

UNMASKING INTERFACES. ARCHAEOLOGICAL MOMENTS OF VISUALLY MEDIATED KNOWLEDGE

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The *prosopopietics* of inter"face"

Does knowledge become simply information when cultural techniques turn technological? The face-to-face and text-to-eyes communication of knowledge has successively been replaced by non-human, discrete media of data storage and transfer. Still the term and the practice of *interfacing* sticks to the illusion of an anthropomorphic discourse. A non-metaphorical use of „interface“ tries to liberate machines from rhetoric.

Is it „natural“ that humans want to anthropomorphize computers? When I switch on my Macintosh PowerBook, the first symbol I get to see is a smiling face drawn on the computer icon. Thus I feel betrayed from the first moment on. In order to separate the rhetoric of interfacing (metaphorical) from its technical functions, we have to separate anthropomorphism from media and the ways they are being *personalized*. „Masks“ is the meaning of ancient Latin (in fact Etruscan) *personae*. The *death mask*, taken from the face of a dead person immediately after death (that is: before decay), derives its authority from the direct contact of the image with the body it represents, as a material trace like photography, thus being both index and icon (in semiotic term).

In which relation does the interface stand to the data it represents: technically or metaphorically?

The bases for knowledge are symbolic data (even if these writing systems masquerade in the guise of images). The theorem of the theatricality of power in recently flourishing new historicism, headed by Stephen Greenblatt, was based on such a mask, the mythic vanishing point of looking beyond the archive: "I began with the desire to speak with the dead" (*Shakespearean Negotiations*). This desire has long been a driving energy in literary studies: „a motive organized, professionalized, buried beneath thick layers of bureaucratic decorum“, and Greenblatt confesses: „If I never believed that the dead could hear me, and if I knew that the dead could not speak, I was nevertheless certain that I could recreate a conversation with them." This I would call an interfacial phantasm: treating a set of data anthropomorphically.

The German literary historian and specialist on memory culture Aleida Assmann deciphered the emergence of the literary genre of „ghost talk“ in European Humanisms and Renaissance (Macchiavelli, Petrarca) as a genuinely mediatic function of writing systems; in a script-based society prevails a trust into the possibility of storing intellectual energy in writing which can be synchronically be re-activated across time by reading (as opposed to oral cultures) <Assmann 1999: 124>.

Since the Renaissance juridical fiction of „the King's two bodies“, occidental political culture has been used to the idea of a *persona ficta*, a mask, embodied by physical man (see Kantorowicz); fictitious, though, means technological as well - *techné* in its most ancient Greek meaning. Thomas Hobbes, in his *Leviathan*, defined the nature of the sovereign in this theatrical sense:

"A person, is he whose words or actions are considered, either as his own, or as representing the words or actions of an other man, or men, or of any other thing to whom they are attributed, whether Truly or by Fiction. <...> The word Person is latine: Instead whereof the Greeks have *prósopon*, which signifies the Face, as *Persona* in latine signifies the disguise, or outward appearance of a man, counterfeited on the Stage <...>: And from the Stage, hath been translated to any Representer of speech and action, as well in Tribunalls, as Theaters"

- and to computer interfaces, we might add (with Brenda Laurel).

„Larvatus prodeo“ (I'll publish under a mask): With such words, which somewhat anticipate our conference title „interfacing knowledge“, René Descartes in 1619 declared his anonymous procedures, since at that time innovative research (under risk of religious or royal inquisition) required simulation. Since Descartes was not the only one to do so, the dschungle of anonymous writers in 1708 required a dictionary edited by Vincentius Placcius: the *Theatrum anonymorum et pseudonymorum*, unmasking anonymous autorship already on the frontispiece. The

learned editor here takes the masks from several authors' faces and attaches them to a cord. Medium of this performance is the academic library, and the technology allegorically alluded to by this cord of masks (or rather cloth-line, with mask allegorizing text/ile/s) is very precisely the contemporary book-like container providing metal frames to which single slips of paper with textual quotations could be flexibly attached <Zettelkasten>, facilitating hypertextual sorting, storing and re-sorting of evidence. Referring to the metaphor of masked authorship, a transitory machinic „interface“ here replaces the traditionally well-defined order of rhetorical *loci* or *topoi* in printed books: a new cultural technique of *interfacing knowledge*, and the volume from which I take this information - a publication on *The „Polyhistor“ of Danile Georg Morhof*, edited by Françoise Waquet (Wiesbaden 2000), is appropriately titled *Mapping the World of Learning*. An inscription on the frontispiece says „*sum cuique*“, to be supplemented by the term „*persona*“: Placcius reveals the authors' true identity behind the masks by identifying authorship and *persona* - a practice which anticipates later criminalistic file cabinets of police. While the criminal archive has long resided on photographic portraits of delinquents or of collected fingerprints - subscribing to an iconic paradigm -, nowadays this iconic interface is being replaced by *dataveillance*, as became evident with the still of a video capturing the terrorist Atta's passage through the gates of Boston Airport on early September 11, 2001:

Monitoring on the metaphorical interface level means displaying images or icons; in its hidden sense, monitoring means data survey; the alphanumeric control space. Instead of images, we are confronted with unspecific digital data sets; even if these data sets are still being phenomenologically generated as „images“ on interfaces (computer monitors), they can hardly be called „images“ any more. The identification of still some 2200 victims of the WTC attack can only be performed by comparative DNA analysis, in order to be able to literally sort (or assemble) 14.000 found fragments of corpses. When the faces are destroyed, they are being replaced by the data „mask“ (the end of the *art of memory* paradigm of ancient and Renaissance location of victims, according to Simonides, from the position of the found victims).

Deferred interfacing of knowledge: letters

Instead of technical interfaces, in the case of the French post-Revolutionary historian Jules Michelet it has been the Romantic discourse of historical imagination which served as a drogue of hallucinating voices from the archive: "Dans les galeries solitaires des Archives <...>, dans ce profond silence, des murmures cependant venaient à mon oreille" <*Histoire de France*, preface 1869>. This is a truly acoustiv interface (since faces mean eyes, ears and mouth). This has been replaced in the

meantime by the multi-media interface in computing. Different from the early number-crunching times, the computer is no longer silent and for your eyes only (that is: „earless faces“, according to Anthony Moore); audio-visual perception supplements the traditional "reading" of data - an "assimilation via the ear as well as the eye. Such a multi-leveled `talking´ archive" allows us to re-enter „a mind set that was endemic to the early modern era, even though it has long been lost to us in the era of silent libraries" <Marcus 2000>.

Interfaces between man and machine render the illusion of a *conversational* dialogue between two individuals. But the hallucination of dialogue turns from the ancient cultural technology of rhetoric to media - from hermeneutics to information theory.

Telematic communication generates - technically formulated - depersonalized forms of interfacing, since the partners of communication have become ciphers of addresses. People thus become symbolic systems. In this sense Michel Foucault was right when he imagined the human face vanishing in the sand - a sand which, in other words, is *silicon*. In letter-based communication, the partners have always been aware of the temporal delay when taking a letter into their hands. This mediatic delay tends to be effaced by tele-communication in realtime (starting with the telephone); in fact we need an artificial buffer, the answering machine, for a *re-entry* of postal message transfer (see Jonathan Goldberg, *Voice-Terminal-Echo*). In previous times, though, the letter was considered as interface, literally:

By letter we may absence make
even presence selfe to be.
And talke with him, as face to face,
together we did see. (William Fullwood, *The Enemie of Idleness*, 1582)

Gregory of Tours, in his *Historiarum libri decem*, tells us the anecdote of the Merovingian king Chilperich (561-584) who once sent to the grave of Saint Martin a letter asking for reply on a tricky subject - hallucinating a prosopopoeitic voice from beyond the grave (*memoria*) later echoed by Chateaubriand's *Mémoires d'outre-tombe*. The messenger transmitting this letter even placed a blank page at the grave; after three days without reply, though, he returned to his master. This reminds of letters as a dynamic, inter-active, time-based (delayed) interface.

In antiquity, the philosopher Epiktet called the postal letter a silent messenger and the living messenger a silent letter. A prosopopoeitic interface indeed, when taking correspondence as the point of an ideal encounter between two persons. The internet does not really mean a return of medievel "communication *face-to-face*. Electronic *im-mediacy* is rather a prosopopoeitic illusion

like the empty gaze of the speaker of television news who does not look at us, but into a mirror, the camera, or the teleprompter. There is no face, but a self-referential mask. Here, the screen itself is the interface, not the face of the speaker behind.

Indeed the face of the speaker in television is not - like in classical theatrical culture - covered by a mask any more, but re-vealed by a transparent mask (in Martin Heidegger's sense). Masks disguise and masks reveal. Concealing here is the message, since behind the mask retreats what is being shown by the mask.

Loose and tight interfacing

If interface means each form of *coupling*, loose coupling then would be „medium“, according to Fritz Heider, and tight coupling would mean „form“; here the printing revolution created a complete reconfiguration of interfacing knowledge. The term *communication*, usually points to oral communication, which we automatically think of as a two-person game. „This may extend to letter writing. For printed communication, however, it is completely inadequate“ <Luhmann 1992>.

"Once writing is defined as a symbolic trace in a receptive material, signs are perforce transmitted through a technological interface. The book is an interface no less than a way tablet or a woodcut print. But from the woodcut to the computer, we have come to require machinic arrangements of greater and greater complexity to translate representations into visible and sonice arrangement our bodies are capable of perceiving."¹

The acoustical medium provides for the tight coupling of noises. The optical medium provides for the tight coupling of things <Luhmann 1992>.

What about *acoustic interfaces*? At this point, literally „Knowbotic Research“ replaces narrative transmission of knowledge. Under the title *Simulationspace* the media art group Knowbotic Research installed a *Mosaic of mobile Datasounds*, an interactive walk-in sound data space, collected through the Internet, installed at the Ars Electronica festival in Linz (Austria) 1993, later at the Siggraph '94 in L.A. Here, the visitor navigating a "datascape" missed the usual feeling for orientation; „the composition of the information in the darkness reveals new clues of perception, new sense of space, the processing of information.

¹ D. N. Rodowick, An uncertain utopia - digital culture, in: Claus Pias (ed.), *Medien. Dreizehn Vorträge zur Medienkultur*, 1999

Medieval heraldy and parchment as interface

We know that the archaeology of the interface dates far back. Heraldry was a technique of designing a screen: the art of dividing a shield into several figurative, geometrical or coloured sections. Historical research on information technologies and interfaces reminds us of the interface-as-weapon, the medieval „coat of arms“ and the military shield with its heraldic figure (Heiko Wandhoff).

Heraldry has been a technique of producing in/dividuality, creating a second, symbolical, juridical body next to the physical one <see Ernst Kantorowicz, *The King's Two Bodies. A Study in Mediaeval Political Theology*, Princeton 1957>. Heraldry is a knowledge or rather reconnaissance system, replacing faces by symbolic systems. The coat of arms functions as a mediatic prosthesis of the physical body, enabling the owner to be at a place even if he was not physically present - analogous to symbols of power such like the imperial image on ancient or medieveal coins as *the mobile, current interface* (similar to seals attached to charts). Only with the Byzantine empire, though, the coins show the portrait of the emperor no longer as a profile, but *en face*.

Medieval representation of power was based on the body as interface. In his vernacular didactic poem *Wälscher Gast* (1215), Thomasin of Zerclaere describes the exemplary, prototypical ruler, who is supposed to reflect higher virtues for the subjects, thus becoming a screen for projection: „You are the mirror, we <sc. the subjects> are the women.“ Comments the medievalist Horst Wenzel: „The master becomes a public medium, a screen accessible for all“ (Horst Wenzel). Nicolaus Cusanus as well described all beings metaphorically as convex mirrors, all reflecting God - like the konvex mirror as metaphor of seeing in baroque curiosity cabinets which concentrated the world in one glance as *speculum mundi*.²

From screen to skin: Interfaces, let us remember, are never immaterial - not even in David Cronenberg's notorious TV-reflection *Videodrome*, where the screen itself becomes „the new flesh“. Indeed, the interface cannot be reduced to the optic dimension, but comprises the acoustic or haptic demension as well.

Medieval perception was aware of the material support (in fact

² See Jan van Eyck's painting *The Arnolfini Marriage* (1434) for the *camera obscura* perspective of this mirror.

the very organicity) of information transfer (the parchment, that is: skin), an awareness which has been replaced by the „transparency“ of paper since 14th century. Information is post-material.

The difference between the parchment and the electronic screen-as-interface, though, is that its inscribed data are less volatile compared with the electronic, light-based screen: *ad perpetuam rei memoriam*, the materiality of the parchment-as-interface itself is metonymic of its inscription (Michael Lindner).

The medieval chart is a „metaphorical machine“ (using Pierre Bourdieu's term). At the same time every screen is not transparent, but a shield, hiding its material, technical or logical infrastructure - „Hiding by Showing“. With regard to the technical practice of interfacing, how can one glimpse the „faces“ behind and within the interface? Thus any screen is allegorical of its own dispositive. The medieval chart dissimulates the real power relations between the imperial author and the recipient. The task of media archaeology thus is an act of un-covering. Hypermedia dramaturgies, starting with TV and video and resulting in the digital worlds, consist of surfaces everywhere (or should we say „interfaces“). This phenomenology of surfaces though cannot be opposed to a hidden interior, since no semantic depth is intended. They are what they show. Do they render all data for (dis)play, i. e. manipulation?

(Inter-)Face / visor

Let us move from the court of arms to real arms. The *visor* in modern times signifies a hinged front part of a helmet, made of transparent or tinted plastic and designed to protect the face or eyes, especially on helmets worn by motorcyclists or welders. For medieval times, it signifies the hinged metal front part of a helmet in a suit of armor designed to protect the face and having slits for the eyes to see through (Encarta Dictionary). Knowledge, here, is attached to reconnaissance. There is a tight triadic relation between knowledge, interface and the visual regime.

The increasing trend to completely close the helmet though did not only lead to the exclusion of the voice-as-weapon and orientation, but to the invisibility of the face as well. The perceivability of the person thus had to be symbolically exteriorized. The armour could only serve as signifier by becoming an interface, displaying a syntagmatic order of paradigmatic elements (Walter Seitter).

From French *vis* (see *visage*) *visage* means somebody's face or facial expression (in a literary sense); metaphorically it names the appearance or look of something (itself derived from Latin *visus*, the perfect participle of *videre* "to see"). But what if this interface looks back, like in the case of current iris-scans?

Iconic / idiotic interfacing

Let us, for the sake of understanding this look / this gaze of visual interfaces, try a media-archaeological amnesia of icons not in the modern, but medieval sense:

In the year 1463, the former bishop Nicolaus Cusanus sent an image across the Alps, addressed for his bretheren in Tegernsee. The icon (which has been lost) was supplemented by a 80page brochure named *De Visione Dei*. What we know is that the image showed a figure whose gaze seemed to pursue the beholder, „as if it was panoptical“. The visual argument is evident: Most of the believers could not read; they were - in the words of Nicolaus Cusanus - literally „idiots“ (laymen, in other words: the meaning of latin-greek „Idiota“ or „idiótes“). But the battles of iconoclams in the Byzantine empire were not forgotten; images proved to be an ambivalent carrier of knowledge or belief. That is why Nicolaus Cusanus ordered the icon to be fixed in a room in such a way that the figurative gaze could fill the room. In front of the icon, the „idiot“ renounces all (script-based) knowledge. „You, master, see all without delay; since your seeing is reading“, Cusanus comments. The media scholar Stefan Heidenreich adds that today, such icons have returned on the computer screen. Umberto Eco, in his essay „MS-DOS is Calvinistic“, opposes the (nowadays prehistoric) MS-DOS interface user to the Macintosh User, mirroring the schism between catholicism and protestantism in Christian religion. The Calvinist version is concentration of information on writing / the alphabet, equalling programming, while the Catholic version is counter-reformation (image policy, iconicity).

The Apple „apple“ biblically symbolizes sin. But icons are not just religious images, they are also „pictures used by computer graphics designers to help improve the man-machine interface“. The apparent naturalness of image-assisted communication has motivated the development of the iconic interface“ (Kenneth N. Lodding). This is, of course, an anthropological claim which might be questioned. Even if iconic communication might historically be the most natural, earliest form of symbolic communication, the archaeology of writing indicates that complex

cultures require symbolic interaction by more abstract signs, such as numbers and the alphabet. Since Alberti and Dürer, images are a function of mathematics (the linear perspective, as explained in Dürer's *Anweysung zur Meßkunst*).

With clickable icons, programming-as-writing and the simulacricity of interfaces may coincide, when it comes to *visual programming*. Iconic programming environments make diagrams (or pictograms, graphical notations) transitive: all of the sudden, they do, what they metaphorically indicate, thus being metaphorical no more in a rhetoric sense, but in a technical meaning of data transfer. Programming is carried out simply by arranging icons on the display. Here,

"objects which the system deals with such as data and program are represented in terms of icons. Programming is carried out simply by arranging icons on the two-dimensional display screen and specifying flow of data." <Tadao Ichikawa / Masahito Hirakawa, *Visual Programming - Toward Realization User-Friendly Programming Environments*, in: Glinert (ed.) 1990>

Icons thus do not just mean small images on a display to visually assist the communication between user and machine, but rather „a concept including both an object consisting of an icon image displayed on the screen and the functional description associated with it such as a program code and a data value“ <ebd., 61>; the icon, in its semiotic sense, here bears resemblance with the coding as a kind of visual short-cut of algorithmic lines.

By the human brain, images are being processed in this way:

"An image is captured as a whole. It is processed in a parallel manner, and the semantics are entered into long-term memory. <...> The speed of image processing and the accuracy of image recognition are two factors on which an iconic-based man-machine interface can capitalize." <Kenneth N. Lodding, *Iconic Interfacing* [*IEEE Computer Graphics and Applications, Vol. 3., No. 2, March/April 1983]>.

- with the restriction that icons may be much more culturally ambiguous than the mathematical codes directly.

Is a virtual machine like the BALS (Brown Algorithm Simulator and Animator) a simulation or a performance of such proceedings? Monitoring of programs in execution by such visualizing tools can lead to immediate interaction with the program observed, and thus advance from simple displaying / viewing algorithms in execution to actually control it. The visual paradigm means monitoring the execution of an algorithm in the cybernetic sense (communication = feedback + control), comparable to the Williams tube in early

computing (which did not only visualize but actually physically perform storage / time-delay functions).³

In a time which has discovered speedy movement as the primordial experience, we arrive at temporally dynamic interfaces, interfacing (thus manipulating) temporal knowledge: „BALSA provides facilities for displaying multiple views of data structure, all of which are updated simultaneously during program execution to give a motion picture of the program in action“ (Brown / Sedgewick 1984/1990). Interfacing history:

(as indicated in my introduction)

"BALSA could replay its saved history of interesting events and the view would update itself incrementally as if the program were executing. This method has the problem that one might not be interested in what happened in the algorithm over history; rather the current state is of interest." <Brown / Sedgewick 1984/1990: 119>

Users of UNIX can, by applying the order HISTORY, re-call a chronicle of terminal events - a visual history, providing for temporal transparency. The *RAND Corporation*, in trying to automatize military simulation games, called this *synthetic history* (Claus Pias). Interfacing knowledge thus transforms from intransitive (i. e. without a direct object, from late Latin *intransitivus* , literally "not passing over") to transitive communication („passing over“) - communication with no interface any more, like the non-symbolical archiving f. e. of biometrical data (fingerprint) on passports?

Visual knowledge?

Radar once extended perception beyond the optical horizon of the visual, while at the same time reducing perception on decisive data or identification and control. Still, the optical metaphors stubbornly survive. Radar signals are being represented by the cathode ray tube visually, thus establishing an interface between the technique of radar and its human interpreter.

Complex data cluster, when represented in abstract symbols and data strings, cannot be comprehended by human reading any more which is too slow. For the sake of human understanding, they are being abridged by images. But thus it is not knowledge any more,

³ See Marc H. Brown / Robert Sedgewick, *A System for Algorithm Animation* (1984), reprinted in: Ephraim P. Glinert (ed.), *Visual Programming environments: Applications and Issues*, IEEE Computer Society Press 1990

but visuality as media-cultural *epistemé*. The future of knowledge will be image-based (actually reducing media to visual data).

Since knowledge and seeing konverge, both etymologically and in the act of reading. At this point, I don't want to become trivial but still I want to remind of the tautology of the term „visual knowledge“ in German: „visuelles Wissen“; indeed there is a relationship between the old Germanic verb *wissen* (*wizzen*) and other indo-european languages in the root **veid-*„ which means „to perceive, to see“, but as well „wissen“ equalling knowing in the sense of „having seen“; see as well the Greek *idein* „to see, to recognize“ in relation with *eidénai* equalling knowledge and, important for the *visual arts*, *idéa* as „phenomenon, prototype“, latin *vidére* „to see“ (compare „vision“). To the same etymological word group belongs *weise* and *verweisen* which means „referring to, pointing at“. Thus we arrive at digital *pointers*: quantities of picture elements, pointing at other picture elements.

Unmasking inter“faces“: From visual interfacing to *monitoring data*

Civil use of computing needed to create interfaces as user illusions. "At PARC we coined the phrase 'user illusion', to describe what we were about when designing user interface", Allan Kay confesses in his essay „User Interface: a personal view“. Neither visual properties nor similarities can guarantee the meaning of an icon, but their advantage is that they suggest to the user who might be completely ignorant of machinic procedures the option of directing the machine. Thus icons fulfil the traditional task of transferring coded commandments to persons who don't know this code. What is the alternative? Transforming users into programmers? But icons themselves might become a form of knowledge, as already practiced in scientific techniques of visualization. To be more direct: The „black box“ of the computer, its hardware, might be iconized down to its most minute register, in order to turn - analogous to Cusanus' notion of the *icon* - the reading of the central processors into seeing, that is: making them visible, transparent.⁴

How to images display knowledge and what kind of knowledge do they reveal? The answer is provided by an uncorruptible „philology of the eyes“ (Andreas Beyer). But within electronic notation of knowledge, do images represent or store knowledge,

⁴ See Stefan Heidenreich, *Icons: Bilder für User und Idioten*, in: Birgit Richard / Robert Klanten / S. H., eds., *Icons - Localizer 1.3*, Berlin 1998

which can be processed and re-membered by corresponding computers like within a psychic system remembering visual knowledge? The early design of a visual interface called *Dataland* in 1973 resulted from the wish to create a multi-media data bank where information could be spatially processed and retrieved - without using key words or logic or relational criteria. On the computer screen there emerged a virtual surface with visual symbols (icons) representing different forms of data quantities (William Donelson).

Knowledge can be visually navigated; thus visualisation and navigation in dynamically generated information landscapes are central tasks for multimedia designers. But do interfaces necessarily require audio-visual orientation in the iconic sense, or is a mathematical interface thinkable, as visioned by Leibniz - interfacing knowledge in logical space? „Many scientists do visual simulation only to legitimize their work to the politicians and secure funding for more projects, not because they want to find something new with the visual simulation language“ (Paolo Atzori).

From classical landscape painting to datascape navigation: Following the example of the manneristic representations of 4 Continents as 'Kunst- und Wunderkammern' by the Antwerp painter Jan van Kessel (1627-1679), the media artist group Knowbotic Research (KR+cF) devised a knowledge space to represent what we geographically call the Antarctis, a model of a Computer Aided Antarctica.

"In his series of four paintings, Jan van Kessel portrayed cultural knowledge representations of the four continents known in his day. KR+cF in its DWKTS installation, limits the material to the available computer-processed information on current antarctic research as it appears in public data networks. The immaterial character of these virtual antarctic 'substance' can only develop meaning and effectiveness (much as in the 17th century) if these items are developed in independent constructs, which never the less remain in distance but related to their antarctic reference subjects. As the given empirical facts are both real and fictitious, the data space give rise to phenomena which are difficult to conceptualize - a Computer Aided Reality. <...> KR+cF designs knowbots, devices operating as spatially and temporally dynamic interfaces for the observer's interactive navigation through the information landscape." <in Blast: 1996 = <http://www.krcf.org/krcfhome/ldwtks1.htm>>

Since the Antarctis actually happens outside the Antarctis, as artificial nature in data representations of measuring and sensing instruments covering this area and procuding, every second, a stream, a flood of data (like satellite vision). These informations tend to become independent and can be grasped and administrated only by artificial intelligence agents (learning algorithms, so-called knowbots) in computer networks. These agents, in the mentioned installation, create out of the flood of

information images from the south pole. The data body of this Cyber-Antarktika is based on temperature data and Ozone values - scientific material which has lost any deep sense or semantic meaning <ibid.>, thus rather equalling the Shannon- than the cultural studies-like notion of communication. Visual, interactive data clouds instead of fixed interfaces, as explained by Christain Huebler in „Discovering CyberAntarctic“:

<see <http://www.krcf.org/krcfhome/ldwtks.htm>>

"Our installation 'Dialogue with the Knowbotic South' <...> is based on knowbots, which generate a vision in a data-network. They originate a hypothetical nature, a Computer Aided Nature (CAN). <...> We have designed a visual form for every knowbot's algorithm corresponding to the data sets. <...> *We do not have an interface any more, a mechanical interface, in the real world, we have interfaces in the network, the dynamic network*" <my italics, W. E.>.

Finally, visual interfaces become redundant in machine-to-machine-communication. The coupling of knowledge to visual interfaces generates *monitoring* in all senses (panoptical survey) - the option of tele-control, control in distance. But is there any transparency beyond the monitor(ing)? Digital calculation beyond the individual subject refers neither to the differential symbolic order represented on the screen nor to a world outside this screen (physical reality behind the screen is chips and current only); the digital machinery retreats into total untransparency, invisibility (Slavoj Zizek).

Intermezzo

Let me explain why I do not try to present a brief cultural history of interfaces as points of communicative interaction, but rather touch some of the media-archaeological repercussions risen by our conference subject. I will do this in the sense of the original title of the conference: „Opening the folder“. We are confronted with an archival rather than historical memory of cultural technologies of interfacing. My avoidance of making use of *historical* discourse for connecting our question with the past is allegorical, since narrative is the interfaces coupling two different time systems, present and past, and turning archival data into knowledge. Thus interfacing knowledge is both the subject and the object of this essay: knowing interfaces.

Knowing = telling?

Either we know something about a subject of knowledge, or we know where to find information about it: *infomapping* <Bolz 2000: 131> - thus rather a mapping than a visualization of knowledge (diagram rather than image). From *storing* data to *sorting* data: the archive is the interface to memory of the past. The notion of information already requires an interface: *Information*, as defined by Shannon and Weaver (1949) and grown up in the computer age, has come to mean the combination of data into messages intelligible to human beings; *communication* occurs only when the meaning of a message is understood by the receiver. But this understanding does no longer necessarily require a narrative shape. New media generate new, non-narrative interfaces of knowledge.

Narrative has been a culturally and historically specific form of ordering knowledge in (linear) time. Carlo Ginzburg speculates that the prehistoric hunter could have been the first to tell a story, since this form of communication permitted the leap from apparently insignificant facts, which could be observed, to a complex reality. Thereby facts could be ordered by the observer in such a way as to provide a narrative sequence. At this point, there is a direct link between knowledge and narrative as interface of communication. The *engl.* etymology of „to know“ reminds of ancient **gnarus* (Latin *gnoscere, noscere*).

To know (according to the Encarta World English Dictionary) means in a rather technical sense to hold and to connect information in the mind or committed to memory (like list of *names*); *both as a transitive and intransitive verb* it means be certain about something, to be or become aware of something, to comprehend something: f. e. „to have a thorough understanding of something through experience or study: *know computers*“ (a kind of tautology), Furthermore, it means to identify somebody or something by a characteristic, very *transitively*: to engage in sexual intercourse with somebody (*archaic* - the „missionary position“?), and finally: to recognize differences, to be able to perceive the differences or distinctions between things or people - „old enough to know right from wrong“, or to know / to tell 0 from 1, digitally. The ultimate interface is the one between the physical and the logical world, the analogue-into-digital transformer.

This links to narration: to narrate means to „tell the story of something, to give an account of something in detail - from Latin, past participle stem of *narrare*, from *gnarus* `knowing´“. „To narrate“ thus, probably derives from „knowing“ (cp. „ignore“). To narrate means to relate the particulars of; to go through with in detail, to give an account of <Webster's Revised Unabridged Dictionary, 1913>.

To quote from the conference paper: The term „knowledge“ can be seen as indexing both the diverse university discourses that produce knowledge, but also the ways in which we store and structure knowledge, the artistic practices that invent new forms for the human-computer interface; John von Neumann even wanted to subsume the input- and output-elements of the computer under „storage elements“.

Is academic, intellectual, dialogic discourse based on the narrative transfer of knowledge? The opposite is Leibniz' dream to communicate by mathematical formulas only.

Interfacing *time-based* knowledge

David Gelernter proposes the data flow of *lifestream* as a future alternative to the desktop-metaphor of present computer interfaces.

The dominant mode of actual knowledge is the transitional, its transitory form which equals the form of the electronic current itself. Accordingly, the user-orientation of knowledge replaces the archival sublation of knowledge, putting emphasis from archive- to process-oriented interfaces - a literal „liquidation“ of spatial metaphors to temporal ones.

Instead of emphasis on spatial memory (on hard disk) „the Lifestreams system treats your own private computer as a mere temporary holding tank for data, not as a permanent file cabinet“⁵. Future and past become just segments, functions of a floating interface differentiating data flows:

The erasure of intervals is the principle of making present. When we minimize the temporal intervals of presence to the past and the future, presence itself becomes the only stage of all times <Großklaus 1994: 44> - presence as interface of past/future (the slash). What is presence, then? The present itself becomes the „interface“ of all times <ibid., 53>. Electronic screens are time-windows <55>. From interval to interface: the interface condenses time on the visible surface of the screen which stages time as visually present. The window-model has been historically successful since Alberti up to the *landscape* format of the present terminal. Different from the cinema screen which still suggested a border between inner and outer world, the electronic

⁵ David Gelernter, *Machine Beauty. Elegance and the Heart of Technology*, New York (Basic Books) 1997

monitor suggest a window to the world itself - like a flight simulator for aeroplanes.

But this has been a monitor in space. The computer-screen, though, is a monitor in time, *interfacing time*. In accelerated tempo images, symbols, data, points and pixels appear on the presence-time window of the monitor - and can disappear as fast, to sink back to the memory, from where they can be re-called every moment into a ever repeatable re-presentation. Once quantified, time is fragmented, becoming divisible into smaller and smaller usable bits (Götz Großklaus) - questions of temporal access.⁶

Narrative time in Bill Viola's video installation *Slowly turning Narrative* (1992) is being replaced by a technical *close circuit* between camera and monitor, with deferred time. In Gary Hill's video installation *Inasmuch as it is Always Already Taking Place* (1990) video tapes whose time code (numbers) remains visible are being rewound again and again. And in Bill Viola's video-installation *Heaven and Earth* (1992) two monitors mirror each other *in time*, one (with a baby's face) mirroring the other (a old, dying woman's face) <Belting 1995: 97>.

We are leaving the archival paradigm of interfacing knowledge as storage and retrieval, heading towards a knowledge of interfacing time.

Against the invisible interface: aesthetics of *enhancing the difference between man and machine*

The invisible interface: *Is the interface a / the medium?*
Aristoteles knows the term „medium“: *to metaxu* = the „inbetween“. The medium is an in-between.

Knowing the difference: Every reader of a medieval manuscript knows about the resistance the materiality and palaeography of the objects poses to its decipherment.

"Objects and properties are not inherent in the world, but arise only in an event of *breaking down* in which they become *present-at-hand*. <...> A breakdown is not a negative situation to be avoided, but a situation of non-obviousness, in which the recognition that something is missing leads to unconcealing <...> some aspects of the network tools that we are engaged in using <...>. This creates a clear objective for design - to anticipate the forms of breakdowns and provide a space of possibilities for action when they occur." <Winograd / Flores 1986: 36 u. 165>

⁶ See Dan Graham's video-installation *Present Continuous Past* (1972), interfacing time (presence) by delay.

To quote from the conference program: „The interface, moreover, need not always be benign, and instead can become a zone of difference and potential conflict.“ Only irritation reveals the medium.

Against the oblivion of hardware by virtual / visual interfaces, the media-ideologically critical project would be to remind the hardware-oblivion of software - a forgetting formulated by David Gelernter as the ultimative goal of all software:

"to *break free of the computer*, to break free *conceptually*. <...> Cyberspace is unlike any physical space. The gravity that holds the imagination back as we cope with these strange new items is the computer itself, the old-fashioned physical machine. <...> every key step in software history has been a step away from the computer, toward *forgetting* about the machine and its physical structure and limitations - forgetting that it can hold only so many bytes, that its memory is made / of fixed-size cells, that you refer to each cell by a numerical address." <David Gelernter, *Machine Beauty*, New York (BasicBooks) 1997>

Interfaces

The term „interface“ suggest an inbetween between two communication partners. But what if we read the interface not transitively, but intransitive? When the computer screen does not simply translate information from computer hard- and software to visibility, but is in itself the message?

The inbetween is not a positive technical interface, but an invisible articulation, a differentiating shifter, a relay which is at work exactly inbetween two discrete states: zero and one, the principle of digital data processing, a kind of pure cut, incision. In this sense all technical interfaces are metaphorical (in the Greek sense of *meta-pherein*), like the runner, the messenger of Marathon: the message will only be transmitted when the messenger finally becomes invisible, retreats (or in this case: dies) <ibid., 45>.

The television screen is a test case for interface culture:

"Everyone should have as many controls as possible to permutate the size, shape, and color of what they're watching. Of course you can do this to a degree with normal controls, but generally they're offered to "adjust" a picture which is thought to be abnormal, rather than to create your own electronic kaleidoscope. However, one thing you can do is draw a magnet across the face of the picture tube. This messes with the magnet field on the picture tube and distorts the image (without damaging the set) at your control." <Shamberg & Raindance Corporation, *Guerilla Television*, 1971>

More generally,

the idea of the „interface“ has come to define machinic interconnectivity as a logic organizing both the virtual presence of bodies in space and the flows of information between bodies and machines. <...> All space becomes an abstract computational space. < D. N. Rodowick>

Thus, the interface becomes a membrane / mem-brain.

Digital interfacing is translation already, since the computer translates, by the peripheral input-media (like the key-board), all analogue data already into discrete symbols (alphabet, scanning of images). Coding requires die transformation of reality into codable data (that is, whatever can be „read“ by the computer). The world (events, properties) thereby have to be reduced to numbers; whatever cannot be translated into numbers, literally *does not count*. So what are the forms and practices of „knowledge“ that we seek to interface?”

Interfacing as metaphor / translation

What is the difference between human / cultural and techical interfaces? The human-computer-interface (HCI) is a metaphorical event in both technical (transfer) and rhetorical sense (interface icons).

Still *interface* is a hermeneutically grown concept that refuses to be exactly defined. In fact, the very word *hermeneutics* itself points to a divine interface: the ancient half-god Hermes resp. Mercur, mediating between heaven and earth, between gods and men. This job has been taken over later by the interpreters of the Holy Bible, mediating between the medium (the Book / Bible) and its readers. Today journalists to this job within an ever-growing information world. Being subject to a speed of information transfer faster than ever, the journalist though becomes a pure interface, with almost no time left for reflexive interpretation unless in *realtime* compared to the events.

The keyboard or the monitor of a computer are interfaces which transform between different states or representations. However, also parts of software can be called interface. Consider an interface that allows for a communication between two or more programs written in different languages. In contrast to the hardware case, the latter interface cannot be localized anywhere. It rather is the functionality behind it that allows to speak of an interface.

"A computer monitor <...> is a cascade of interfaces that transforms internal electromagnetic states via data buses, oscilloscope, fluorescent material etc., to electro-magnetic states in the visual range of wavelengths. A purist may write down a [partial] differential equation of the whole thing on a microscopic level where the notion of an interface seems to become rather

arbitrary. It seems, that the intuitive notion of an interface is a relativistic concept." <Hans Diebner, Timothy Druckrey and Peter Weibel [ed.], Sciences of the Interface. Proceedings of the International Symposium, preface>

„The interface concerns what is in between: between inside and outside, between the observers' world and the non-observable“ (Siegfried Zielinski / Nils Röllner). The Interface is (a kind of double-bind) both a point of cutting and linking.

Otto E. Rössler (University of Tübingen, Germany) even declares *Relativity is Interface*: "[...] the Now is pure interface. The world is pure interface. G. H. Mead discovered the relativity of being a person" - back to the mask, again.

Interactive interfaces

Peter Weibel, director of the ZKM - Center for Art and Media Karlsruhe, Germany, on *The Art of Interface Technology*:

"Between cognition and vision, logic and picture, between reality and representation new equations developed. Today scientific/methodic and aesthetic techniques of representation based on computer aided simulations are united in a new field beyond the science wars. So far the technology of the image imitated the representation of reality and the natural perception by the eye. Machines, instruments, dispositives were built to deceive the eye. The new dispositives will deceive the brain. For that new interfaces have to be developed, which impart/mediate not only between viewer/observer and picture, but between pictures themselves. After the simulation of motion (motion picture) followed the simulation of life, the viable picture. The virtual storage enabled the variability of information and indicated a changeability of picture content in real time. If it was possible to develop an interface technology between the viewer and the technique of picture, the viewer's behaviour was able to control/navigate the behaviour of the picture. The viability of the behaviour of picture transforms the motion picture into an animated picture. Where the paintbrush and the palette became keyboards and sensors controlling the picture production and -reception, the access to picture was coded by a technical interface. Ensuing the art practice moved to the research in interface technology. The image technology was transformed to an interface technology. Today interactivity and dislocation are the most important innovations of the new image-technologies. The new interfaces will control the information not only between different places, but between different picture worlds at different places. Beyond it the interactivity will be also reversible. Because of the interface effects of the viewer on the picture will have also feedbacks. This results in a reduction of traditional ontological hierarchy between the real event and the realm of signs. In the empire of the interfaces reality becomes a privileged option between several parallel worlds."

In military action as recently seen in the Gulf War, the Kosovo War and the Afghanistan War, smart bombs that interactively check observations of the terrain against a stored map of their routes are `smart`, i. e. they „know“ as soon as they are able to

enhance algorithms with interaction, while traditional linear algorithms are metaphorically dumb and blind because they cannot adapt interactively while they compute <Peter Wegner, Why interaction is more powerful than algorithms, in: Communications of the ACM, vol. 40, no. 5, May 1997>.

Transitive interfacing

From cybernetics (Wiener) to interface / cyberspace: „A graphic representation of data abstracted from the banks of every computer in the human system“ <William Gibson, Neuromancer, 1984>.

This is the moment to return to *Alice in Wonderland*: Alice jumped lightly down into the Looking-glass room.

The ultimate interface, then, would be the abandonment of interfaces, the immediate sending of sensual data from computer to human senses / nerves, constructively: no simulation any more, but cerebral stimulation.

As opposed to traditional *mimesis* (mirroring reality), the interface *generates* (virtual) realities - from mirror to monitor. The notorious Turing test though requires an interface between man and machine, a teletaper (as proposed by Turing in „Computing Machinery and Intelligence“), since direct coupling between man and machine is (still) not yet possible.

The computer-human interface is not incidental to the accessing of information and creation of knowledge, but a crucial epistemological element in knowledge production. To put it more directly: The interface itself interrupts, is a rupture, an epistemological break (see Canguilhem).

Interface thus involves a cut, a rupture, always bridging a gap and thus, according to rhetorical theory, being allegorical.

But there is an epistemological rupture as well in the media-temporal sense: When compared with most traditional physical interfaces, which remained relatively stable over long periods of time (like the book/page), the digital (virtual) interface is uniquely open to reconfiguration and radical redesign. While current interface design still metaphorically (or iconically) mirrors the old media (following McLuhan's law), like the „folders“ in current windows still conservatorily mirror the bureaucratic, archival paradigm of administering knowledge, we might now expect of computers and of our interfaces to them new forms which are genuinely information-based. Utopian expectations

computer-human interface design in the last few decades takes place not in technology only, but as well in fiction (which, in Greek *techné* or *mechané*, has been the same term). Obviously we expect the direct, transitive coupling of man to machine, the analogue/digital (or qbit) hybrid.

Compare medical amputation and the adjustment of a prosthesis: the background of Marshal McLuhan's media theory of „extensions of man“.

As long as the key-board of computers is alphabet-based like a type-writer for printing just letters, the paradigm of printing remains dominant; progressively though the mouse-click replaces the key-board for directing the monitor, and orientation shifts to visually perceived information landscapes.

Just like the media theoretician professor O'Blivion says in David Cronenberg's movie *Videodrome*: The electronic image from the screen is mirrored by the retina of our eye (which can be transferred from television and video to the computer screen).

Thus the electronic data already invade our bodies by the very physical act of perception. All of the sudden, the interface is within our body. The future will be the transition from exterior to interior interfacing. The term „immersion“ indicates the dissolution of the interface as such. The dialogical model (and each interface is a model in the scientific, experimental sense) is being replaced by the immediate (if this is not a metaphysical fiction).