MEDIA ARCHAEOLOGY: THE CRISIS IN NARRATIVE MEMORY

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Media materialism: Cultural technologies and Nietzsche´s typewriter

Media archaeology is not Mass-Media studies; its notion of communication rather relates to Claude Shannon´s *Mathematical Theory of Communication* (1948) which does not mistake communication for mutual human understanding. Conceptual media archaeology is neither about re-discovering the loosers in media history for a kind of Messianic redemption, but rather an effort for in-depth insigh into the principles of technological events. Therefore, media archaeology reminds of the hardware material or software logical substance of which media is made or consist. Digital archaeology operates below sight and sound, and is therefore not immediately accessible to human senses. Let us not forget, the very term "digital" reminds of the archaeological meaning of computing, its hardware relais, signal processing by electric fluidity and swichting boards.

If there is something like a Nietzschean oder Heideggerean approach media theory, it is extremely hardware-orientated in the sense of material culture studies. Wendy Chun seeks to mediate between visual culture studies and media archaeology:

"[T]o exaggerate slightly, the screen divides new media studies into these two fields. Visual culture studies stem from the Anglo-speaking academy and generally treats the

interface, or representations of the interface, as the medium. The second approach, media archaeology, although inspired by Marshall
McLuhan and Foucault, is mainly Germanic (most specifically, it emerges from [...] Humboldt University in Berlin). Taking as its ground zero McLuhan's mantras of 'the medium is the message' and 'the content of a medium is always another medium,' media archaeology concentrates on the machine and often ignores the screen's content. Archaeological studies critique visual culture studies' conflation of interface with medium and representation with actuality; visual culture studies critique the archaeologists' technological determinism and blindness to content and the media industry."[1]

Inbetween stands Lev Manovich´s notion of "cultural software". Manovich separates between the cultural and the technical level in the computer; the term "cultural engineering" (German *Kulturtechniken*) links both.[2]

Media archaeology focuses cultural analysis to techno-cultural engineering which differentiates it from the more discourse-oriented Cultural Studies. At this point media archaeology exposes the technicality of media not in order to reduce culture to technology, but applying what is known in textual studies as "close reading" to the analysis of mediated and mediating processes in order to reveal the epistemological momentum in technology. The aesthetics of "loops" in popular music or video art, for example, are a product of the technology itself, resulting in a specific sense of repetivitive temporeality in contemporary media culture.[3] A technical notion like "real time", on a discursive level, is commonly confused with synchronicity and "live" transmission like in radio and TV, but is rather a simulated presence: the time-critical processing of an complex event in digital space for what the human perception still conceives as "present".

Media archaeology takes as its actual model and point of departure the digital condition of contemporary culture, by opening the horizon ranging from the elementary ancient Greek vocal alphabet across Raimundus Lullus´ combinatorial "memoria artificialis" which operates with the idea of the discrete, stochastic "alphabet" of terms[4], up to the operative algorithms of digital computing.

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[1] Wendy Hui Kyong Chun, Control and Freedom. Power and Paranoia in the Age of Fiber Optics, Cambridge, Mass. / London (M.I.T. Press) 2006, 17

[2] See Theory, Culture & Society, vol. 30, no 6 (November 2013), special issue *Cultural Techniques*

[3] See Tilman Baumgärtel, Geschichte und Ästhetik des Loops, demnächst Berlin (Kulturverlag Kadmos), Herbst 2014

[4] See Sybille Krämer, Symbolische Maschinen: die Idee der Formalisierung in geschichtlichem Abriß. Darmstadt 1988, 88

Marshall McLuhan underlines that the "archaeological" analysis of scientific research is itself a by-product of the Gutenberg era of printed, discrete letters; analysis in fact operates by de-composing a text into single elements (*elementa*, or even *stoicheia*, the Greek expression for both single alphabetic letters and atomic units in nature). It has been a crucial moment - rather archaeological than historical, since not immediately reflected in cultural terms - when the invention(s) of the discrete alphabet (as opposed to ideographic writing systems like the Egyptian hieroglyphs) cut down the human language into smallest elements which are meaningless in themselves, from house (*beth*) to "B", so to say. At this moment the machines take over, since only machines can perform symbolic operations without any semantic referentiality (which hinders effective data processing) at all, purely syntactically.

The discrete alphabet materially refers to a prominent media-archaeological artefact. A small exhibition at Weimar 2002 grounded so-called Weimar culture as rupture between classicism (Goethe) and modernism (Nietzsche) in two media-archaeological artefacts: Goethes mechanical pencil and Nietzsche´s typewriter. Different kind of content has been produced by such different devices, as explicitely expressed by Nietzsche: "The writing instrument co-produces our thoughts." Media technologies are not simply functions of historical and cultural discourses. On the contrary, the French *Apparatus* theory, notably Marcelin Pleynet, took account of the ideological *a priori* (in the Kantean sense) of the technical apparatus:

"[...] l´existence non significante d´un appareil producteur d'images, qu´on peut indifférement utiliser à ceci ou à cela, à droite ou à gauche. <...> les cinéastes auraient intérêt à s'interroger sur l'idéologie que produit l´appareil (la caméra) qui détermine le cinéma"[5], for instance "une caméra productrice d´un code perspectif directement hérité, construit sur le modèle de la perspective scientifique du quattrocento" <ibid.>.

The Weimar project resulted in an analysis of the hardware of Nietzsche´s typewriter itself (housed in the Weimar Classic Collection). Such an operative analysis could not be accomplished by textual hermeneutics of the resulting typescripts exclusively, reading the texts which Nietzsche produced. It is the mechanism and symbolic order of his typewriter itself which produced his co-called "nonsense-poems", proving that Shannon was right when in his theory of information he declared that semantic aspects do not matter to techno-mathematical engineering.

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[5] "Éconimique, idéologie, formel ...", in: Cinéthique no. 3 (1969), 10

Soft *versus* analytic media archaeology: theory and method

The term "media archaeology" is *en vogue* nowadays in media studies; path-breaking have been the writings of Siegfried Zielinski (recently called "variantology"[6]), to Bruce Sterling's "Dead Media Handbook Project", and the writings of Erkki Huhtamo, Jussi Parikka and others.[7] On occasion of the February 2004 festival "An Archaeology of Imaginary Media" at De Balie in Amsterdam it became apparent that many authors take the term "media archaeology" at face value, almost metaphorically: referring to the "digging out" of forgotten machinic visions of the past, of alternative media in the baroque, f. e., media which were never materialized or which are simply forgotten today.

Recent Science and Technology Studies place technological development within a broader social, discursive and cultural frame of reference. C. W. Ceram's seminal *Archaelogy of the cinema* (1965) puts emphasis on the actual mass-media effects in the prehistory of motion pictures rather on the epistemological *momentum* behind the subsequent discoveries. Radical media archaeology rather looks for techno-epistemogenic constellations than for media-sociological roots. Such moments erupt as conceptual discontinuities, physical thresholds, technical limits and data series – as (non-technically) expressed in the introduction to Foucault´s *The Archaeology of Knowledge*.[8]

Media taken as physical channels of communication and as techno-mathematical artefacts which are operated by symbolic codes and streaming data, ask to be analyzed in ways different from texts or works of art. The archeological gaze (theory in the ancient sense of "insight") is such a way of looking at media objects: enumerative rather than narrative, descriptive rather than discursive, infra-structural rather than sociological, taking numbers into account instead of just letters and images. Images from data bring us back to the American Standard Code for Information Interchange (ASCII), based on a seven bit structure, which in early days of computing was used for transmitting photos and graphics as well by pixeling the visual information and translating it

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[6] See Siegfried Zielinski / David Link (eds.), Variantology 2. On Deep Time Relations of Arts, Sciences and Technologies, Cologne (Walther König) 2006

[7] See Erkki Huhtamo / Jussi Parikka (eds.), Media Archaeology. Approaches, Applications, and Implications, Berkeley / Los Angeles / London (University of California Press) 2011

[8] The Archaeology of Knowledge [FO 1969], New York (Routledge) 1972. For an current media archaeology of cinema, see Thomas Elsaesser, Film History as Media Archaeology. Tracking Digital Cinema, Amsterdam (Amsterdam UP) 2016

into the available 128 characters. Different art projects
refer to this digital Stone Age, and *ascii Vision* is seen in
the context of the works of the *ascii-art-ensemble* and Gerhard
Sengmüller´s *VinylVideo* project. He calls his undertaking a
"piece of faked media archaeology"[9]; it still shares with
serious media archaeology the bias the reminds vievers of the
basic, even archaic *principles* of media functions - reducing
electronic complexity to their techno-lical *arché*.

Positioned between archaeology as academic discipline for
analyzing material culture from the past and the Foucauldean
notion of *l'archive* as the set of rules governing the range of
what can be verbally, audiovisually or numerically expressed
at all, media archaeology is a) a methodic way and aesthetics
of practicing media studies and media criticism, b) an effort
to re-enact apparently "dead" media and their reverse
engineering,
and c) an awareness of moments when media themselves, not
exclusively humans any more, become active "archeologists" of
understanding and insight, such as imaged-based image
retrieval within digitized media archives. Beyond Marshall
McLuhan, media are not just extensions of men any more, but
become chrono-poetic themselves.

Vocal machines

In occidental logocentric epistemology, there is a vibrational
event which looks most human: the voice. Machines for
artificially synthesizing vowells like "a-e-i-o-u" have been
construced. Once sound waves and frequencies of the human
voice were mathematically (that is: "really", not simply
symbolically by the vocal alphabet / *stoeicheia*) analyzed,
they became computable, starting with a Leonard Euler in St.
Petersburg, a contemporary of Immanuel Kant, when in 1739 he
developed his music theory and chose the analytical way to
approach human articulation (the Euler equations).

Truly *media*-archaeological analysis of cultural articulations
(be it artefacts of voices) takes place when media themselves
become the technical tools of analysis, just like in early
chrono-photography which was meant to analyze the movement of
horses unpercetable by human eyes since too fast. The interest
is not in representation but in techno-operative measuring, as
opposed to the performative use of cinematography for
narrative film projection.

Beyond media-anthropomorphism, the technical functionen can be

[9] visomat inc., asciiVision, in: Thomas Y. Levin, Ursula Frohne
/ Peter Weibel (eds.), CTRL[SPACE]. Rhetorics of Surveillance
from Bentham to Big Brother, Cambridge, Mass. (MIT) /
Karlsruhe (ZKM) 2002, 372

performed much better by not imitating living beings, but adopting to the genuine physical signal event. Such media are not McLuhan's extensions of man any more, but rather they subject man to the apparatus. In 1878, Edison describes in a patent one of the possible uses of the phonograph as speech generator, "to teach the relationship between each letter of the alphabet and its sound: a set of typewriter keys, each labelled with a single letter, activated the playback of individual sections of a long cylinder that contained the spoken forms of those particular letters".[10]

Siren songs and *Musurgia*

Sirens, by their singing, almost seduced Ulysses to death. Homer´s epic can be read in terms of classical philology, cultural poetology, mythology and even gender studies.[11] Media archaeology, on the other hand, has a different reading of what seems to be neglected in these analyses. The fact that Homer explicitely (by using the grammatical archaic form of the dual at song 12 line 52 and 167) names t w o Sirens can only be explained by an archaeology of early Greek music (enharmonics, the double-flute *auloi*). A literal reading of such "ambiguity"[12] surrounding the Sirens' song comes close to Maurice Blanchot´s interpretation of the "superhuman"[13], not even anthropomophic Siren motive. Thus the Sirens do not simply "present the most serious female challenge to the authority of the *Odyssey* narrator"[14], but rather a challenge to the idea of the human voice as such, just like in the so-called Turing Test the gender question and uncertainty is extended to the human-machine communication at all.

Already Descartes deciphered animals as automata. Media archaeology refers to the uncanny in the human itself (like von Kempelen's artificial chess-player referred to in Benjamin ´s *Theses on the notion of history*). Siren voices - what did they sound like? Operative media archaeology actually explored the acoustic uniqueness of the Li Galli isands in the Gulf of Positano at the Italian Amalfi coast in early April 2004: a range of experimental sounding and measuring, from two opera singers performing the Siren song lines which are in Homers´ *Odyssey*, up to an electronic sampling of the kind of noise which is produced on these islands by bees, by the wind, by

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[10] Hugh Davies, A History of Sampling, in: Feedback Papers 40, Cologne (July 1994), 2-15 (4)
[11] See Lillian Eileen Doherty, Siren Songs. Gender, Audiences, and Narrators in the Odyssey, Ann Arbor (University of Michigan Press) 1995
[12] Doherty 1995: 61
[13] Doherty 1995: 136
[14] Doherty 1995: 139

the waves.[15] Thereby the sono-sphere has been given the chance
to express itself by help of most advanced sonic technologies,
assuming that (like Schliemann excavating ancient Troy) the
Sirens were not just poetic fiction but there is implicit
local knowledge which has been preserved in cultural aocustic
memory. Sound frequencies belong to the regime of the real,
not the symbolical, and (according to Jacques Lacan) the real
always returns to its place. Media archaeology is as close to
natural or technical sciences as it is to academic humanities.

A recurrence of bodiless or technological (thus: monstruous)
voices is the phonograph which for the first time made the
voice not only symbolically (alphabet) but physically signal-
recordable. Reverse phonography is acoustic media-archaeology.
In Gregory Benford's novel *Time Shards*[16], workers at the
Smithsonian Institution prepare a time capsule to be buried in
2000 AD, while a scientist tries to resurrect voices from 1000
AD. As suggested in Paul DeMarinis' media-artistic
installation *The Edion effect* we can listen to the voices of
people from a thousand years ago by rading grooves on pottery.

Different from such wave forms is discrete acoustic signal
processing, known from an instrument appropriately called
"Siren" for war attack or fire warning. The technical Siren
was developed by Charles Cargniard La Tour in 1819 and
improved by Hermann v. Helmholtz, linking discrete sound
production (the siren / the alphabet) to the mathematics of
Fourier series: auditory perception as a machinic process. The
composer Edgard Varèse, in his piece *Ionisation*, performed
this "corporification de l´intelligence qui est dans le sons".
With the introduction of the optical film soundtrack in the
end 1920s, sound could be photoelectrically recorded on a
narrow track beside the visual images and therefore even be
monitored and visually analysed itself. Most of the early
electro-acoustic instruments like photoelectric organs from
the late 1920s and the 1930s were based on a rotating disc
that interrupted the passage of a beam of light between its
source and a photocell to avoiding mechanically direct contact
with the surface of the recording. "Many of these sytems used
a principle derived from that of the siren, interrupting the
light-beam by a rotating opaque disc in which holes or slits
had been cut."[17] Synthesizers take over - between the analog
and the digital. Athanasius Kircher once designed a machine to
compose music with stardardized set pieces, the *Arca
musarithmica* from his study on Baroque music in 2 volumes
Musurgia universalis (Rome 1650). Music automata, as the
precursors of computer-programmable music, allowed for music

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[15] See W. E., Towards a Media-Archaeology of Sirenic
Articulation. Listening with media-archaeological ears, in:
The Nordic Journal of Aesthetics, No. 48 (2014), 7-17
[16] Orig. 1979; electronically *online* 2000: FictionWise eBooks
[17] Davies 1994: 6

to unfold without a human musician being present.[18]

The Sirens in Homer´s *Odyssey* uncannily reminded humans that their own voice maybe not be that individual but be reproducible by a technical vocoder. Such automata are by no means imaginary or allegoric but rather, with Descartes, they reveal the automativity within the animal itselt, just like Norbert Wiener's *Cybernetics* (1948) explictely correlates communication and control in the animal and the machine. The sublime epistemological challenge of technical media addresses the notion of humanness itself. In fact, the media archaeological impulse and method - as apposed to media anthropology or media sociology - is to take the perspective of the machines in order to get liberated for moments from the subjective human view.

Sound archaeology

If sound is evasive, liquid, in itself unrecordable and transferable beyond the bodily range, then technical media (different from alphabetic phonetic writing which "freezes" the human voice by reducing it to a range of a very limited symbolic code) are able to de-freeze recorded voices in all its frequencies in re-play as heritage of the Edison wax cylinder. The author Arthur Schnitzler knew it, when speaking into the phonograph on 19th March 1907, thus admitting that confronted with the phonograph literature had lost its unique privilege to transmit the memory of human language.[19] But any replay of such a recording will result as well in the scratching, the noise of the recording apparatus itself. True media archaeology starts here. The auditive equivalent to the media-archaeological cold gaze is cold listening.[20]

It is still an undigested shock in the cultural unconscious that we are able, today, to listen to bodyless human voices which exterminated hundred years ago, by applying laser reading of the wax cylinders which do not destroy its source

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[18] See Sebastian Klotz, *Ars combinatoria* oder "Musik ohne Kopfzerbrechen". Kalküle des Musikalischen von Kircher bis Kirnberger, in: Musiktheorie Bd. 14 (1999), Heft 3, 231- 245; for the link between music automata in Arabic medieval culture and current computing, see Shintaro Miyazaki, Algorhythmisiert. Eine Medienarchäologie digitaler Signale und (un)erhörter Zeiteffekte, Berlin (Kulturverlag Kadmos) 2013

[19] Phonograph record signature Ph 536 in the Vienna *Phonogrammarchiv* (Austrian Mediathek)

[20] "Der Phonograph hört eben nicht wie Ohren, die darauf dressiert sind, aus Geräuschen immer gleich Stimmen, Wörter, Töne herauszufoltern; er verzeichnet akustische Ereignisse als solche." Friedrich Kittler, Grammophon - Film - Typewriter, Berlin (Brinkmann & Bose) 1986, 39 f.

in the act of re-play. But what do we hear: Message (the vocal articulation) or noise (the scratch)? The micro-physical *close listening* to sound, where the materiality of the recording medium itself becomes poetical, dissolves any semantically meaningful archival unit into discrete blocks of signals. Instead of musicological hermeneutics, media-archaeological understanding is required here. The media archaeologist, without passion, does not hallucinate life when he listens to recorded voices; his exercise is to be aware at each given moment that we are dealing with media, not humans, that we are not speaking with the dead but dead media operate.

Media archaeology - against media anthropology? Karsakov 1832

Does human performativity differ essentially from technical or algorithmical operativity? Semen Karsakov´s text *Aperçu d'un procédé nouveau d'investigation au moyen de machines à comparer les idées*, St. Petersburg 1832, was at first unretrievable, because of the wrong spelling "Korsakov". Every letter changes the address in storage techniques like libraries or computer memories. Here, media archaeological research literally requires media archivology.

Karskakov once worked in the statistical department of the Russian Police Ministery in St. Petersburg. In his machines, data was recorded (and stored) on punched cards. Punched cards were, at the time, introduced in France in 1805 by Jacquard for controlling his textile machines. Korsakov implement them for informatics, in anticipation of Hermann Hollerith. He defined in his own terms and presented the conception of artificial intelligence as an "auxiliary amplifier for natural intelligence".[21] Emphasizing the decisive meaning of the alphabet which enabled humankind to "impress ideas onto (physical) matter" up to appearance of the synoptic tables in the Modern Age, Korsakov developed his idea further on to suggest the combination of these tables with a mechanical processing device so as to facilitate (automate) the "comparison of ideas". He called such devices "machines intellectuelles", and predicted their intensive future development. "Just as the telescope and the microscope provided the additional power to our eyes, the intellectual machines would limitlessly strengthen the power of our thought (mind), as soon as distinguished scientists apply their knowledge to studying the principles of this process and compose the tables necessary for its application in various fields of the human knowledge."[22]

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[21] See Wladimir Velminski / W. E., Semën Karsakov: Ideenmaschine. Von der Homöopathie zum Computer, Berlin (Kulturverlag Kadmos) 2007
[22] Karsakov 1832: 8

Thus Karsakov took seriously into account what the novellist Giacomo Leopardi in his *Proposta die preme fatta dall ´Accademia dei Sillografi* in 1824 where he described his age as "l´età delle macchine", where "non gli uomini, ma le macchine, si può dire, trattano le cose umane e fanno le opere della vita"[23].

Data anthropometrics

The reason for the existence of archives has for centuries been the legal memory of the state, not the imperative for cultural memory. Media memory is not primarily for cultural use; images from (surveillance) data are nothing but iconic abbreviations of a statistical data avalanche which would otherwise be unperceivable, unmasterable by human senses. What the constant data stream of pictures from surveillance cameras acutally performs is a film-making of a different kind, a kind of aesthetics which was re-translated into film by Mike Figgis ´ *Time Code* (USA 2000) which advertised that "for the first time, a film shot in real time"[24]. Heiner Mühlenbrock´s video assemblage of footage from material of surveillance cameras in the Berlin International Congress Center (ICC) is appropriately named *The ice-cold eye* (1989/90). In such a truly media-archaeologal perspective, the traditional story board is replaced by the non-narrative logic of the camera itself; its electronic indifference opposes the culturally coded (rather than anthropologically natural) longing for story-lines in life and in movies: no cameraman, no director, no script, no actors, and no story[25], rather *imaging*.

The punched card

With the numerically punched card, images from data gernerate a trans-visual memory in Descartes' sense, no more visual *artes memoriae*.[26] Textile imagery in the subsequent Jaquard loom were derived from punched cards which literally in-formed the weaving of textile images.[27] Charles Babbage contained a

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[23] In: Le Operette morali, Florenz (Sansoni) 1931, 30 ff.; quoted here after: Hilda L. Norman, Leopardi and the Machine Age, in: Otto Mayr (ed.), Philosophers and Machines, New York (Science History Publications) 1976, 147-157 (148)
[24] www.sony.com/timecode
[25] Heiner Mühlenbrock, The ice-cold eye, in: Levin / Frohne / Weibel (Hg.) 2002: 614
[26] This epistemic rupture has been described by Frances Yates in *The Art of Memory*
[27] See Birgit Schneider, Textiles Prozessieren. Eine Mediengeschichte der Lochkartenweberei, Berlin / Zürich (Diaphanes) 2007

punched-card based woven portrait of Jaquard in his office. In reverse, Ada Lovelace's notes on the Analytical Engine pointed to the option of computationally weaving "algebraic patterns". The analytical engine is itself a media archaeologist, performing data processing which humans can never do in that speed. In textile processing, the fabrication of the tissue - just like with electronic pixel images - follows a pre-structuring by lines, columns and puntual elements; such image weaving operations results from the logic within the machines itself which is ultimately a mathematical logic. Whereas Babbage, for his Analtical Engine, was inspired the image-producing Jacquard loom which is a programmmable medium to calculate numbers, later the number crunching machine called computer produces images from numbers. This kind of Moebius loop is the figure of media archaeology, a figure which is alternative to historiography and terms like evolution, development, progress. There is rather a mechanism of strange attractors at work which can be media-epistemologically specified down to its techno-logical components.

Images from data

Therefore media archaeology looks at images not iconologically, but with the "cold archaeological gaze": as lots of data (once scanned into digital space), thus calculable, rather than narratable.

Such as the electronic tunnel microsope does not actually transfer images of the atomic surface of matter, but analyses its object by matching data statistically and reprsenting these calculations as images - just like bats do not perceive space iconically, but by echo orientation in space.

Media archaeology is akin to the gaze of the optical scanner other than the "ethnographical" gaze. An image, for media archaeologists, is different from what an image is to art historians or Visual Studies. The media archaeological gaze is close to radar which is rather a "system of measurement rather than communication"[28]. Radar is an analogue technique rendering a physical image (rather map) of the surrounding area of an antenna, while on the level of signal transfer it operates with discrete impulse- and duplextechnology. Thus the radar image is rather analytical (a measuring device) than a medium of representation, of projection (like mass media). Both though, TV and radar, are based on the same cathode ray tube; actually the German TV set which was ready to go into mass

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[28] Woodward 1950, as quoted in: Friedrich Wilhelm Hagemeyer, Die Entstehung von Informationskonzepten in der Nachrichtentechnik. Eine Fallstudie zur Theoriebildung in der Technik in industrie- und Kriegsforschung, PhD thesis Berlin (Freie Universität) 1979, 341

production in 1939 was immediately converted to military uses after the outbreak of WWII.

Media archaeology is not only a form of research, but as well an aesthetic of observation - the passion for distancing, corresponding with the gaze of the camera (proclaimed by Dziga Vertov as "Kinoglaz") or the digital monitoring system which has long replaced the tele*visual* panoptical regime of video cameras by data patterns and clustering.

At this point we come back to the radar image as form of intelligence, a very precise way of translating the Greek notion of "theory". Radar in fact embodies something like "the inverse principle of broadcasting ("das inverse Prinzip zum Rundfunk"[29]).

That is why media archaeology is the other side of the coin of mass media studies in that it does not focus on one-way signal transmission of intelligence; unlike broadcasting, rather like radar, it gathers intelligence from technological surroundings and from within the "black box".

The cold (media-)archaeological gaze versus warm historical imagination? Farocki *versus* Cameron

The cold camera-eye gaze of *tele*visionary media relates to media-archaeological aesthetics; Nietzsche´s "pathetic distance" corresponds with Michel Foucault´s insistence on the exteriority of analysis, as opposed to hermeneutric empathy. The media-archaeological gaze is *cold* in McLuhan´s sense of differentiating between "hot" and "cold" media - with the later ones inviting the human receiver zu participate actively in putting data streams into relation(s). When media themselves become active archaeologists of data, the cold gaze of the machinic eye is no eye any more but an element in cybernetic feedback systems, as expressed in Harun Farocki's video film series *Auge / Maschine*. Does it make sense for media theory to metonymically apply the catgory of the human gaze to machine vision? Dziga Vertov, in his film *The man with the camera*, makes the camera-eye (the KinoGlaz) the agency of vision.

In Alfred Hitchcock's film *The Birds*, at one point, the camera switches to the birds-eye perspektive from above, where the whole scene looks completely different, more like a configuration. In fact, the overall perspective in this film is, technically, the camera eye. In technical systems, the notion of "seeing" itself becomes metaphorical; while communicating, signale are being compared - no more camera „eye". In C3I technologies, Command, Control, Communications

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[29] Hagemeyer 1979: 341

and Intelligence converge. Cruise Missiles are guided by matching pre-recorded with actually perceived visual maps (operative images), like in GPS not images but topological data are being communicated.

The past search for the wrack of the ocean liner *Titanic* has been a true act of submarine archaeology. While the gaze of the camera is able to look at this archaeologically (that is, purely evidentially in the sense of remotely sensing data), the human eye immediately confounds evidence with magic when it comes to "re-presencing"[30] of such relics. "Out of the darkness, like a ghostly apparition, the bow of a ship appears [...] just as it landed eighty-four years ago", expresses the screenplay of James Cameron´s *Titanic*, and film director James Cameron recollects his search: "Initially <...> I was like the astronauts who experienced the moon as a series of checklists and mission protocols" - the true archaeological gaze. But "at a certain point I abondoned 'the plan' and allowed the emotional part of my mind to engage with the ship. It made all the difference in the world."[31]

Hermeneutic empathy (instead of navigating data) is a rhetorical figure; the gap between an *archaeology of knowledge* and historical imagination opens which seeks to replace positive evidence by reanimation. What is sonar echoing in submarine archaeology becomes *resonance*. But let us not confuse data with life. Sometimes the iconological impulse as cultural knowledge of contextual image-reading even hinders operative insight. The image search machine of the company Cobion at Kassel, Germany, f. e. once crawled the Web for pornographic child abuse images - a task which, for humans, is painsome.[32]

The visual metaphor of ancient Greek *theorein* is linked to theatre and to "evidence" in law. Media "theory" itself recognizes that the occidental links between the optical regime and epistemological insight is being replaced by the numerical sublime, that is: mathematical calculation. The Greek notion of "(h)istor" (for witness) derives from the linguistic root *w(e)id* (to see, to know) just like in

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[30] See Vivian Sobchack, Afterword. Media Archaeology and Re-presencing the Past, in: Erkki Huhtamo / Jussi Parikka (eds), Media Archaeology. Approaches, Applications, and Implications, Berkeley / Los Angeles / London (University of California Press) 2011, 323-333

[31] Joel Avirom / Jason Snyder, James Cameron´s Titanic, foreword by James Cameron, New York (Harper Perennial) o. J., xii

[32] "Daß Maschinen kein Empfinden haben, bedeutet in diesem Fall eine große Hilfe." Sandra Kegel, Auf der Suche nach den verlorenen Kindern, in: Frankfurter Allgemeine Zeitung, February 20, 2001, 56

"video".[33]

The US minister of foreign affairs, Colin Powell, once presented "undeniable evidence" of Saddam Hussein's mass killing weapons in the Iraque to the UN Security Council on February 5th, 2003; but these satellite images were fuzzy. And during the Bosnian War, when in July 1995 Serbian soldiers systematically executed several thousand Muslim men and then accumulated their bodies into mass graves around the area, these events occurred in TV news on the ground of US intelligence officers who used satellites to monitor them from afar. But what kind of evidence are such tele-visual electronic or digital signals, brought as an event on the television screen? As Paul Virilio repeatedly emphasized, photographic, cinematographic, electronic and digital cameras "see for us." Media scholar Lisa Parks adds the extra-terrestrial point of view: Satellites occupy a position that no human eye can ever replace - a non-human, unearthly position indeed, the media-archaeological gaze.[34]

Archive, culture, memory, entropy, Internet, storage-to-transfer

Media archaeology not only analyzes media culture in a non-anthropocentric way; it takes the presence of the archive itself at face value, not history as imaginary model of processing "past" data. Therefore no historical anthropology, but an archivology of media, which is subversive of the linear causality of narrative history. In accordance with the cultural semiotics developed by Jurij Lotman and the Moskow-Tartu-school, culture is a function of its memory agencies; Lotman has defined culture as a function of its inherent media, institutions and practices of storing and transferring cultural knowledge. Even closer to the physics of culture, media archaeology is concerned rather with data processing than with semiotics, with signals rather than signs.

One function of the technical archive is to take care that cultural and scientific data is being preserved for future retrieval; only the improbable re-use is *informative* since it makes a difference. In media philosopher Vilém Flusser's somewhat idiosyncratic definition, culture is based on negentropical energy, the un-natural order-keeping (the archive); for media archaeology, with Shannon, entropy is rather the measure of information probability. In Norbert Wiener's *Cybernetics* (1948), information is neither energy nor

[33] A derivation contested by Edwin D. Floyd, The Sources of Greek "(H)Istor" "Judge, Witness", in: Glotta LXVIII (1990), 157-166

[34] See Lisa Parks, Cultures in Orbit: Satellites and the Televisual, Duke University Press 2003

matter; thus a new kind of "cultural" analysis (not energetical any more) emerges.

Is multi-media memory "archival" in McLuhan's sense that each new medium has the form or the preceding media as its content? The Internet has not yet arrived at its own media-specific memory form. Data banks organized by the World Wide Web is not about content, but rather a transversive constellation of communication. Without content, there is no need for memory; "cyberspace has no memory".[35] Only data which are provided with addressable metadata can be accessed in the techno-cultural archive[36]; in the case of the Internet, this archival infrastructure itself becomes temporally dynamical with the need for *access* data of a given moment in a virtual text. Memorial space itself is being replaced by a limited series of temporal entities. Such topologies become readically temporalized, with the archival paradigm being replaced by permanent transfer.

Media-archaeologically seen, cyber"space" is not about images, sounds or texts, but about bits; hidden behind this romantic surface which misleads by metaphors the media-archaeological mapping is to indicate (indexical rather than iconical) the real stream of data: mapping Internet protocols, depending on IP-protocols. Thus any cartographic or mnemotechnical approach is misleading. This opens new horizons for search operations in the Internet: Not just addressing and linking images and texts by alphabetical addresses, subjecting images and sound to words and external meta-data once more (the archival classification paradigm), but addressing digital images down to the single pixel from within, in their own medium, allowing for random search (apparent disorder as alternative source of information as the unexpected) - literally bit-mapping, mapping (by) bits.

Images and sounds thus become calculable and capable of being subjected to pattern-recognition algorithms. The notion of „pattern", after all, is derived from Latin *pater* - a matrix or rather patrix, a patri-archival order. 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 tagging by meta-data but according to its proper criteria - endogenic visual memory in its own medium.

What is being digitally „excavated" by the computer is a genuinely media-mediated gaze on a well-defined number of

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[35] Christoph Drösser, Ein verhängnisvolles Erbe, in: Die Zeit, 23th June 1995, 66

[36] Axel Roch, Adressierung von Texten als Signale über Bilder. Eine Anwendung der Informationstheorie auf Buch und Bibliothek, typeskript (Berlin)

(what we still call) images - media-archaeology instead of iconographical history. This reminds of the color theory of the impressionist school of painting, as analyzed by art historian Max Imdahl in his seminal study *Farbe* (*Color*) from 1987. Its main characteristic is the „desemantization of seeing", freeing the image from its pictorial logic – an archaeological gaze indeed.[37] Media themselves thus possibly become archaeologist.

Beyond the iconicity of visual interfaces there is algorithmic mapping. Against ideological and referential visual cartography, the archaeological gaze is a mapping gaze, as performed by Global Positioning System devices which time-critically implement the Cartesian grid into real space, mathematically instead of iconically, by numbers instead of images. The very term "mapping" is still associated with metaphorization, visualization, aesthetisation, against which stands the media-archaeological idea of the *operative diagram*: conceptual rather than visual, topological rather than geographical, data-based rather than narrative, connective instead of spatial; code (software) rather than surface, numbers rather than images. From location to pure address: „Only what has been stored can be located" - rather *vice versa*.[38] In this sense the Internet generates a „new culture of memory, in which memory is no longer located in specific sites or accessible according to traditional mnemonics, and is no longer a stock to which it is necessary to gain access, with all the hierarchical controls that this entails."[39] Addressability remains crucial for mediated memory. In Platon´s dialogue *Meno* „it appears as if the matter of memory is but an effect of the application of techniques of recall"[40] - *there is no memory*, rather operative functions of address spaces.

Storage versus transfer? Different data cultures

European cultural memory is archive-centered; resident material values (libraries, museums, millenia year old architecture), whereas the Transatlantic US media culture is transfer-based.

Michael Hardt's and Tonio Negri's book on power in times of

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[37] "Entbegrifflichung des Sehens", ibid., 26. See Lambert Wiesing, Die Sichtbarkeit des Bildes, Reinbek (Rowohlt) 1997, chapter „Die Relationslogik des Bildes", 95-117 (112)

[38] Harriet Bradley, The seductions of the archive: voices lost and found, in: History of the Human Sciences Vol. 12 No. 2 (1999), 107-122 (113)

[39] Howard Caygill, Meno and the Internet: between memory and the archive, in: History of the Human Sciences Vol. 12 No. 2 (1999), 1-11 (10)

[40] Caygill 1999: 2

global communication networks is appropriately called *Empire*. In a media-archaeological analysis of power today, of we turn from a territorial notion of empire to the original meaning of latin *imperium* which rather means reaching out, extension, a dynamic transfer.

When it comes to heritage, the US Federal Archives do not simply store documents away in an old archival privileging of secrecy, but care for a memory imperative, a very mobile offering of its contents to the public, even advertising to make this memory circulate. If there was no copyright, every online user might take advantage of the fact that in digital networks the old separation between archival latency and present acutalization of information has already collapsed.

"Counting by numbers" (instead of narrative): media archaeology

Media "archaeology" enacts a kind of stratigraphy - or Harris matrix - in techno-cultural sedimentation which is neither purely human nor purely technological, but literally inbetween: symbolic operations which turn the human into a machine as well as they can be performed by machines. Once numbers were abstracted from material things and could then be re-implemented in matter again, as *calculi*, as has been discovered by the archaeologist Denise Schmandt-Besserat for almost pre-historic tokens in the ancient Mesopotamean cultures which were included in a sealed clay volume, with their value imprinted on the surface - an archaic, pre-technological archive of numbers.

Today, computing re-materializes such abstractions from within integrated circuits. Technology, according to Martin Heidegger, is more than instrumental, it transcends the human.[41] There is a mathematical layer inbetween: "Real is only what can be measured" (Max Planck); data come into existence only by the very act of measuring, be it by human physiological senses (which operate in discrete frequencies) or by measuring apparatuses. Such record-making devices turn virtual latency into single-valued actualities - which means that measuring media are generating worlds, by data-giving, or more fundamentally, by turning undecided states into countable data at all in the very act of measuring as act of drawing a destinction.[42]

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[41] "Das Eigenste der modernen Technik ist kein bloß menschliches Gemächte": Martin Heidegger, Überlieferte Sprache und technische Sprache [lecture 1962], St. Gallen (Erker) 1989, 19

[42] "Die Natur wird daraufhin gestellt, sich in einer berechenbaren Gegenständlichkeit zu zeigen (Kant)." Heidegger 1962/1989: 17

Counting is related to telling, but in an antogonistic way. When it comes to the question of memory in the age of digital computing, according to Lev Manovich[43], the data model is becoming primary, dictating the narrative; the database (which is "archival" by nature) inverts the relation between *paradigma* and *syntagma*. Archival information refers to the media archaeological mode, whereas narrative belongs to media historiography. Digital narrative, on the techni-infrastructural (not interface) level, is linked to discrete mathematics. Whereas narrative (according to Gotthold Ephraim Lessing's *Laocoon* theoreme of 1766) once was a time-based art like peotry, literature and theatre, nowadays time is organized by technologies.[44] Walter Benjamin 1936, in his essay *Der Erzähler*, states that experience, when cut off from epic tradition, can not be communicated any more in a narrative way. When heterogeneously juxtaposed, information has to be immediately consumed, at once. Realtime analysis belongs to computing and signal processing and is not narratable any more, subject(ed) to the time-critical instant (the *Augenblick*) - while a narrative is extensive interpretation. Henri Bergson insisted on human consciousness of durable time against the chrono-photographical registering of temporal processes. Today, media archaeology corresponds with such mathematical time, and indeed deals with the crisis of phenomenology and its subjective notion of the "inner sense of time" (Edmund Husserl).

From a media-archaeological view, a computing culture deals with calculating memory, which makes sense with a pun in German (just like in other language): *er/zählen* (narrate / count). In Medieval German, the words for "counting" and "narrating" were etymologically the same. To narrate popularly means "to tell, rehearse, or recite, as a story", in mid-17th century derived from Latin past participle of *narrare*, from *gnarus* "knowing." So narrative means as well to relate the particulars of; to go through with in detail, to give an account of - which can be recounting in detail, describing, even listing - like in book II of Homer´s *Iliad* when the epic is suddenly interrupted by a listing of Greek commanders heading ships.

„Narration is assimilating information and retelling it."[45] But

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[43] See the chapter "Data banks as symbolic form", in: Lev Manovich, The Language of New Media, Cambridge, Mass. (The MIT Press) 2001

[44] "Zeit wird durch Technologien organisiert": Paul Virilio, Technik und Fragmentierung, in: Karlheinz Barck / Peter Gente (ed.), Aisthesis. Wahrnehmung heute, Leipzig (Reclam) 1990, 71-82 (71). See Dieter Thomä, Zeit, Erzählung, Neue Medien, in: Mike Sandbothe / Walther Ch. Zimmerli (ed.), Zeit - Medien - Wahrnehmung, Darmstadt (Wiss. Buchges.) 1994, 89-110

[45] Catherine Levison, *Narration*:

knowledge communication does not necessarily require
narrative. The term „knowledge" itself can be seen as indexing
both the diverse university discourses that produce it, but
also the ways in which technoogies of tradition store and
structure knowledge. Academic discourse in the Humanities is
still primarily based on the narrative transfer of knowledge.
The computer reminds of an opposite option of commumication:
Leibniz´ dream to communicate by mathematical formulas, in
symbolic language (*characteristica universalis*).

Mediated memories and cultural records

Is a term like "mediated memories" tautological? Memory,
according to G. W. F. Hegel, is always already technical, a
framework for storage; whereas "remembrance" (*Erinnerung*, as
the German term implies) refers to a kind of "interiorized"
activity which needs to be individually or culturally
addressed. Such framing and addressing as an act of
remembering is often at odds with the causal views of linear
historical research.

Cultural records that today comprise memory like textual
libraries, film, music, and data banks have always been bound
to archival media; these media literally "govern"
(cybernetically) the ways in which we remember, territorialize
and reconfigure the past. The archive itself is a storage
medium; so far in occidental culture,though, narrative has
been the primary mode of processing archivally stored data in
the name of history, which on the surface of so-called multi-
media continues in the form of stories (even in computer
games, though in fragmented ways).

Media-archaeological analysis, on the contrary, does not
operate on the multi-media level: Taking account of the fact
that all so-called multi-media is radically binary values,
digital data processing is undermining the separation into the
visual or auditive or textual or graphical channel which on
the surface (interface) translated data to human senses.
Therefore an archaeology of operative media is not looking for
the metaphorical discursive impact of technologies, but
reconstructs the generative matrix created by such
dispositives. Kircher´s term for his machine to automatically
compose music is not by coincidence called *arca*, which is the
old name for "archive". In Foucault's updated sense, *l'archive*
for Kircher is the generative set of rules which
algorithmically produce the music like nowadays programming
with software libraries such as SuperCollider.

Instead of asking for cultural memory and the archive on the
surface level in discourse, let us pose the question of the

generative archive behind cultural production. Media
archaeology, different from Cultural Studies, concentrates on
the material genealogy of apparatuses which are imbedded
within "the archive" as condition of techno-logical knowledge.
Let us thus define media archaeology in the sense of a
mathematical reaeding of Foucaults "Archaeology" which does
not only deal any more with the audio-visual or textual, but
with numbers as well, reminding that at the very orgin of the
vocalized Greek Alphabet the single letters (*stoicheia*) were
used for numers as well (Pythagoras), counting in an
"elementary", discrete way.

Different from a media-archaeology of imagination as research
into the tension between technology and cultural imagination
and magic, radical media archaeology focuses on actual
mathemathics, on the operative diagram instead of imaginary
maps, on signal processing as cultural technology instead of
the cultural semiotics and the iconic regime.

Media, mathematics, archaeology

Epistemologically the unvisibility (and silence) of numerical
evidence reminds of the crisis of intuition in mathematics a
century ago. Hilbert´s meta-mathematical theory led to a non-
referential use of mathematical signs: simply operative, thus
engineerable, resulting in Turing's conceptual invention of a
paper machine for calculating algorithms in 1936.

No more humans explore the Universe like Galilio Galilei with
his telescope; instead, the cold gaze looks back from deep
space itself. The eye is not the fastest channel of acquiring
knowledge, as expressed by Goethe in *Dichtung und Wahrheit*,
but the word.[46] Such words have excalated into data strings in
algorithmically coded machines, in the programming of the
computational executions which are the hidden agencies behind
all apparent interface iconicity and metaphors.

Media archaeology analyzes the techno-logical negotiations and
reciprocity between mathematization of machines and
machinization of mathematics itself. Any archaeology of the
computer and its programming practice oscillates between these
two poles. Almost like a transistor itself, the materiality of
mechanics and electronics at the same time enables and resists
to pure *mathematical procedures* (Kurt Gödel).

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[46] "Das Auge mag wohl der klarste Sinn genannt werden, durch
den die leichteste Überlieferung möglich ist, Aber der innere
Sinn ist noch klarer, und zu ihm gelangt die höchste und
schnellste Überlieferung durchs Wort, denn dieses ist
eigentlich fruchtbringend." Quote here after: Wolfgang Iskra,
Die Darstellung des Sichtbaren in der dichterischen Prosa um
1900, Münster (Aschendorff) 1967, 41

"Simple mechanics may be able to implement simple calculating
rules or algorithms, such as the four-species-machine which
the young Leibniz presented to an astonished Royal Society,
successfully translated the Indian-Arabic counting system by
ciphers into a hardware of decadic cog-wheels, thus for the
first time automating the primary counting modes. But this
flow of numbers between mechanical wheels has simply be a
calculation but noch yet a program which would be able to
start, control and finish calculations on its own account.
Historically programing only started - as opposed to
calculability - at the time when technologies changed from
tools to machines."[47]

The *logic of engineering* is one aspect of technology and
another one *is the engineering of logic* such as the building
of logical machines.[48] Such an approach might claim to
integrate philological and historical aspects of computer
archaeology on the one hand and scientific and engineering
aspects on the other under the perspective of *cultural
engineering*.

These techniques comprise not only texts and images, but
numbers as well. Therefore a true media archaeology is close
to mathematics, replacing the historicist quest for temporal
origins by the mathematical quare root symbol (for *arché*
itself).

Martin Kusch reads Foucault´s *Archeology of Knowledge* with its
key terms like "series", "enunciation" etc. as the language of
propositional logic. The natural way of rendering these
passages intelligible therefore is "to take the notion of a
function at its mathematical face value."[49] This, finally, it
radical media archaeology in its purest form.
In the Pythagorean tradition, Friedrich Nietzsche once mused
upon the relation between mathematics and nature; embodied in
technological artifacts, numbers have indeed became
autonomous.[50] With algorithmic computing comes true what

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[47] Friedrich Kittler, Hardware, das unbekannte Wesen, in: Lab.
Jahrbuch 1996/97 für Künste und Apparate, edited by the
Academy of Media Arts, Cologne 1997 (Walther König), 348-363
[transl. W. E.]. Related to this argument, see Peter Berz,
08/15. Ein Standard des 20. Jahrhunderts, Munich (Fink) 2001
[48] See the contribution by Gellius N. Povarov, Logic,
automation and computing, to Georg Trogemann / Alexander
Nitussov / W. E. (eds.), Computing in Russia. The history of
computer devices and information technology revealed,
Braunschweig (Vieweg) 2001
[49] Martin Kusch, Discursive formations and possible worlds. A
reconstruction of Foucault´s archeology, in: Science Studies
1/1989, 17-25 (17)
[50] "Die Zahlen haben sich verselbständigt." Martin Stingelin,
in: Kunstforum Internatnational, vol. 155 (2001), 166

Nietzsche has declared.