The Cultural Techniques of Time Axis Manipulation
On Friedrich Kittler's Conception of Media

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Nur was schaltbar ist, ist überhaupt. (Kittler, 1993b: 182)[1]

THE NOTIONS of 'technological determinism' and 'hardware euphoria' (Kittler, 1993b: 182) in Friedrich Kittler's media theory have already been examined and critically assessed many times. The following considerations, however, forge a new path in that they attempt to reconstruct an idea that can provide a new impetus for reflections on media that transcends specific schools of thought; they attempt to reconstruct an idea that is an integral part of contemporary media theory and can no longer be ignored. The task here is to reconstruct an ingenious discovery without, however, disputing the fundamental core of Kittler's notion of media. This breakthrough can be found in Kittler's linking of media with the technique of time axis manipulation.

1. Media Beyond the Register of Signs

Friedrich Kittler's notion of media gains its contours in the context of his project on historical media studies (see Kittler, 1997: 147–55). His interest in 'media' can be located in their potential for profiling the breaks in the evolution of media and for furnishing a means with which to describe these breaks. For Kittler – a founding member of the Helmholtz Center for Cultural Techniques at Humboldt University – 'media' are first and foremost cultural techniques that allow one to select, store, and produce data and signals.

This approach may seem, at first glance, to be rather traditional, if not to say simplistic. And yet, at the same time, the innovative aspect of Kittler's approach is that it begins to shift the very accents of the familiar history.

First, Kittler's reconfiguration affects our understanding of media history. Our traditional conception of media is based on the stereotype – which appears to be almost a belief – that media history is made up of three marked phases: the invention and dissemination (1) of the alphabet; (2) of the printing press; and, finally, (3) of the computer. Kittler's classification, by contrast, assigns these categories different contours. For Kittler, the caesura that represents the invention of the alphabet and the cultural implementation of literacy finds its significant equivalent in the emergence and spread of analog, technological media such as film and gramophone. Analog media – and optical-technological media in particular (Kittler, 2002) – mark the beginning of a development that ends with digitization and the computer. In the age of handwriting and of the printing press, all forms of writing are bound up in a symbolic universe – which in its most basic variant is that of everyday speech transcribed by notation. Technological media, by contrast, attempt to select, store, and produce the physical realities themselves. Here, Kittler adopts the term 'real' from Jacques Lacan's distinction between the symbolic and the real (see Kittler, 1997: 130–47; 2002: 38). In the era of writing, one could only write things down that already existed as elements in the symbolic universe – or in other words, the things that are inherent to the 'nature' of a sign – but after the technological analog media have broken writing's monopoly, one can record the extra-symbolic – or that which is beyond the symbolic realm. In other words, one can record nature itself. Technological media allow one to select, store, and produce precisely the things that could not squeeze through the bottleneck of syntactical regimentation in that they are unique, contingent, and chaotic.

If the assumption is indeed correct that print media capture and produce the symbolic and technological media, the real, then a medium can no longer be described using a terminology that is modeled on semiotic procedures. And yet, this is precisely what occurs as soon as one begins to pose questions concerning the relation between the medium and the message. Such questions are still bound up in the notions of the signifier and signified from the theoretical language of signs.

This is precisely the point where the media-historical and hermeneutic-critical aspects of Kittler's thought come together: his concept of media continually attempts to speak about the realm of literary studies in a way that avoids using distinctions such as 'understanding', 'interpretation', 'meaning', 'referent', or 'representation', terms that are integral to the vocabulary of literary studies. The context of this theory lends further significance to Kittler's provocative view that everything that literary studies deals with is data processing, and it also reveals the subversive function of this view. Kittler detaches a discourse from the Western discourse of signs, in which everything that is a medium has already been formulated in the language of the symbolic. Kittler is thus concerned not with a media analysis that is diametrically opposed to meaning, but rather with a practice of writing about media in which concepts such as sense and sensibility are no longer relevant.

2. Two Obstacles

At least two major difficulties arise when one attempts to tackle Kittler's key media-theoretical texts:

1. The first problem is his exclusion of the body as a medium and his omission of human perception – as long as one operates, that is, under the assumption that the body and perception have not first been infiltrated by technological media and that they cannot already be reconstructed as projections of apparatuses (see Kittler, 2002). The inattention to the dimension of 'those things that cannot be switched', or in other words to a corporeality that has not yet been transformed into a mechanical apparatus, should not be seen as an oversight but rather as an intentional act on Kittler's part. I will return later to discuss the arguments that Kittler himself uses to justify this vanishing act. At this point, it suffices to note the unique condition that humans are excluded as a medium from a historical analysis of media.
2. The second difficulty that one faces is the canonical status of Claude Shannon's communications-theoretical writings in Kittler's texts (see Kittler, 2002: 42f.). Digitization and computer data processing are the focal point of his media-historical reconstructions, whereas in the computer sciences themselves Shannon's communication theory plays a rather marginal role. In the realm of cybernetics, by contrast, the theories of automation and of self-organization were central to shaping the perspective on development and on computer design – even more so now from the standpoint of neuronal networks. Even so, Shannon's ideas and his model of communication continue to be the classical subject of Kittler's texts and they serve as his systematic point of departure. One must, perhaps, question whether Shannon's notion of quantifying the capacities of data transmission channels can ever be anything more than of mere 'archaeological' interest. Or, at the very least, it should strike one as curious that a discussion of the functions of media that is open to contemporaneous media technology, and that, in fact, first becomes important with this technology, takes its paradigmatic example from Shannon's model of channel transmission and from his conception of communication technology.

At this point, one could offer a simple explanation for the peculiarity that a projection of media studies does not include the human body and is, instead, anchored in Shannon's communication theory. This explanation can be found in the context of Kittler's methodological pre-decision and in his pointed statement that: *Everything that can be described, can be represented in the terminology of technological processes*. A literary scholar might reject such an approach as being too daring, and yet one should consider that a prerequisite for every attempt to describe something is to first define the distinctions with which one will work. The decision to adopt a technologically biased terminology – in contrast to a 'hermeneutic' vocabulary, for

example – is not necessarily wrong to begin with. Instead, one might grant this terminology a probation period since it attempts to describe something in a way that allows the surprising, the unexpected, and the new to emerge.

Returning for a moment to the 'difficulties' in Kittler's texts. First, the fact that the human body is excluded as a medium (and that, subsequently, only that 'which can be switched exists at all') makes sense if one is concerned with the processes by which, for example, the hand's movement becomes an object on the keyboard of the typewriter, or by which the mixed frequencies of the voice are inscribed onto vinyl structures. And with regard to the second difficulty, that of signposting with Shannon's theories, one could argue: Is this not, in fact, a completely valid approach in the context of an attempt to reformulate a discourse based in literary studies as a techno-logical discourse? In contrast to Alan Turing, who linked his Turing Machine to the (already mechanical) cultural technique of formal language, Shannon's concept can be seen as radical in that it considered familiar, everyday communication itself from the liminal perspective of a techno-logical event that is completely indifferent to meaning. Regardless of whether this is the correct explanation, the other possibility, that of explain-ing Kittler's approach in terms of his techno-centered rhetoric, would be insufficient to explain the uniqueness of his approach. This second expla-nation would also be insufficient because of the provocative question raised by this uncompromising drive for the technological, not only as the basis of description but also as the only legitimate language of description: What conception of the technological becomes operative with this approach?

3. Media Technology: The Reversal of Units of Time

This provocative question is precisely the one that leads us to the crux of Kittler's thought, and hence to the aspects of his method of thematizing media history that bring a new impetus to the approach. In order to answer this question, I will attempt to contextualize the technological within our traditional methods of managing time. Indeed, the explanation of the techno-logical as a modality of time management is precisely the 'main point'. The most basic experience in human existence – and this is relevant because man is, after all, a physical being – is the irreversibility of the flow of time. Technology provides a means of channeling this irreversibility. *In media technology, time itself becomes one of several variables that can be manipu-lated*. In the age of writing and of the book, symbolic time, by being fixed in space with linear syntactical structures, becomes repeatable and, to some extent, also moveable. What is unique about the technological era (from the gramophone to the computer) is that these technologies allow one to store 'real time' – in other words, those processes that cannot be fixed by syntac-tical structures and are thus not irreversible, but rather contingent, chaotic, and singular – and, at the same time, to process 'real time' as a temporal event. *Data processing becomes the process by which temporal order becomes moveable and reversible in the very experience of space* (Kittler, 1997: 130–46).

Kittler's media-historical investigation is thus located in the epochal transition from written to technological media: and this is a fundamental procedure for an archaeology of the present.

4. Discourse Networks Instead of Discourses

With this move, Kittler links his approach to Michel Foucault's 'Archaeology of Knowledge'. His historical study of media becomes the heir of discourse analysis, but only in order to radically alter the inheritance. What Kittler adopts is Foucault's method of disregarding explication and understanding in favor of describing rules that organize the 'actual discourses of an epoch' (Kittler, 1990: 369). He also adopts Foucault's orientation on exteriority, which in Foucault's theories emerges in the doubling of discursive and non-discursive techniques, of discourses and institutions. Finally, he maintains the historical *a priori*: this is the system that magnetizes the influences of the eras, which Foucault terms the 'archive', and which epitomizes the systems of expression that can be documented.

This is also where the similarities between Foucault and Kittler end. For Kittler, Foucault's discourse analysis remains an elegant expression of the 'old European epoch' that is subject to alphabetical writing. After all, the archive is virtually equivalent to a library, a collection site for monumental typescript. And yet, this form of typescript is by no means the only possible discourse network (Kittler, 1990). As soon as the monopoly is broken that writing and the book hold on processes of storing and processing, and as soon as other types of discourse networks emerge with technological, analog media, then an archaeology of present forms of knowledge can no longer be practiced by discourse analysis but must rather be taken over by technological media analysis. In this regard, it is quite logical that Foucault's historical analyses end at 1850. While the monopoly of writing had already been broken prior to this threshold, the monopoly of discourse networks as a whole still persisted; after all, if writing and the book are discourse networks, then the reverse also holds true: every discourse network must be either writing or a book. Kittler's media-historical analyses begin where Foucault's end. His historical approach transforms discourse analysis into the reflex and symptom of a specific – and since ended – media epoch. With this move, Kittler takes up technological media as the focal point around which everything is arranged that can even be registered as an analyzable fact after Foucault.

The crux of this story of the metamorphosis of the discourse-analytical approach is the technological transformation of the notion of media itself: media are no longer directly linked to signs, to communication, or, for that matter, even to information, but rather to data, in other words to the material 'carriers' of information. The operations of media structure the terrain of data processing: they select, store, and produce signals.

In order to avoid misunderstanding about the relation between data and media, even if Kittler's own terminology does not always avoid this confusion, it is necessary to note that there are not always data, on the one

hand, and then, on the other hand, the media that are concerned with the data. It is far more the case that media are the production sites of data. These production sites are discourse systems, the networks of techniques and institutions that preprocess what will even be considered data in a given epoch.

Turning now to those discourse networks that are attributed to the monopoly of alphabetic writing: the 'grammatological' era of chirographic and typographic cultural techniques of data processing.

5. The Monopoly of the Alphabet

What is writing, and what is alphabetical writing? Kittler provides a simple, and perhaps far too simple, answer to this question. According to McLuhan's theory that the content of a medium is always another medium, the content of writing is speech. Of course, Kittler's most recent works have shown that, in its origins, the Greek alphabet transcribed speech, music, and numbers.[2] And yet the decisive fact remains that the potency of alphabetical writing is rooted in the categories of oral and written language. Kittler's attention to this fact must be seen as more than a mere attempt to reproduce the belief in the secondary, derivative, and supplementary 'nature' of writing in contradistinction to spoken language that is prevalent throughout the realm of literary studies. In his classification of alphabetical writing and oral speech, Kittler attempts to emphasize a fact that is crucial for his concept of media, namely that everything that occurs in the context of the discourse networks that precede technological media is subject to symbolic order. Written media select, store, and produce precisely the data that have passed through the narrow chasm of the chain of signification, or in Kittler's terminology, those that are given in the form of a code. And this is precisely where the radical distinction of technological media becomes apparent: these media produce data that no longer refer to the symbolic world but rather to the material universe, or in other words, to that which cannot be encoded and fixed in writing in the symbolic network. The content of written media – and precisely this is Kittler's purpose in emphasizing the transcription of speech in writing – is the symbolic.

Associating media with the symbolic is not exactly a unique approach. After all, isn't the interpretation of media as the material carriers of events with signs commonplace in media studies? And yet, Kittler does not tread on this common ground, for media are not inevitably linked to the symbolic but only exclusively when pre-technological, literary media are involved. Kittler's use of the symbolic is indebted to Jacques Lacan's terminology. For Lacan, a symbol is not something that stands for an extra-symbolic entity, but rather is primarily something that can be substituted for another symbol. The symbolic is based in exchanging places (Kittler, 1997: 143). With regard to the place that they occupy, symbols can be replaced by other symbols. The prerequisites to these processes of shifting and substitution are, of course, blanks: a chain of signification can only be constructed and reconstructed with varying combinations if there is a distinction between

empty and filled spaces. The order of the symbolic is, thus, primarily a discrete structure.

This feature of the symbolic, for its part, also predestines the symbolic to becoming an instrument for dividing time into discrete units. The connection between the symbolic and time is what is at stake here: by referring to the symbolic, written media adhere to a specific temporal order. 'Texts and musical scores' become means of 'storing time', and yet they do more than just this. 'Writing is historically the first technique for manipulating time' (Kittler, 1993b: 182).

How is one to understand this statement by Kittler? Time flow is continuous. The 'simultaneous presence of full and empty spaces' (1993b: 182) does not exist in the flow of time, and thus the order of time's flow is, traditionally, irreversible. Kittler considers alphabetical writing, however, as the technique of 'assigning a space to each element in the temporal series of the chain of speech' (1993b: 182) together with the invention of blanks. This approach creates the necessary precondition for a method that Friedrich Kittler terms 'time axis manipulation'. It is nearly impossible to shift speech into a different type of order, i.e. without attending to the syntax of speaking from the end forwards. And yet this is precisely what writing makes possible. By shifting the chronological order of time to the parallel order of space – and spaces are things that can principally be restructured – written media become elementary forms that not only allow temporal order to be stored but also to be manipulated and reversed.

By contextualizing the potential opened up by media in this process of time axis manipulation, Kittler offers a means of understanding two anomalies in his media-historical descriptions:

1. The first peculiarity is his consequent exclusion of oral language and of the (unrecorded) voice as media. Even the voice that has not yet been reduced to a written text has a means of preserving the things that, in the flow of speech, would become subject to the irreversible streams of time. This strategy is the simple possibility for repetition. Yet Kittler excludes precisely this means of preservation and with it the voice, which is the original organ of repetition. Drawing on Hegel, who characterized the existence of tone as 'a disappearance of being in the act of being' (Hegel, quoted in Kittler, 1999: 36), he notes laconically that 'spoken language will thus be disregarded from the outset'. The only techniques that can be considered data processing are those that use a spatial means to create possibilities of ordering the things *differently* that are etched into this spatial order. This notion carries specific consequences for Kittler's concept of storage. Storing is not merely a means of preserving but is also intrinsically connected to spatial order. Wherever something is stored, a temporal process must be materialized as a spatial structure. Creating spatiality becomes the primary operation by which the two remaining functions of data processing – transporting and processing – become possible at all.

2. The other anomaly concerns Kittler's revision of the media-historical meaning of the printing press. In contrast to traditional references to the epochal break in the Gutenberg Galaxy that can be found in almost all media-historical analyses, Kittler regards the true, significant break as being not so much the invention of the printing press, but rather the transition from the scroll to the codex. A scroll has to be unrolled with two hands when it is read. It is thereby almost impossible to reach forward or to go back, or, in other words, to deviate from the sequential order of the material. The codex in which one can leaf through the text first transforms the temporal spaces of the material into individuated and traceable spaces in the text (Kittler, 1993b). To use technical jargon, one could say that this invention transforms the sections of the text into 'addresses'. This invention secures the accessibility of writing that must no longer adhere to the strict linear sequence of the successive material and precisely that can deviate from the sequential order. The printed book subsequently turns the addressability of writing into a stereotype, in that every copy of an edition – beginning with its pagination – has the same structure. The same holds true for the technological reproduction of illustrations that is also connected to printing.

The significance of alphabetical writing for the flow of speech is analogous to that of the codex, and later the printed book, for the continuously progressing scroll. Through these media, an act that transpires in time becomes divisible into discrete units and becomes thereby – or tends to become – moveable and reversible.

6. Technological Media

Textual media record some things while leaving others unwritten. What is noted is analogous to the repeatable chain of signification in speech; what eludes transcription is equivalent to a singular sound – just as musical notation records intervals but not the tone of the instruments (Kittler, 1993b: 185).

Technological media are the very media that make the data-producing processes of storage and manipulation accessible, processes that were previously unwritten and thereby fell through the 'grid of the symbolic' (Kittler, 1999, 11). Textual media transform the linguistic-symbolic into an operable code; technological media, by contrast, transform the contingency-based, material, real itself into a code that can be manipulated (see Kittler, 2002: 37). This type of manipulation creates the possibility of *reversing temporally-sequenced events*. Around the turn of the century, analog media first began to practice this technique: the gramophone as the device that records acoustic and film as the apparatus that transcribes visual events. Kittler uses an example from music to describe how one is to understand the distinction between the textual and technological time axis manipulation. Musical notation records intervals and makes them reversible – such as in the case of Bach's Fugue, in which the interval sequence B-A-C-H

becomes in reverse H-C-A-B (with counterpoint). This transposition does not affect the tonal characteristics of the individual sounds, and their individual sequencing remains intact even in Bach's reversal. Then Edison begins to experiment with his phonographs and discovers the possibility of playing musical numbers in reverse, which affects precisely the actual tonal characteristics of the individual sounds. The consequence of this procedure is that when a piece of music is actually reversed, the listener only hears the characteristic tonal color of the instrument as a whole after the fact, or in other words, when the individual tone of the reversed piece comes to the end.

The significant point here is that analog, technological media are the first to record events that transpire outside of the audible and visible realms. The real itself is saved by the phonograph, by photography, and by cinematography, it is transmitted by radio and television, and it is – at least in part – also even produced.

This is only possible in situations where the singular, material events are transformed into numerical values with the aid of mathematical processes. The significant point in the calculability of the contingent is that the 'purely unrepeatable' (Kittler, 1993b: 196) become visible as the sum of decimals, and thereby also become repeatable. The Fourier Method makes this possible. Mathematician Jean-Baptiste Joseph de Fourier recognized that periodic operations can be dissected and then reconstructed by trying out a variety of sine functions. The formalism of the Fourier Transformation that is subsequently developed also accomplishes this task even in the case of non-periodic functions. The linguistic phoneme and the musical interval, which are the fundamental elements for Kittler and which are the basis of the network of alphabetic order, are subjugated to this mathematization of a code in the second transition. This mathematical code is the frequency scale in which the spectrum of sounds is dissected. The Fourier Method accomplishes for the material realm of signals what the Greek alphabet achieved for the symbolic realm of language.

And yet, in contrast to the domain of language with its structures of signification that inherently rely on repetition, what is at stake since Fourier is the calculability of the irregular itself (Kittler, 1993b: 177). The unforeseeable thereby becomes foreseeable; the real, in the Lacanian sense, is transformed into a code that can be manipulated. One can now arrange previously unorganized elements into numerical columns. The quantification and codification of chaotic sequences are the reason that Shannon continues to be relevant in Kittler's thought; Shannon's communications technology attempts to process contingency, and to do so in a two-fold manner. First, Shannon's manipulation of information functions only in situations where something can either occur or not occur, in situations where presence and absence, yes and no, are possible. In the Universe of Laplace, which is ruled by material necessity, information would not exist (Kittler, 1993b: 164). Stochastic characteristics form the foundation for Shannon's notion of a quantity of information. Second, and in this context more

significantly, Shannon's communication theorem on chance noise holds the things accountable that accompany the transmission of information. The trick of communications technicians can be found in their attempt to deal with noise-laden sounds as if there were two different sources: a source of the signals and of the noise – whose emissions can then be added up. In lieu of this mathematically-equivalent approach to signals and noise, together with planned and chance events, Kittler proposes an additional interpretation that goes back to Shannon: the relation between signals and noise can also be interpreted as that between a coded signal and its deciphering by enemy intelligence. This perspective would also level the differences between information and noise, between signals and pure noise, in a way that makes it possible to interpret noises, as well as noise itself, as a type of code (Kittler, 1993b, 165). 'Computers can also operate, and indeed can only begin to operate, with chance data as if they were elements in a finite code, in other words elements that can be predicted and recalled' (Kittler, 1989: 110). This is the point where the discourse analysis, whose legacy Kittler takes up, turns into crypto-analysis (Kittler, 1997: 165f.). This type of analysis, in contrast to that of Foucault's theories, no longer refers to the realm of the symbolic but rather operates in the material world of the real. This perspective transforms nature into an encoded text, albeit a text that no longer needs to be interpreted but must rather *be decoded* with machines.

A peculiar metamorphosis emerges in this projection of the real as enigma cryptography, which – when brought to a technological stand – is almost a rehabilitation of the hermeneutic project of 'nature as a text'. The notion of dealing with chance data in this technological manner as if they were elements in a code continually resounds throughout Kittler's thought. This notion emerges in the context of Kittler's vision of erasing the difference between the scientific and literary studies with the terminology of data processing; or it appears in Kittler's continually expressed interest in analyzing the unconscious – which is also accomplished with cryptographic analysis. This notion also explains Kittler's fascination with Alan Turing's, Claude Shannon's and Norbert Wiener's work, who with their crypto-analytic, communications-theoretical, and communications-technological ambitions achieve precisely what will prove to be the computer's unique accomplishment: making chance sequences calculable.

What role do digitalized media technology play for Kittler? Analog media record with the aid of an electric, sensory data streams and – within limits – they also produce. However, they also lack a universal standard that would allow these media to be connected and translated reciprocally. The binary numerical system of digital technology provides such a standard. The constant functions – which analog media transform into equally constant data streams – are now accessible to continually discrete and digital production by means of scanning points in time that are equally spaced. The binary system provides a universal key that allows one not only to translate each of the numerous formats of image, sound, and textual media reciprocally,

but also, and at the same time, to traverse the symbolic-technological boundaries of the epoch of alphabetic writing. Alphabetic and numerical representations, functions and arguments, numerical values and operators, commands, data and addresses are equally and reciprocally translatable. The computer connects all of these media, in that it incorporates their input and output data into a mathematical procedure of digitalized signal processing with microsecond rhythms (Kittler, 1993a: 187).

What Kittler thereby accomplishes was already described with enviable precision in Turing's Universal Machine: regardless of whether a sign on a strip of paper is present or absent, the next step in production is regulated,

> which amounts to a type of writing: it depends on this reading whether the machine keeps the sign or erases it, or, vice versa, whether it keeps a blank space or replaces it with a sign, and so on and so forth. That's all. But no computer that has been built or will be built can do more. (Kittler, 1999: 18)

Kittler's idea of reconstructing the history of media as the history of discourse networks reaches its idealized realization in the operation of the computer – provided that one does not overlook one crucial fact that is central for Kittler. While it is true that the computer writes and reads, it does so in a way that is invisible to the writing and reading human. The operative logic of technological media is comprised precisely in structuring streams of data in such way as to pass under the radar of the 'time of human perception' (Kittler, 1993a: 180). The so-called 'real time reactions' can only emerge as a consequence of skipping over human perception. Real time analysis does not exist. Every step in computer processing takes time, albeit a span of time that is less than the smallest unit of time that can still be captured by the human senses (Kittler, 1993b: 201).

7. Beyond the Senses, but also the Observer

The uncoupling of information and communication brought about by technological media is at the same time the uncoupling of media and the human senses, at least as far as it concerns the working rhythm of technological media. Paradigmatic of this fact is the discovery that comes with electricity and that rings in the era of the analog media: the discovery of the formless flow of electromagnetic waves as an immaterial channel for information transmission (Kittler, 1993a: 188). This technique of passing under, or over, the radar of the perceptible also continues in the practice of time axis manipulation that becomes possible with technological media. While syntax-bound media such as musical notation carry out time axis manipulation in lower frequency ranges, in other words, in realms that are still accessible to acoustic and optical perception (Kittler, 1993b: 191), technological media diverge into the higher frequency ranges, 'where our hearing and sight disappear' (Kittler, 1993b: 192). The interfacing of a data processing system represents an image, voice, or text only as a 'surface effect'.

These remain mere 'eyewash', whereas 'inside the computers themselves everything becomes a number: quantity without image, sound, or voice' (Kittler, 1999: 1).

What Kittler characterizes here as a media-induced disappearance from perceptibility continues in numerous vanishing acts: the body disappears, as does art, history, but, most of all, man himself disappears. Man is no longer the referent in communications techniques, and is most certainly not its subject: the progress in media development cannot be characterized as intentional, nor as purposeful, but rather as 'escalatory and strategic' (Kittler, 1989: 115) in that techniques of data processing surpass and outperform each other reciprocally by means of their own dynamic (Kittler, 2002: 22f.). The human senses are taken over by the technological media.

The uncoupling of human sensibility from media raises more questions than it can answer. Doesn't the systematic abstraction of the dimension of sensory perception collide with the precise terminological structure that Kittler attempts to put into the place of interpretative termini? In his media-historical writings, Kittler uses terms such as 'signal', 'information', 'noise', 'data processing', 'calculability', and, in particular, 'time', and 'time axis manipulation'. Can these terms be used in a meaningful way without the reference to perceptibility? Does 'time' even exist without the connection to observation and/or experience, also, and particularly, when one is concerned not with subjectively experienced but rather with objectively measured time?

One can continue to inquire, for example, into Kittler's presumption that the interface regarding human senses reaches its historical fruition as a result of procedures within the computer that are stripped of their quality. Doesn't this process lead to an unauthorized proliferation of the function and use of artifacts? The technological thrives on its trick of separating operational methods from use. We can cook meals, drive cars, calculate with zero, etc., without needing to understand which chemical, electromechanical, and numerical-theoretical relations inform these processes. We can use technology without needing to understand how, and especially why, it works. In practice, Kittler also refuses to make this distinction. His sincere attention to the technological can be found in his engagement with things that he can do himself – at least in the form of a 'miniaturized model' (quoted in Hartmann, 1997). Nonetheless, the performance of the technological in quotidian use draws on the ability to make distinctions between use and mention. Kittler's leap from methods of operation that are far removed from the sensory to a process of making something useable that marginalizes the sensory thus falls short.

To continue with our questions, we are confronted with the paradoxical situation that handwriting and printing can be read for hundreds of years, while discs can only be read for a few years due to changes in operating systems. Can Kittler's theory of skipping over human perception using the logic of the escalating innovations in data processing even conceptualize the decisive problem faced by a society supported by computers – a problem

that is rooted in the escalating disappearance of possibilities for decipher-
ing information threatened by Alzheimer's? Or does Kittler's vision of trans-
forming an analysis of the real in the form of crypto-analysis already provide
the answer to this question? But here Kittler provides yet another argument
for disregarding the sensory: our knowledge of the senses is bound to a
language that our senses have always treated as a projection-surface of
media technology (Kittler, 2002: 30). However, determining something is
not necessarily equal to marginalizing it. Our senses are stimulated by
media, which does not lead to the reciprocal case that media can be
effectively described without reference to the senses.

The assumption presents itself that a *theoretical-strategic consider-
ation* outweighs Kittler's factual arguments. Kittler develops his concept of
media in connection with, but especially in latent opposition to, the father
of contemporary media debates, Marshall McLuhan (Kittler, 2002: 24f.). For
McLuhan, technology is an extension of the human body: media technology
of the human senses, electric media of the central nervous system, and
finally, electronic media of human consciousness. Kittler avoids this method
of anthropomorphic genealogy of media in the spirit of the human senses –
and quite rightly so.

Problematic presuppositions only produce noteworthy results on
occasion, but this is indeed the case with McLuhan in two respects. First,
there is McLuhan's theory that innovations in media cause a re-stratification
in the system and hierarchy of human senses so that tactility acquires a new
significance, as opposed to the traditional predilection for the optical sense.
When Kittler criticizes this idea – as far as here the condition of television
technology that is historically reduced to 'scanning' is universalized
metaphorically as 'touch' – he is indeed correct with regard to McLuhan's
interpretation of television as a tactile medium, but he does an injustice to
its theoretical potential, which also includes the idea of the changed status
of the tactile under the conditions of electronic media. Here, one need only
think about the possibilities for conducting tactile explorations with models
that are brought about by virtual realities. In addition to this idea, McLuhan
arrives at another interesting description of the stages of media innovation
as a result of his hypothesis on extensions. For McLuhan, there is a continu-
ing cycle of self-extension and self-amputation of man, from causing
numbness to one-sided irritation by the media, throughout each new phase
of technologization. In other words, McLuhan's theories reflect the aspect of
the escalating drive of media to surpass that is so crucial to Kittler in a way
that does not exclude but rather incorporates man and the organization of
his senses into this self-dynamism without thereby needing to fossilize man
as the intentional subject of this wave of technologization.

Finally, one last implied problem is brought about by Kittler's
elimination of the sensory. Excluding the dimension of perceptibility also
leaves no room for the relativity of the observer as a methodical principle
for making categorical distinctions. Kittler's terminology of the techno-
logical shifts to the function of a language – lacking in alternatives – whose

advantage is meant to be that it can describe the actual relations in our world precisely. But how can one justify this privileged role of the technology-infused terminology? I suspect that Kittler transfers an operative principle of formal writing to his non-formal, media-historical descriptions. The operative trait of formal writing is found in being *not only a medium of representation but also an instrument that works with the represented*, and indeed to a certain extent also produces the represented. What this means becomes apparent intuitively in written calculation. The decimal positioning system represents numbers, it operates with them, and finally – one need only think of the zero – also first produces numbers with its system. A characteristic of symbolic machines (Krämer, 1988) is that they *are also actually what they describe*, just as for example each Turing Machine transforms itself into the exact symbolic machine that is inscribed onto the strip of paper.

Does Kittler make the operative truth absolute, that aims to transform 'truth' into 'technological precision' and that applies exclusively to formal, calculable systems (Krämer, 1991)? And does he thereby arrive at a *technological ontology*, in which only that which can be switched exists at all? This 'ontology of switchable existences' has two interesting implications that Kittler also intends:

1. Because with digital technology everything that can be switched is essentially invisible to the human senses, nothing that is significant can even be perceived. Phenomenology, therefore, no longer exists (and therefore neither does art, when taken to be 'aesthesis'). Every type of phenomenology loses its foundation. Kittler's critique of hermeneutic sense-orientation encompasses phenomenological strategies. Both of these are not only falsified but they also become historically obsolete with the development of technological media.
2. That which can be switched, or in other words can be comprehended in discrete units, can be manipulated in relation to its time axis. If only that which can be switched exists at all, then also only that which can be manipulated with time axis. Time is no longer a universal form of our perception or experience, but rather it becomes a universal form of technological accessibility.

8. What, Then, Are Media and What Is Their History for Friedrich Kittler? A Caveat

1. *What are media?* Media are practices that use strategies of spatialization to enable one to manipulate the order of things that progress in time. Such means of time axis manipulation are only possible when the things that occupy a place in time and space are not only seen as singular events but as reproducible data. Such production sites of data are 'discourse networks'. Discourse networks are media in the broader sense: they form networks of technological and institutional elements.
2. *What is a history of media?* The answer to this question can be given

from two perspectives: (a) from the perspective of spatialization, what is at stake is the differentiation of the functions of saving, transmitting, and processing data, and finally, their 'reunification' in the computer; and (b) from the perspective of time axis transformation, the crucial aspect is the sequential order of written media that attempt to change the 'symbolic time' and the technological media that endeavor to change 'real time'. These perspectives reveal remarkable breaks with tradition. The decisive break within the era of writing is not the invention of the book, but far more the transition from the scroll to the codex that can be leafed through. The computer is not the first, significant innovation in media-technology, but rather – after writing – the analog, technological media. While writing makes the things that are already given as a symbolic structure operable as a syntactical linear stream, technological media record, encode and produce the material real itself which is laden with contingency.

3. *What is the purpose of media studies?* The strategic significance of historical media studies is found in continuing or even replacing the 'language-theoretical turn' with a 'media-technological turn', 'discourse analysis' with an analysis of 'discourse networks', and in providing an 'archeology of the present'. Precisely because 'data' serve as the fundamental concept and at the same time the foundational element of the symbolic as well as the material real, media studies operates beyond the gulf between the natural and social sciences.

4. *Are media a priori functioning universals?* Media are not anthropological universals but rather techniques that emerge with the invention of writing and that end with the conglomeration of media that are wired by the computer. To the extent that they are subject to the irreversibility of time without the possibility of reversal, human bodies can no longer be seen as media. Media history thus has a beginning and an end. What takes place in the middle is not a story of redemption but rather one of substitution in which something ultimately disappears never to be recalled. The machine substitutes man as the referent of communication; corporality disappears, and with it, each and every trace with which the body is involved. This teleology is not a specific aim of someone, nor is it a result of human intention, but can rather be ascribed to the self-dynamic of escalating inter-reference between technological media. Is the view of thematizing history as a story of the disappearance of man and his body the intellectual property of a media-technological version of eschatology?

5. *Does this concept of media imply an ontology?* Communication can be traced back to data processing and can be analyzed as communication technology; information and noise can be handled as mathematical-equivalent data. Technological media thus transform contingent events into repeatable data. A piece of data thereby becomes the smallest unit that underlies the realm of the symbolic as well as of the real and in which everything that belongs to our world can be dissected. The code

of this atomization of data is the binary code: in this manner, digitalization becomes the modern form of a universal language.

6. *A form of digitalized existentialism?* The culminating points within the tradition of literary studies – such as, for example, the rationalized project of universal characteristics (*characteristica universalis*) that speak to the eye, or the modern conception of nature as a book with mathematical letters, or the structuralist notion of the world as text – are transformed into the absurd with the binary code that cannot be expressed by humans, and with modern data processing as a textile that cannot be read by human eyes. This 'absurdity' can be understood in the sense of Kierkegaard as a paradox of the historical, which stands in stark opposition to human logic and sensibility, or in the sense of Camus, who counter-intuitively lets the world remain mute to human questions. Does a type of 'digitalized existentialism' speak out from Kittler's texts?

Translator's Notes

1. A key axiom of Kittler's 'information-theoretical materialism' that literally translates as 'Only that which is switchable is at all.'

2. See the article 'Number and Numeral' in this issue.

References

Hartmann, F. (1997) 'Materialitäten der Kommunikation. Zur medientheoretischen Position Friedrich Kittlers', *Information Philosophie* 2: 40–4.

Kittler, F. (1988/1995) 'Die Stadt ist ein Medium', in Gotthard Fuchs, Bernhard Moltmann and Walter Prigge (eds) *Mythos Metropole*. Frankfurt a. M.: Edition Suhrkamp.

Kittler, F. (1989) 'Synergie von Mensch und Maschine. Ein Gespräch mit Florian Rötzer', *Kunstforum* 98: 108–17.

Kittler, F. (1990) *Discourse Networks, 1800/1900*. Stanford, CA: Stanford University Press.

Kittler, F. (1993a/2003) 'Geschichte der Kommunikationsmedien', in Jörg Huber and Alois Martin Müller (eds) *Raum und Verfahren*. Basel/Frankfurt: Stoemfeld/Roter Stern.

Kittler, F. (1993b/2003) *Draculas Vermächtnis. Technische Schriften*. Leipzig: Reclam.

Kittler, F. (1995) 'Musik als Medium', in Bernhard J. Dotzler and Ernst Martin Müller (eds) *Wahrnehmung und Geschichte. Markierungen zur Aisthesis materialis*. Berlin: Akademie Verlag.

Kittler, F. (1996) 'Farben und/oder Maschinen denken', pp. 119–32 in Eckhard Hammel (ed.) *Synthetische Welten. Kunst, Künstlichkeit und Kommunikationsmedien*. Essen: Verlag Die Blaue Eule.

Kittler, F. (1997) *Literature, Media, Information Systems*, ed. by John Johnston. Amsterdam: OPA.

Kittler, F. (1999) *Gramophone, Film, Typewriter*. Stanford, CA: Stanford University Press.

Kittler, F. (2002) *Optische Medien. Berliner Vorlesung 1999*. Berlin: Merve.

Kittler, F. (2003) 'Zahl und Ziffer', pp. 193–204 in Sybille Krämer and Horst Bredekamp (eds) *Bild, Schrift, Zahl* (Reihe Kulturtechnik, vol. 1). Munich: Fink.

Krämer, S. (1988) *Symbolische Maschinen*. Darmstadt: Wissenschaftliche Buchgesellschaft.

Krämer, S. (1991) *Berechenbare Vernunft*. Berlin: de Gruyter.

Vollhardt, F. (2001) 'Kittlers Leere. Kulturwissenschaft als Entertainment', *Merkur* 8(55): 711–16.

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