

MEDIA TEMPORALITIES AS OBJECT OF KNOWLEDGE (AND THEIR SONIC UNDERSTANDING)

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For an epistemological understanding of technical media

Starting from an *operative* definition of technological media, media epistemology can be specified in its various modes. Against G. W. F. Hegel's critique of mathematical machines and his philosophy of history a close reading of the specific tempor(e)alities of technologies opens alternatives. Media diagrammatics here replaces traditional history of technology. Technological and epistemological experimenting (with) media time leads to a final focus on *sonicity* as epistemic media object in the dynamic chronosphere.

There is a specific quality of *media* epistemology: Its analysis is firmly rooted within techno-mathematical, that is: material and logical constellations from which inductive sparks of epistemic questions and insights are being derived.

A basic definition of "what is a medium?" starts from the ontological assumption that technologies are *in being* only once they *operate* (processing signals and / or symbols). Media epistemology is thus always rooted in and limited by technological actuality, different from speculations in theoretical physics or purely cognitive philosophy. The case is different for the most powerful contemporary medium: the digital computer.

"At home" in Hegel's house?

Humboldt University's Media Theory finds itself suitable at home in its present location which has been formerly Hegel's house.

Contrary to Gottfried Wilhelm Leibniz' vision of a universal language expressed in mathematical symbols (a *characteristica universalis*), Hegel rejected the option of mechanized reasoning.

Charles Babbage in fact declared himself a "philosopher" as well. Should we say "logotec" instead of "technology"?

Different from Hegel's *Logik* is Charles Sanders Peirce's first "electrification" of logical operations (as machine) by drawing the first electric circuit. Media archaeological analysis is applied epistemology in the sense of Peirce's "diagrammatic reasoning" - operative media diagrammatics.

New philosophy of media time(s) - or disguised Hegelianism?

Re-discovering Hegel for media theory leads as well to a critical re-consideration of Hegel's philosophy of history. Is it possible to interrelate

different layers of technology in recursive ways rather than implying linear development as non-historicist concept of technolog(ia)l tempor(e)alities?

The specific (a)historicity of media time (epistemology of the technological object)

By analyzing and experimenting with technical media, their specific temporality and especially time-critical, micro-temporal processes can be experienced. Media-experimental settings perform "culturalized" knowledge of a secondary nature - with measuring media being the crucial observer. A technological setting is an artificial configuration based on cultural knowledge - but still it is of scientific nature, since there are electro-physical laws at work which are not completely dependent on the arbitrary cultural discourse. The media-experimental event can not be reduced to discursive effects. There is always an imminent physical or mathematical "veto"

- which is timing in terms of recursive algorithms, generating presence.

From time-based media to media tempor(e)alities

No cybernetic analysis of technology, whether it be analogue or digital, is complete "unless we possess a proper analysis of its appropriate time-concept"¹. Any media event is a time-based function of signals.² Analogous to the way Martin Heidegger once re-shaped the philosophical question from "what is time" to "how is time" (the *shape of time* as expressed by George Kubler) as a processual existence ("eventuality"), media archaeology replaces the ontological definition of media by a dynamic one: media-in-beeing (in allusion to the British military term of a "fleet in beeing"), its temporal mode of existence. Processuality is the core definition of electro-mechanic and electronic media as such. *Time-based media* in the traditional sense comprise literature and theatre, then grammophone and film. Media archaeology sharpens this notion by focussing on *time-critical* processes as well, i. e. such media, where micro-temporal events are crucial for the overall process to happen at all (synchronization of telecommunication, clocking in computers).

The difference between "time-based" and "time-critical" is itself decisive. "Critical" is meant in the ancient Greek sense - that is, "decisive". In time-critical processes, a whole plethora of temporal figurations are at work, not just the temporal axis as an abstract parameter. Time itself becomes figurative here, a kind of chrono-actor.

The term "media archaeology" sounds like a structural analysis, but - opposed to the archaeological metaphor of "layers" - it is concerned with what is at the essence of technological media: their operative, processual, that is: temporalized mode of existence. Only when being in operation a medium is truly in the medium state; otherwise the apparatus is a piece of furniture.

¹ Norbert Wiener, *Time, Communication, and the Nervous System*, in: *Annals of the New York Academy of Sciences*, Bd. 50, 1948/50, 197-219 (197)

² Karl Küpfmüller, *Die Systemtheorie der elektrischen Nachrichtenübertragung*, Stuttgart (Hirzel) 1974, 393

Let me come to the heart of "digital", that is: computer-based culture. In 1936 the "invention" of the computer as symbolical machine happened as a by-product of Alan Turing's answer to the problem of the mathematically undecidable: "Computable" numbers are those which are calculable by *finite procedures*. The question if computer programs have a sense of ending (the *Halteproblem*) leads to the more general consideration of media-induced temporality. Media systems internally develop new forms and operations of temporal sequences and a different notion of "ending" (recursive functions, real-time operations) and provide of a micro-dramaturgy of synchronizations where smallest bits of time are "critical" for the success of the whole media event.

[Externally media are able to address the human perception on its most essential channel of being-in-time (both on the level of neurons and in consciousness). Thus Heidegger's philosophy of *Sein und Zeit* needs to be extended and specified to the question of media tempor(e)alities.]

Focus: Media tempor(e)alities

Michel Foucault's archaeology of knowledge remains somewhat letter-centred and thus autopoietically refers to the alphabet-based world and the symbolic order of textual libraries. But "discourse analysis cannot be applied to sound archives or towers of film rolls."³ With the age of so-called analog media such as the phonograph and cinematography, signs as a function *of* and *in* time themselves can be registered. They maintain not just a symbolical relationship to macro- and microtime (such as historiography), but they inscribe and reproduce functions of time themselves. It is only with the digital computer that the symbolic regime *dialectically* re-turns: this time in a genuinely dynamic mode (which differentiates implementation of software from the traditional Gutenberg galaxy): algorithmic time, operative diagrams.

What is frequently called "posthumanistic" by now, is very much bound to a critique of historiographical narrative. Thinking based on digital codes directs itself against "'progressive' ideologies, to replace them with structural, system-based, cybernetic moments of thought <...>".⁴ This almost Foucauldian discontinuity is what currently is associated with the rupture between the analogue and the digital. Post-modern critique of narrative in historical discourse, (inspired by Hayden White's *Metahistory*⁵) has finally resulted in reflections about alternative ways of writing media-in-time. Again, Hayden White has sharpened the analytical attention. Telling is not just about stories, but about counting as well (the writing mode of digital media), as becomes evident by an anamnestic reconsidering of historiography. Early Mediaeval forms of registering events (the Annalistic tradition as opposed to chronicles and

³ Friedrich Kittler, *Gramophone - Film - Typewriter*, Palo Alto, Cal. (Stanford UP) 1999, 5

⁴ Vilém Flusser, *Die Schrift. Hat Schreiben Zukunft?*, cited in Strohl, Introduction, in: Vilém Flusser, *Writings*, Minneapolis (University of Minnesota Press) 2002, xxxiii

⁵ Hayden White, *Metahistory. The historical imagination in nineteenth-century Europe*, London / Baltimore 1973

historiography proper) convey a way of experiencing reality not in terms of continuous but in discrete time⁶, thus closer to state-based automata with discrete writing/reading of symbols on an endless divine memory tape (which is, of course, the diagram of the Turing Machine).

E. R. Clay termed the "specious present" in 1882 for a recent past which is delusively given as perception of the now, different from the obvious past. Every electronic image is already the "halo" of an image (William James), "the dying echo of whence it came to us [and] the dawning sense of whither it is to lead"; such an image (like sound) is always already in transition.⁷ New media phenomenology, by combining recent research in neuro science on brain temporalities⁸ with the Husserlean definition of temporal experience (pro- and retention), couples technologies with the human experience of affective temporalities.⁹ Already Marshall McLuhan's notorious theorem of the "acoustic space" opened the notion of electrified media. In media art like Bill Viola's works the "cinema-digital-video hybrid technique exposes the viewer to minute shifts in affective tonality well beyond what is visible to natural perception"¹⁰. Let us take this *tonality* literally: There is a sound in electronic media, with the sonic not taken in its physical (acoustic, audible) but in its epistemological sense: being an expression of tempor(e)alities. The privileged relation between sound and technological media is grounded in their analogous time-basedness and chrono-poietical time-basing.¹¹ New media articulate (themselves in) time, which is their musicality.

New options of navigating in archives of audiovisual times past

Once being digitized, the electronic image is open to almost real time access and new search options like similarity-based image retrieval. From this derive options of searching new kinds of archive which are not simply alphabet-based any more but signal-based like phonographic records or the electronic video image on magnetic tape. The traditional architecture of the archive is based on classifying records by inventories. This is being replaced in the digital media by order from fluctuation, that is: dynamic order. But this is an "archive" no more, but algorithmically ruled processuality.

⁶ Hayden White, *The Value of Narrativity in the Representation of Reality*, in: *Critical Inquiry* vol. 7 no. 1 (autumn 1980), 5-27

⁷ As quoted in: Bill Viola. *Installations and Videotapes*, ed. Barbara London, New York (The Museum of Modern Art) 1987, 79

⁸ On the neuro-processual time frame ("window of simultaneity") which counts as the human experience of "presence" see Francisco Varela, *The Specious Present. A Neurophenomenology of Time Consciousness*, in: Jean Petitot / Francisco J. Varela / Bernard Pachoud / Jean-Michel Roy (eds.), *Naturalizing Phenomenology. Issues in Contemporary Phenomenology and Cognitive Science*, Stanford, Cal. (Stanford UP) 1999, esp. 272f and 276f

⁹ See esp. Hansen 2004, chap. 7 "Body Times", 235-268

¹⁰ As paraphrased by Tim Lenoir, "Foreword" to Hansen 2004, xxvi

¹¹ See Bill Viola, *The Sound of One Line Scanning*, in: Dan Lander / Micah Lexier (eds.), *Sound by Artists*, Toronto / Banff (Art Metropole & Walter Phillips Gallery), 1990, 39-54. While entries like time, temporality and vision figure prominently in the "index" of Hansen's book, what is missing is the "acoustic", the "sonic", "sound media time".

On the borderline of digital addressability, it is possible now to navigate through large amounts of audiovisual data beyond verbal language, an immediate access to sound and images, unfiltered by words. Images and sounds thus become calculable and capable of being subjected to pattern-recognition algorithms. Such procedures will not only media-archaeologically "excavate" but as well *generate* unexpected optical statements and perspectives from an audio-visual archive that can, for the first time, organize itself not just according to meta-data but according to its proper criteria - visual memory in its own medium (endogenic). The notion of „excavating the archive“ in terms of media-archaeology (instead of iconography) is not meant to be a metaphor.¹² What is being digitally „excavated“ by the computer is a genuinely code-mediated gaze on a well-defined number of information patterns which human perception calls "sound" or "images". Contrary to traditional semantic research in the history of ideas, such an audio-visual archive will no longer list sound & image sequences according to their authors, subject, and time and space metadata of recording. Instead, digital data banks will allow audio-visual sequences to be systematized according to genuinely signal-parametric notions (mediatic rather than narrative *topoi*), revealing new insights into their informative qualities and aesthetics.

Epistemogenic things: Listening to the monochord

There are epistemogenic things like the setting in a laboratory which is the *dispositif* for knowledge to emanate.¹³ In reverse, from a media-archaeological point of view, there is (technologified) knowledge materialized, embedded and implemented within operative media themselves which deserves to be extracted and derivated by explicit academic inquiry and verbalization.¹⁴

See e. g. the *phonisches Rad* as element in the otherwise optically oriented electro-mechanical image transmission Nipkow system.¹⁵ The electro-magnet "phonetic" wheel (inside the apparatus) is meant to synchronize the image lines here between transmitter and receiver - a kind of *tuning by resonance*. The sonic is rather implicit here (with no sound to be heard), as implicit chrono-technical sound knowledge (sonicity), while visible tuning here takes place with the stroboscopic disc (attached to the Nipkow disc) which is on the front side

¹² For Michel Foucault, the term archaeology explicitly "does not relate analysis to a geological excavation": Foucault 1972: 129

¹³ Hans-Jörg Rheinberger, *Experimentalsysteme und epistemische Dinge*, Göttingen (Wallstein) 2001; same author, *Experiment, Differenz, Schrift. Zur Geschichte epistemischer Dinge*, Marburg (Basilisken) 1991, chap. IV "Das 'Epistemische Ding' und seine technischen Bedingungen", 67ff

¹⁴ This is the special Media Studies training and task within the Faculty of Humanities as different from the engineering and mathematical disciplines.

¹⁵ E. g. the Nipkow-Televizor (30-line), produced by the Tratri Novakove Company in Prague, 1934, on display in the *60 Years of Television Broadcasting* special exhibition at the National Technical Museum, Prague, May-December, 2013)

("Interface") visible to the user parallel to the actual television image. The message of the medium process is *timing* here.

[see W. E., EXPERIMENTING MEDIA-TEMPORALITY. Pythagoras, Hertz, Turing, in: W. E., Digital Memory and the Archive, Minneapolis (University of Minnesota Press) 2013, xxx-xxx]

When we re-enact Pythagoras' experiment with the monochord in the 6th century B.C. today, that is: when we mechanically sub-divide and musically activate such a string, we actually re-enact the techno-physical insight of the relation between integer numbers and harmonic musical intervals which once led Greek philosophers to muse about the mathematical beauty of cosmic order in general (including the rejected experience and fear of [deviation of this aesthetic ideology resulting in] the "Pythagorean *komma*", that is: irrational numbers). We are certainly not in the same historical situation like Pythagoras, since the circumstances, even the ways of listening and the psycho-physical tuning of our ears, is different. But still the monochord is a time-machine in a different sense: It lets us share, participate at the original discovery of musicological knowledge, since - in an almost Derridean sense (expressed in his *Grammatology*) - the repeatable *is* the co-original.¹⁶

In the Italian re-naissance of such ancient knowledge,

Vincenzo Galilei undertook a number of experiments with a lute to investigate the nature of musical harmonics¹⁷ - a kind of media-based archaeology of the acoustic: "Galilei employed the lute here not as a musical instrument but as a piece of laboratory equipment [...]." Once within experimentation time, it can be re-enacted. On the diagrammatical level, the re-enactment is time-invariant; on the operative level of implementation, the materiality of the medium itself seems to impose certain vetoes rooted in the historicity of the instrument, but in fact, the epistemological operation remains intact in principle (that is: *archaeologically*): Claude V. Palisca set out to replicate this experiment using a lute built in the 17th century by an unknown maker. "The present condition of the instrument required the use of some substitutions for the materials originally used by Galilei in his experiment; however, these did not affect the basic tenets of the experiment."¹⁸

Once human senses are coupled with technological settings, one is within their autopoietic temporal field, a chrono-regime of its own dynamics (or mathematics, when data are registered digitally). Such couplings create moments of literal exception: Man is taken out of the man-made cultural world (Giambattista Vico's definition of "history") and confronts naked physics.

¹⁶ Martin Heidegger, *Sein und Zeit*, xxx, 385: "Die Wiederholung ist die ausdrückliche Überlieferung, das heißt der Rückgang in die Möglichkeiten des dagewesenen Daseins."

¹⁷ As described in: Vincenzo Galilei, *A Special Discourse Concerning the Unison*, trans. in Claude V. Palisca, *The Florentine Camerata. Documentary Studies and Translations*, New Haven / London (Yale University Press) 1988, 203-205 (Italian text on pp. 202-204)

¹⁸ Claude V. Palisca, *Was Galileo's Father an Experimental Scientist?*, in: Paolo Gozza (ed.), *Number to Sound. The musical way to the scientific revolution*, Dordrecht / Boston / London (Kluwer) 2000, 191-199 (195)

On the one hand, any experimental "event" is a singular and instant act which cannot be subsumed under general terms. On the other hand, in Martin Heidegger's late philosophical work, the fundamental notions of *being* (Sein) and *time* (Zeit) converge in the notion of the *event* (Ereignis).¹⁹ In this double sense, the experiment allows a unique experience and at the same time for communication across the temporal gap (bridging a temporal distance. In the processual moment of the re-enacted experiment, we share the same temporal *field* (a notion which implicitly refers to the episteme of electromagnetic dynamics).

Can such experimentation be extended to macro-temporal eventality as well? At first glance, experimentation does not give access to historical experience, since past culture can not be re-enacted (except in experimental archaeology, maybe). This is the argument of historians usually applied to differentiate their hermeneutic discipline from the natural sciences. Hermann von Helmholtz declares at the climax of historicism in Germany:

"Die Beziehung auf die Geschichte der Musik wird <...> auch deshalb nötig, weil wir hier Beobachtung und Experiment zur Feststellung der von uns aufgestellten Erklärungen meist nicht anwenden können, denn wir können uns, erzogen in der modernen Musik, nicht vollständig zurückversetzen in den Zustand unserer Vorfahren, die das <...> erst zu suchen hatten."²⁰

But media-archaeological experimentation (simulation as opposed to historiographic historicism) gives access to the invariant elements of knowledge in time: kind of "'Experimentalisierung der Geschichte' in Simulationen. Sofern im Rahmen von Medienarchäologie und Simulationstechnologie heute ganze Theorien simulierbar sind, beginnen wir beständig tunnelartige Verbindungen durch die Historie <cultural time> zu graben, wodurch selbst unwägbare scheinende Zusammenhänge erkennbar werden und erforschbar sind. Indem wir aber Zeitobjekte vergangener Zeiten als solche reinstanziiieren, läuft das "Wissen von der Musik" immer mehr selbst und von selbst in Musiktechnologie."²¹

Such "tunneling" brings us back to ancient music.

On *sonicity*: Sound as epistemic object of (media) analysis

¹⁹ See Martin Heidegger, *Beiträge zur Philosophie (Vom Ereignis)*, [= Gesamtausgabe III. Abt. Unveröffentlichte Abhandlungen Vorträge - Gedachtes. Bd. 65.], Frankfurt/M. (Klostermann), 3rd edition 2003

²⁰ Hermann von Helmholtz, *Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik* [*1863], Braunschweig (Vieweg) 1913, 411

²¹ Martin Carlé, *Geschenke der Musen im Streit ihrer Gehörigkeit. Die antike Musiknotation als Medium und Scheideweg der abendländischen Wissenschaft*, in: *MusikTheorie. Zeitschrift für Musikwissenschaft*, vol. 22, no. 4 / 2007 (thematic issue "Peri mousikes epistemes - Zur Aktualität des antiken griechischen Wissens von der Musik, edited by Sebastian Klotz), 295-316 (313f)

In assuming the epistemological dimension of sonic memorization, the analysis goes far beyond to simply doing justice to *auditory memory* which indeed "has been largely neglected in memory studies in favour of visually-oriented arts of memorization [with their long tradition within rhetoric (*ars memorativa*)]"²².

Let us take as example how "Piano Tuners Have Built a Bridge To 18th Century".

[Katie Hafner, Piano Tuners Have Built a Bridge To 18th Century, in: The New York Times, published February 17, 2000²³]

Electronic tuning allows to change a piano's tuning (its "temperament") with ease from universal "equal temperament" to time-specific ratios.

"Modern pianos are tuned in "equal temperament," which divides each octave into twelve equal half-steps. The frequency of a note is adjusted up or down, sacrificing some harmony in all keys so none are too dissonant.

On the other hand, in many tunings that were popular in the Baroque period, intervals are extremely pure in some keys at the expense of others, increasing the dissonance in those keys.

[When Bach wrote his famous "Well-Tempered Clavier," pieces that exploit the 24 major and minor keys in which they were written, in the first half of the 18th century, it gave rise to the term "well temperament." That tuning scheme, although not an example of absolute equal temperament, was a departure from earlier tunings and allowed keyboardists to play all the pieces without retuning the instrument.]

Equal temperament is now universally accepted but a compromise. Variable temperaments are essential to unlock the emotional charge of earlier music." Techno-mathematical re-tuning of instruments (even in microtones) serves thereby as true media archaeology of the sonic past.

"Sing me, Muse, the deeds of a man called Odysseus", Homer's epic starts. What if memory is not only actually sung (known as "oral poetry") to be later registered and displaced in writing symbols which replace (and "technologize"²⁴) the oral signal with all its rich overtones (tuning, pitch, timbre, rhythm), but essentially sonic in itself?

Erkki Kurenniemi is "an unsung" pioneer of electronic art, the back cover (endorsement) of the DVD *The Dawn of Dimi* articulates²⁵, quoting *The Wire* (January 2003): "Viewed from a historical perspective, Kurenniemi's music foretold digital directions in rhythm, noise and jumpcut editing, only back then no-one was listening." Is there a "historically" delayed listening? Yes and no:

²² As defined in the call for papers to the workshop *Auditory Memory and Sound Archives from the Late-Nineteenth Century to the Present*, University of Amsterdam, 18 February 2013

²³ = <http://www.nytimes.com/2000/02/17/technology/piano-tuners-have-built-a-bridge-to-18th-century.html?pagewanted=all&src=pm> (accessed July 11, 2013)

²⁴ In the sense of Walter Ong, *Orality and Literacy. The Technologizing of the Word*, London (Methuen) 1982

²⁵ Published by Kinotar Oy and Museum of Contemporary Art Kiasma, Helsinki 2003; Editor: Mika Taanila

not historically (since this cognitive sphere is a function of historiography and the alphabetically recorded and organized archive), and yes: temporally delayed, reminding of the physically given evidence that every "presence" of aural listening already involves the delayed transfer of acoustic vibrations through air with a speed of around 330 meters/sec. - *medium* time in terms of Aristotle's "acoustic" definition of physical media.

Sonic eventuality is not only time-based, but in a more radical reading it leads humans to experience time at all.

The neo-logism of "sonicity" aims at catching "sound" as an epistemological rather than musicological object of knowledge from a media-philosophical perspective).

Inquiring *sonicity* does not equal Sound Studies. The audible section of the bandwidth of sonicity (acoustic sound) is just the deceptive top of the ice berg above the water level, or comparable (in less "layer" metaphors) to the visible part of the electromagnetic spectrum which animals perceive as "light".

Das Sonische, a neo-logism in German language (different from *Klang* which is acoustic "sound") in this context refers to the inaudible vibrational ("analogue") and rhythmic ("digital") field (*Sonik*).

Sound as epistemological form of timing refers to continuous ("analog") vibrational and discrete ("digital") frequential dynamics of all kinds, ranging from the most precise (electro-)physical micro-moment over the human affect of temporal perfection up to repercussions of what traditionally (fixed by writing) used to be called history. But to understand the ways that media inscribe themselves on our bodies, we need a philosophy of time that recognizes the production of a different time-writing. "Before the phonograph, no sound had the option but to be fugitive. A historical rupture in the nature of sound arises that, in turn, rewrites its entire history."²⁶ But maybe this irritation is more fundamental: not just a historical rupture, but a rupture of the privileged dominance of historical discourse over the phenomenology of emphatic time as such. The generation of vocal or even musical "presence" of cognitively known absence induced by the phonograph does not simply ask for a re-writing of media historiography, but requires different ways of writing temporal figurations as such - a kind of archaeography which the oscilloscope making visible sonic wave forms performs for long time already.

Sound and music let us experience transient time and even time-invariant affects. It is this processual experience which the sonosphere shares with high-electronic media. Just like culture tries to save sound and music itself from its ephemeral temporality, signal recording media for the first time in cultural history mastered the time axis towards arbitrary manipulation.

The term "sonicity" does not refer to the apparent phenomenological quality of sound but rather to its essential temporal nature which is its subliminal message behind the apparent musical content.²⁷

²⁶ Peters 2004: 193

²⁷ This argument refers both to Marshall McLuhan's central argument ("the medium is the message") in *Understanding Media* (1964) and to Martin Heidegger's

Nicole Oresme's late medieval *Tractatus de configurationibus qualitatum et motuum* defines the "sonus" in its physical materiality as a function of the time axis²⁸ and thus comes close to the present definition of sonicity as epistemic articulation. The diffuse genealogy of the term *sonus* ranges from the concrete physical materiality of sound up to its epistemological definition²⁹ for which the neologism *sonicity* might be allowed.

Sonicity refers to knowledge about implicit periodically varying functions of time.³⁰

In reverse, acoustic sound - in order to be communicated beyond its natural physical limits - must be technically transduced in order to fit to a technical channel such as the telephone line or electro-magnetic radio waves. While passing as transduced signal (voltage-controlled current), sound is in its implicit state.

Volatile sound and speech must be converted implicit in order to pass the channel of cultural time and "historical tradition": it must either be signal-recorded in phonography or symbolically coded by musical notation.³¹

According to Marshall McLuhan, telephone, gramophone, and analogue radio were "the mechanization of post-literate acoustic space"; in fact: "We are back in acoustic space".³² McLuhan declared on the climax of analogue electronic broadcast media culture. "Sonic" space is understood here as the epistemological existence of sound, somewhat opposite to the term in physics.

The term "sonic epistemologies" itself is already awry; ancient Greek *epistemé* is already triggered by the visual bias of alphabetic writing (as defined by McLuhan 1962).³³

epistemology of technology's essence, in: *The Question Concerning Technology and other Essays*, New York (Harper and Row) 1977

²⁸ "[...] aliam vero extensionem habet [sonus, et] motus, a tempore, que nunc vocetur longitudo ipsius soni": Nicole Oresme and the Medieval Geometry of Qualities and Motions, ed. by Marshall Clagett, Madison, Milwaukee / London (Univ. of Wisconsin Press) 1968, Book II, chap. 15 *De natura et difformitate sonorum*, 306

²⁹ See Frank Hentschel, entry "Sonus", online www.sim.spk-berlin.de/static/hmt/HMT_SIM_Sonus.pdf (accessed July 2013)

³⁰ In that sense, John Durham Peters writes of "sonic revelations" of the vibrational qualities of the human eardrum by Hermann von Helmholtz' artefactual resonators (Resonatoren): Helmholtz, Edison, and Sound History, in: Lauren Rabinovitz / Abraham Geil (eds.), *Memory Bytes. History, Technology, and Digital Culture*, Durham / London (Duke University Press) 2004, 177-298 (185)

³¹ See Peters 2004: 188

³² McLuhan, "Five Sovereign Fingers Taxed the Breath" (1954)

³³ Tatsächlich führt die Altphilologie das griechische *gignóskein* (das Erkennen eines Gegenstandes als sein Erzeugen) auf den Zusammenhang mit Begriffen des Sehens, des Auges, zurück.

Therefore, no. 4 of the Journal for Sound Studies (JSS) is a special issue devoted to *Sonic Epistemologies* which is sometimes called "acoustemic" already.

Marshall McLuhan made a crucial discovery about the intrinsically "acoustic" structure of electronic mediascapes.

The immediacy of electricity has been valued essential by McLuhan as the definite difference to the Gutenberg world of scriptural and printed storage of information:

"Visual man is the most extreme case of abstractionism because he has separated his visual faculty from the other senses <...>. <...> today it is threatened, not by any single factors such as television or radio, but by the electric speed of information movement in general. Electric speed is approximately the speed of light, and this constitutes an information environment that has basically an acoustic structure."³⁴

Very media-archaeologically, McLuhan's terms "basic" and "acoustic structure" evidently refer to an epistemological ground, not to the acoustic figure in its phenomenological body-related sense.

In an epistemological sense, the sonic is not about (or limited to) the audible at all, but a mode of revealing modalities of temporal processuality, up to the "superstring" theory of today. Already Henri Bergson formulated his dynamic idea of matter in the sense of vibrating waves and frequencies.³⁵

"The *message* or effect of electric information is acoustic" (McLuhan) - even when it is perceived as an electronic "image" - as defined by the video artist Bill Viola in his essay "The Sound of One Line Scanning"³⁶.

McLuhan's "acoustic space" is oscillating time and implicitly re-turns in Gilles Deleuze's "interval" philosophy.

But information in "online" worlds come a-simultaneous from topological directions which recalls a different structure of the act of *hearing*.

"Sonic" tempor(e)alities unfold on the level of packet switching in the "social net": "Temporalities of flows, bursts, and various techniques and technologies of time management [...] is what characterises the specificity of reproducing existing worlds in network culture."³⁷

So let us listen to how "prosodic" communication in the World Wide Web sounds

³⁴ Letter to Barbara Ward, 9 February, 1973, in: McLuhan 1987: 466

³⁵ Henri Bergson, *Matière et Mémoire*, Paris 1898; in English *Matter and Memory*, 276: matter = vibration

³⁶ Bill Viola, *The Sound of One Line Scanning*, in: Dan Lander / Micah Lexier (Hg.), *Sound by Artists*, Toronto / Banff (Art Metropole & Walter Phillips Gallery), 1990, 39-54

³⁷ Abstract to Jurri Parikka, *Of Queues and Traffic: Network Microtemporalities*, lecture at the Glasgow Memory Group symposium *Digital/Social Media and Memory*, April 17th, 2013

like on its basic media-archaeological level, its signal clocking in terms of *dactyles*:

All of the sudden, one of the oldest figures of prosody in occidental poetic speech returns as implicit sound of digital tele-communication - true *technopoiesis*.

Sonic tempor(e)alities

In fact, the sonic ground of the electronic image is "hidden" in the media-archaeological and Heideggerean (*aletheia*) sense: "It is acoustic. It resonates. But this is a hidden ground, because superficially people think they're looking at a visual program. And they're not. They're not looking at all - they're absorbed, involved in a resonating experience."³⁸ So-called immersion is rather into a *sonic* than visual sphere.

There are two kinds of carrying sound and music through time: musical memory as symbolically notated in scores (the archive) and sonic memory preserved in signal-based recording media (starting with the Edison phonograph) which are endowed with "temporal indexicality" (Thomas Y. Levin). Media temporality refers both to the symbolical ("digital") and the physically real ("analogue") regime - like the clocking of computers and the "Time-To-Live" which in the Internet for data packets decides about the success of communication in virtual, that is: calculated space.

In the world which is experienced by all of us as presence we observe an implosion of the despotic signified "time" into a multiplicity of times and timings in the sense of chrono-poetics.

This time machine (not in the sense of time-travelling, but of time-generating mechanisms) is sonic by nature. The term "sonic" here refers to the two bodies of dynamic tempor(e)alities: the wave form and the digital, that is: mathematically intelligent (algorithmic) manipulation of numerically addressable frequencies.

Music when effectively, that is: physically, implemented in operative media is in itself *a priori* already, a sonic *Versinnlichung* as the temporal affect. In a more advanced interpretation, sound is even a *sonifiction* of time in the strict sense of Latin *fictio*, since it *generates* temporality.³⁹

Different from functional sonification as defined by Gregory Kramer as "the use of nonspeech audio to convey information"⁴⁰, sonicity is about *implicit* acoustics

³⁸ Marshall McLuhan, in: Letters of Marshall McLuhan, selected and edited by Matie Molinaro / Corinne McLuhan / William Toye, Toronto / Oxford / New York (Oxford University Press) 1987, 177

³⁹ See W. E., Chronopoetik. Zeitweisen und Zeitgaben technischer Medien, Berlin (Kulturverlag Kadmos) 2012

⁴⁰ "More specifically sonification is the transformation of data relations into perceived relations in an acoustic signal for the purposes of facilitating communication or interpretation": Gregory Kramer et al., Sonification Report. Status of the field and Research

- like the Pythagorean notion of sound as number⁴¹ which is the "acoustic" in McLuhan's *implicit* audio sense - a processual mode taken as epistemological term.

The present music field - be it experimental popular music or avantgarde compositions - is characterized by an aesthetic multiplicity which extends the limits of human perception to infra- and ultra sound and to micro-temporal events.⁴² This pushing of sonic limits is itself a effect of the almost infinitive flexibility of digital technologies. Thus it makes sense to extend the term "sonic" to non-acoustic time-based eventualities: vibrations and their mathematical reversal which is frequencies.

[The (h)ear(ing apparatus) is much more sensitive to micro-temporal (time-critical) processes than the eye. While the flickering of an electric bulb (50 times/sec.) can not be noticed by the after-image in the eye any more (the cinematographical effect), the rising of acoustic pitch from 50 to 100 oscillations/sec. is very well perceived indeed.]

This hits a deep epistemological dimension. If the experience of being is not a static one (ontologic), but rather processual (being-in-time), then the definition of existence as "being tuned" ("Durchstimmung" with Heidegger) recalls sonic resonance. "Stimmung", in German, relates both to the voice ("Stimme") and to the tuning ("stimmen") of an instrument - constituting "sonic" media temporality.

"In order for one person to understand what another person says, he must be 'in tune' with him. [...] such intrapersonal synchrony is far more fine-grained than that of any *corps de ballet*."⁴³ This gives a sonic meaning to the common insight that "all communication is a function of social context"⁴⁴.

Let me fundamentally question the historicity of sound, arguing for an archaeology and insist that in many respects sound - heard, recorded or transmitted - is radically ahistorical; its specificity could not be captured and subsumed by the logocentrism of traditional narrative historiography. Serious engagement with "the sonic" - sound as sound and sound as time - provides access to a plurality of non-narrative temporalities.

Agenda, *online* <http://sonify.psych.gatech.edu/publications/pdfs/1999-ns-f-report.pdf> (Januar 2013)

⁴¹ Dazu Paolo Gozza (ed.), *Number to Sound. The Musical Way to the Scientific Revolution*, Dordrecht / Boston / London (Kluwer) 2000

⁴² On "sonic" time, see chap. 9 "Toward a Media Archaeology of Sonic Articulations", in: W. E., *Digital Memory and the Archive*, edited and with foreword by Jussi Parikka, Minneapolis / London (University of Minnesota Press, Reihe Electronic Mediations, Bd. 39), 172-183

⁴³ Alan Lomax / Irmgard Bartenieff / Forrestine Paulay, *Choreometrics. A Method for the Study of Cross-Cultural Pattern in Film*, in: Ronald D. Cohen (ed.), *Alan Lomax, Selected Writings 1934-1997*, New York / London (Routledge) 2005, 275-284 (278), referring to: W. S. Condon / W. D. Ogston, *Film Analysis of Normal and Pathological behaviour*, in: *Journal of Neurological and Mental Diseases*, vol. 142, no. 2 [Jahr xxx], p. 237

⁴⁴ Lomax 2005: 277f