften* (Frankfurt am Main: Suhrkamp, 2002), 309.

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Wolfgang Ernst is Professor of Media Theories at the Institute for Musicology and Media Studies at the Humboldt University, Berlin. Trained as a historian and classicist in Latin Philology and Classical Archaeology, his research interests include archival theory and museology; media materialities; and his ongoing interest in cultural tempor(e)alities and the technology-orientated "German school" of media studies. His current research focuses on media archaeology as method; theories of technical storage; technologies of cultural transmission; micro-temporal media aesthetics and their chronopoetic potentials; and sound analysis ("sonicity") from a media-epistemological point of view. Recent books include: *Digital Memory and the Archive* (2013); *Stirring in the Archives: Order from Disorder* (2015); *Chronopoetics: The Temporal Being and Operativity of Technological Media* (2016); and *Sonic Time Machines: Explicit Sound, Sirenic Voices and Implicit Sonicity in Terms of Media Knowledge* (2016).