

From Memo to AI

On Observing Infrastructures

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»On the one hand, we had the impression that the humanities and the institutions associated with them tend to overlook their own practice.«¹

The fact that knowledge does not arise out of nothing but presupposes infrastructures is a perspective that becomes productive precisely where this condition of possibility is lost sight of. Even in the Aristotelian distinction between *doxa* and *episteme*, mere opinion and knowledge, it is easy to overlook the fact that knowledge presupposes the comparison of doctrinal opinions of expert authorities. In *Nicomachean Ethics* Aristotle differentiates *episteme* as specific theoretical knowledge and distinguishes it, for example, from *techne* as a practical skill,² while his *Analytics* prioritises logical conclusions and syllogisms. Nevertheless, knowledge is always based on prior knowledge, as is inconspicuously stated at the beginning of *Second Analytics*.³ Aristotle himself compiled collections of the doctrines of earlier philosophers and scientific collections on nature or important political constitutions of Greek cities

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- 1 I would like to thank Jessika Hammers for her help and work on the translation from German. For the sake of readability, all quotations are translated. The original text is given in the footnotes: »Zum einen hatten wir den Eindruck, dass die Geisteswissenschaften und die mit ihnen verbundenen Institutionen dazu neigen, die eigene Praxis zu übersehen.«; Martus, Steffen/Spoerhase, Carlos (2024): »Praxeologie der Geisteswissenschaften – revisited«, in: IASL 49:2, pp. 323–340, here p. 326. Online: <https://doi.org/10.1515/iasl-2024-0016>.
 - 2 Aristotle: *Nicomachean Ethics*, 1139b. *Episteme* and *techne* are distinguished from *nous* (intuitive understanding), *sophia* (wisdom) and *phronesis* (moral, practical understanding); Cf. Parry, Richard (2020): »Episteme and Techne«, in: Edward N. Zalta (ed.): *Stanford Encyclopedia of Philosophy*. Online: <https://plato.stanford.edu/entries/episteme-techne/#Aris> (last access: 15.04.2025).
 - 3 Aristoteles: *Zweite Analytik*. Ch. 1, in: Wolfram Detel (ed.): *Aristoteles: Zweite Analytik*. Hamburg 2011, p. 1.

and the performance dates of tragedies.⁴ This prerequisite of an infrastructure of knowledge, which also plays a fundamental role for *topic*, is pushed so much into the background by the focus on syllogisms and deduction in *Second Analytic* that it must be emphasized separately.

For Aristotle, knowledge and science are on the one hand specific mental states of a rational being, but on the other hand also a set of scientific assertions and theories we have established according to appropriate criteria and methods.⁵

Even in Aristotle's time, knowledge of already established principles therefore presupposes written fixation as the infrastructure of knowledge. Aristotle thus turns away from the priority of oral instruction and introduces a new infrastructure of knowledge. In other words: a library is needed.⁶ The reference to his own library then became almost topical; early modern chronicles and encyclopedias from *Schedelsche Weltchronik* to *Zedler's Universallexikon* continually refer to it. »Let us go to the home of the bookworm«, Plato is believed to have once said.⁷ However, the library itself presupposes the production and dissemination, collection and maintenance of writings. It requires order and classification according to genre as well as concrete practices in dealing with texts, infrastructures which book culture has developed further since then. In today's zones of contact between book printing and digital texts it is easy to study how these infrastructures must be replaced by new ones in order to ensure the transposition of functionality and practices in media change, such as accessibility and sustainability.

Sciences therefore not only need (heated) spaces in which they can take place as well as devices, but they are also based on a variety of social, medial and praxeological prerequisites that can be understood as infrastructures of knowledge. The perspective is very connectable, think of the work of Bruno Latour and Actor-Network-Theory or of praxeology as an approach to social practices. Last but not least, Michel Foucault's concept of discourse and dispositif should also be considered. According to the understanding developed by Foucault, the *episteme* is always already inherent in the discourse. As we know, he is concerned with the

4 Detel, Wolfram: »Einleitung«, in: Aristoteles: Zweite Analytik, p. XI.

5 Ibid., p. XIV. »Wissen und Wissenschaft sind für Aristoteles im übrigen einerseits spezifische mentale Zustände eines vernünftigen Lebewesens, andererseits aber auch eine Menge von wissenschaftlichen Behauptungen und Theorien, die wir nach angemessenen Kriterien und Methoden etabliert haben«.

6 Wilker, Julia (2002): »Irrwege einer antiken Büchersammlung. Die Bibliothek des Aristoteles«, in: Wolfram Hoepfner (ed.): Antike Bibliotheken. Mainz: Philipp von Zabern Verlag, pp. 24–29.

7 Cf. Schwarz, Franz Ferdinand: »Einleitung«, in: Aristoteles: Politik. Stuttgart 1989, p. 11–12.

fundamental codes of a culture which govern its language, its patterns of perception, its exchange, its techniques, its values, the hierarchies of its practices, which right from the start determine for each person the empirical orders they will have to deal with and within which they will find themselves.⁸

Foucault thus indicates that infrastructures are not only to be thought of as the material structure of the condition of possibility (such as electricity or gas pipelines) but that immaterial prerequisites for communication, social affairs or knowledge must also be taken into account.⁹ Simon Ganahl gives a broader definition of the term in this sense, following Brian Larkin: »Infrastructures are built networks, systems of objects that enable a continuous flow of things, living beings or signs.«¹⁰ Foucault himself developed the concept of episteme further in this sense by also understanding it as a dispositive. He could

define the episteme as a strategic dispositive that makes it possible to filter out from all possible statements those that can be acceptable within, I am not saying: a scientific theory, but a field of scientificity, and of which one can say: This one is true or false. The episteme is the dispositive that makes it possible to separate not only the true from the false but also the scientifically qualifiable from the non-qualifiable.¹¹

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- 8 »[Die] fundamentalen Codes einer Kultur, die ihre Sprache, ihre Wahrnehmungsschemata, ihren Austausch, ihre Techniken, ihre Werte, die Hierarchien ihrer Praktiken beherrschen, fixieren gleich zu Anfang für jeden Menschen die empirischen Ordnungen, mit denen er zu tun haben und in denen er sich wiederfinden wird.« Foucault, Michel (1974): *Die Ordnung der Dinge*, Frankfurt a.M.: Suhrkamp, p. 22.
 - 9 Cf. Laak, Dirk van (1999): »Der Begriff ›Infrastruktur‹ und was er vor seiner Erfindung besagte«, in: *Archiv für Begriffsgeschichte* 41, pp. 280–299. It was first used in France in 1875 to describe the substructure of railroad constructions, later for the military, then as an economic term, which became more common after 1950.
 - 10 »Infrastrukturen sind gebaute Netzwerke, Systeme von Objekten, die einen kontinuierlichen Fluss von Dingen, Lebewesen oder Zeichen erlauben.«; Ganahl, Simon (2015): »Poetiken der Infrastruktur oder Foucault und Materialität«, in: *Le foucauldien* 1:1. Online: <https://doi.org/10.16995/lefou.6>. Cf. Larkin, Brian (2013): »The Politics and Poetics of Infrastructure«, in: *Annual Review of Anthropology* 42, pp. 327–343.
 - 11 Foucault, Michel (1978): *Dispositive der Macht. Über Sexualität, Wissen und Wahrheit*. Frankfurt a.M.: Suhrkamp, p. 124. He could »die Episteme als strategisches Dispositiv definieren, das es erlaubt, unter allen möglichen Aussagen diejenigen herauszufiltern, die innerhalb, ich sage nicht: einer wissenschaftlichen Theorie, aber eines Feldes von Wissenschaftlichkeit akzeptabel sein können und von denen man wird sagen können: Diese hier ist wahr oder falsch. Die Episteme ist das Dispositiv, das es erlaubt, nicht schon das Wahre vom Falschen, sondern das wissenschaftlich Qualifizierbare vom Nicht-Qualifizierbaren zu scheiden.«

Episteme, however, is thus no longer conceived as the foundation of knowledge but is itself recognized as an infrastructure of knowledge, as it is based on historical traditions, habits and norms.

Nevertheless, both the material and immaterial conditions of knowledge are easily overlooked. However, they are taken for granted. Even the transport, water and electricity networks usually only are made aware of when disruptions and crises remind us how important they are. In 2021, for example, the »gas crisis« in Germany together with the sudden increase in prices (or the condition of the railways, bridges and roads in Germany) has recently brought the importance of infrastructure to the public's attention. The ensuing uncertainty results from the realization of the limitations of our prosperity. Imagine a few days without electricity, without light or Internet, a scenario that immediately evokes catastrophic and almost apocalyptic conditions.

With its 2nd Annual Conference 2024 on *Infrastructures of (Non-)Knowledge*, the CRC 1567 *Virtual Lifeworlds* has set a highly interdisciplinary topic and was able to provide a multitude of concrete insights into the complexity of the interplay of knowledge, technology and infrastructure, whether from a sociological and praxeological or a media-technical perspective of the computer sciences, or from a literary, art or educational historical perspective. From the conversation about the digital text constitution of a medieval codex to the question of virtual archives and the functioning of large language models, the focus on infrastructures encompasses a fascinating range of research. What they have in common is marking and reflecting on the conditions of functioning and their infrastructural prerequisites in material, medial and practical terms as a condition of the possibility of knowledge. Restructuring or deviant practices play a particular role here, by questioning, shifting and reshaping known knowledge.

A small example may illustrate this. As part of the *Vocabulary of the Virtual* exhibition on the CRC's projects a doctoral student (Ann-Carolyn Hartwig) presented a three-dimensional graphic together with a 3D print. Both digitally implement a map of the island from Johann Gottfried Schnabel's novel *Insel Felsenburg* (1731). The fact that this imaginary place is visualized even in the first edition by an inserted map is a special feature of the book that opens up a play between fiction and authenticity. Such real maps of fictitious places have their own literary history which, however, only dates later in history.¹² Stevenson's *Treasure Island* and Tolkien's map of Middle-earth are famous examples. Both novels are the result of the maps that precede them. In the case of *Insel Felsenburg*, the digital 3D modelling of the map does something that is hardly noticeable but visible this way. Only in the three-dimensionality of the island landscape surrounded by mountains with its villages does the central castle

12 Cf. Bushell, Sally (2020): *Reading and mapping fiction. Spatialising the literary text*, Cambridge: Cambridge University Press.

of patriarch Albert Julius rise above everything else. This central position marks the entire symbolic structure of the utopia, as this state is strictly patriarchal. What is broadly explained in terms of content (which sons of Albert preside over which villages and what they produce for the common good) is shown in detail on the map. Yet, it is only in the three-dimensional realization that the centralist system becomes visible. This example shows that even the visualization of infrastructures leads to new insights. Before the contributions in this volume speak for themselves, I would like to take up three examples highlighting the interplay of infrastructure, form and meaning from the perspective of literary and media studies.

1. Waxboard—The infrastructure of memory as non-knowledge

If knowledge presupposes the knowledge of scholars, then this presupposes the existence of locally comprehensive media, in short: writing and the change from oral to literal culture. In addition to the text medium of antiquity, the scroll (*volumen*), notes on wax tablets (*tabulae*), were already common very early on, for example in Socrates' time. The muses and their acoustic whisperings, which were regarded as *inspiration*, and the daimon of Socrates were replaced by material writing media.¹³ The wax tablet with a wooden frame and a surface made of wax, several of which could be bound together in book form, as it were, is characterized as an early Greek writing medium by its potentially infinite storage capacity. The corresponding stylus had a flat and wide end so that the engraved characters of what one wanted to remember (*hypomnemata*) could be erased by heating the wax. In this form of memory with an integrated erasing function, the ancient wax tablet is unique. In terms of media technology, it was not until the magnetic head of the tape recorder in 1935, even before the computer, that this permanent link between erasing and writing became possible. Books, on the other hand, whether in the form of the scroll or later in the form of our books as a codex, are ROM in terms of media technology: read only memory. They preserve written content permanently, while the wax tablet functions as a technically extended working memory: as RAM, i.e. random access memory. The wax tablet as a medium of memory is therefore ideally suited for illustrating this astonishing but invisible and intangible capacity. Plato explicitly uses it as a metaphor for the human memory.

13 Cf. Havelock, Eric A. (2007): *Als die Muse schreiben lernte. Eine Medientheorie*, Berlin: Wagenbach.

Assume, then, for the purpose of our investigation, that there is a waxen tablet in our soul [...]. This tablet shall now be called a gift from the Mother of the Muses, Mnemosyne; on this tablet [...] we imprint what we want to keep in our memory.¹⁴

This image may be considered successful, as it also allows, as Plato explains, that some people with coarser wax remember less accurately, while people with finer wax remember more accurately. Even today's German expression »sich etwas einprägen« (to memorize something, lit.: to imprint) uses this memory metaphor which has remained highly effective throughout the ages alongside the »storage« (»Speicher«), i.e. a room in which something is stored.¹⁵ From now on, memory will be oriented towards the state of the respective media technology in order to linguistically illustrate the performance and, so to speak, the infrastructure of the invisible and intangible ability to remember and have a memory. Memory can thus appear as a (weathered) grave inscription, as a book or library or even as photographic memory after photography was invented. Finally, since the advent of the Internet, it is now described as a network of synapses. However, the fact that these do not know any traces or inscriptions but that the network simply constitutes the current electrochemical readiness to react or not to react, is once again pushed into the background by the metaphor of »pathways« (»Bahnungen«) or even »circuits« (»Schaltkreise«). With their inscription paradigm, the metaphors of memory thus provide a vivid but ultimately false picture. This example of an effective metaphor shows that infrastructures of knowledge may simultaneously be infrastructures of non-knowledge.

2. The infrastructure of the book

There exists a media revolution in media history that is often overlooked. It does not appear in the classical triad of writing, printing and computers. The book tends to be identified with the printing culture. In this way the medium of the book in the form of the codex' has disappeared from view. However, the establishment of our book form in late antiquity must be seen as one of the most important changes in

14 »Nimm also zum Zweck unserer Untersuchung an, in unserer Seele befinde sich eine wächserne Tafel [...]. Diese Tafel soll uns nun ein Geschenk der Mutter der Musen, der Mnemosyne, heißen; auf diese Tafel [...] drücken wir ab, was wir im Gedächtnis behalten wollen.«; Platon: »Theätet (191c)«, in: Platon: Sämtliche Dialoge. Bd. IV. Ed. by Otto Apelt. Bd. 4. Reprint Hamburg 1988, p. 111.

15 According to Harald Weinrich, the entire Western metaphor of memory can be traced back to these two types: Memory and wax tablet. Cf. Weinrich, Harald (1964): »Typen der Gedächtnismetaphorik«, in: Archiv für Begriffsgeschichte 9, pp. 23–26. Cf. Assmann, Aleida (1991): »Zur Metaphorik der Erinnerung«, in: id./Dietrich Harth (ed.): Mnemosyne. Formen und Funktionen der kulturellen Erinnerung, Frankfurt a.M.: Fischer, pp. 13–53.

the infrastructures of knowledge. Yet, it took about three centuries before the codex was able to establish itself, as the culture of the book scroll was too much institutionalised.¹⁶ As a symbolic form, it continued to represent the authority of texts into the high Middle Ages, for example in the *Codex Manesse* (around 1300 to 1340), where we see Walther von der Vogelweide not with a book but with a scroll rising from his hands into the sky. The codex became established for the first time after the turn of the millennium, supported by the growing influence of the Bible. What makes this form of book a media revolution is its layering of sheets, which provides a completely different infrastructure for texts and their practical use. Scrolls already had pages (strung together), but in the codex the *pagina* becomes a structure that can be turned. The first literary mention of the book in this form was made by the Roman poet Martial in his *epigrams* in the 1st century AD.

You who want my books everywhere with you / and as companions on long journeys: / buy those that the parchment presses onto narrow pages. / Put the large ones in their covers. A hand grasps me.¹⁷

The self-advertisement for the »handy« book, as inconspicuous as it may seem, brings up a groundbreaking innovation. While scrolls were laborious to read and had to be removed from their rolls and rolled up with both hands, usually while standing up, the codex is literally handy. It is smaller, easier to transport and stores more text, such as Homer's *Illiad* and *Odyssey* in one volume, as Martial admiringly notes.¹⁸ Above all, you can hold it in one hand. What seems self-evident today is a revolution that has largely been forgotten. The codex liberates the other hand while reading. Therefore, it allows for the possibility to take a pen and write into the book or to copy out of it. In this respect, the tradition of (Bible) commentary and exegesis is based on the book, thus providing the infrastructure of Western scholarly culture.

Martial's praise of the handiness of the codex thus reminds us that the book is a highly technological medium, long before the printing press and even more so in the digital age. Its form also structures the access to the content in a non-linear way.

16 On the enforcement of the codex cf. Mazal, Otto (1999): *Geschichte der Buchkultur*. Bd. 1, Graz: Akademische Druck und Verlagsanstalt, pp. 128–130. On the book scroll culture in Rome cf. Cavallo, Guglielmo (1999): »Vom Volumen zum Kodex: Lesen in der römischen Welt«, in: Roger Chartier/Guglielmo Cavallo (eds.): *Die Welt des Lesens. Von der Schriftrolle zum Bildschirm*, Frankfurt a.M.: Campus, pp. 97–133.

17 »Du, der du meine Bücher überall bei dir / und als Begleiter wünschst auf weiten Wegen: / kauf jene, die das Pergament auf schmale Seiten drängt. / Die großen steck in ihre Hüllen. Mich faßt eine Hand.«; Martial (2013): *Epigramme*. Latin-german. Ed. by Paul Barié and Werner Schindler (Sammlung Tusculum), 3rd, revised edition, Berlin: Akademie Verlag, p. 37.

18 Ibid., p. 1084.

Pliny's *Historia Naturalis*, with its 37 volumes, is the first to introduce a table of contents that allows for the targeted selection of chapters and passages instead of successively reading through, as Pliny announces in the preface. From the perspective outlined here, indexes of terms, page numbers, headers and footers are therefore infrastructures of the book that enable non-linear use and navigation within the text.

This structure of the book results in a remarkable and momentous consequence: the codex sequentializes the fabric of the text independently of possible text-immanent structures such as paragraphs and chapters. It spatializes the text, turning it into a tangible object made up of individual layers that must be leafed through. If the book is a leading medium of our culture, then it is not only the history of the codex, then our cultural history also reveals itself as a culture and a history of turning pages.¹⁹

The book introduces new possibilities of access. The story told by St. Augustine in his *Confessiones* (about 397 AD) is famous. After years of struggling to find the right faith in God, one day he hears a voice: »tolle, lege, tolle lege«, take it and read.²⁰ He opens the Bible he is carrying at a random point and reads the sentence that first catches his eye.²¹ This is Augustine's famous conversion scene. This would simply not have been possible with a scroll. In view of the digital other of the book, be it e-books or Internet texts, the material *bookishness* of the book has been reflected upon since recent years and its quality of difference emphasized.²²

19 »Aus dieser Struktur des Buches ergibt sich eine bemerkenswerte und folgenreiche Konsequenz: Der Kodex sequentialisiert das Gewebe des Texts unabhängig von möglichen text-immanenten Gliederungen wie Absätzen und Kapiteln. Er verräumlicht den Text, macht aus ihm einen aus einzelnen Lagen geschichteten greifbaren Gegenstand, der geblättert werden muss. Wenn das Buch ein Leitmedium unserer Kultur ist, dann ist sie nicht nur die Geschichte des Kodex, dann zeigt sich auch unsere Kulturgeschichte als eine Kultur und eine Geschichte des Blätterns.«; Schulz, Christoph Benjamin (2015): *Poetiken des Blätterns*, Hildesheim/Zürich/New York: Olms, p. 26. Cf. Maye, Harun (2019): *Blättern/Zapping. Studien zur Kulturtechnik der Stellenlektüre seit dem 18. Jahrhundert*, Zürich: Diaphanes.

20 Augustinus, Aurelius (1987): *Bekenntnisse/Confessiones*. Latin-german. Translated by Joseph Bernhart, Frankfurt a.M.: Insel.

21 Ibid. p. 417.

22 Cf. Piper, Andrew (2012): *Book was there. Reading in Electronic Times*, Chicago/London: University of Chicago Press; Bickenbach, Matthias (2023): *Bildschirm und Buch. Versuch über die Zukunft des Lesens*, Berlin: Kadmos. See also Bickenbach, Matthias (2019): »Opening, Turning, Closing: The Cultural Technology of Browsing and the Differences between the Book as an Object and Digital Texts«, in: Nicolas Pethes/Gabor Kelemen (eds.): *Philology in the making in the digital Age*, Bielefeld: transcript, pp. 163–176 and Bickenbach, Matthias (2020): »Die Form des Buches. Oder warum das absolute Buch bei Novalis Seiten hat«, in: Torsten Hahn/Nicolas Pethes (eds.): *Formästhetiken und Formen der Literatur. Materialität – Ornament – Codierung*, Bielefeld: transcript, pp. 139–163.

3. The Internet as an empire and the ignorance of AI

The fact that the Internet makes other knowledge structures possible became clear at the latest with the hypertext euphoria of the 1990s. In contrast to the printed text, which was now often described by the metaphor of the *frozen text*, the digital is seen as a liquid space of plural possibilities for networking. Drawing on Marshall McLuhan's euphoric farewell to the Gutenberg galaxy through multisensory and multimedia technology, hypertext pioneers were able to contrast the supposed linearity and thus also the hierarchy of author and reader to the flexible digital data possibilities. Theodor Nelson's *Xanadu* project and his book *Literary Machines* (1981) as well as Jay David Bolter's *Writing Space* (1991) present writing by way of digital possibilities as a new creative form even in terms of thought and knowledge. George P. Landows, in his book *Hypertext* (1992), saw this as a revolution of all established positions of author and reader, teacher and student, teaching and knowledge.²³ However, the supposed freedom compared to the linearity of the book also proved to be a great challenge or overload for orientation when reading.²⁴ In retrospect, the initial euphoria of a revolutionary infrastructure of knowledge can certainly be traced back to *Californian Ideology*,²⁵ to the euphoria and unreserved belief in progress through technology that Silicon Valley once produced.

In the mid-1990s, as the Internet and the World Wide Web went public, a utopian nearconsensus about their likely social impact seemed to bubble up out of nowhere. The Net would level social hierarchies, distribute and personalize work, and dematerialize communication, exclaimed pundits and CEOs alike. The protocols of the Net were said to embody new, egalitarian forms of political organization.²⁶

An astonishing document of this time is the famous *Declaration of the Independence of Cyberspace* by John Perry Barlow in 1996. The governments of the nations are contrasted to an independent realm of digital data, as if this were an autonomous coun-

23 Cf. Landow, George P. (1992): *Hypertext. The Convergence of Contemporary Critical Theory and Technology*, Baltimore/London: Johns Hopkins University Press.

24 Cf. Winko, Simone (1999): »Lost in hypertext?«. *Autorkonzepte und neue Medien*, in: Fotis Jannidis et al. (eds.): *Rückkehr des Autors. Zur Erneuerung eines umstrittenen Begriffs*, Tübingen: Niemeyer, pp. 511–534.

25 Cf. Barbrook, Richard/Cameron, Andy (1996): »The Californian Ideology«, in: *Science as Culture* 6, pp. 44–72. Online: <https://doi.org/10.1080/09505439609526455>.

26 Turner, Fred (2006): »How Digital Technology Found Utopian Ideology«, in: David Silver/Adrienne Massanari (eds.): *Critical Cyberculture Studies*, New York/London: New York University Press, pp.255–269. Online: DOI 10.1007/s11569-017-0285-6.

try. The full-bodied tone of this manifesto, which alludes to the US Declaration of Independence, is what makes it so fascinating to this day. It begins with a contrast:

Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather.²⁷

New versus old, matter versus spirit, freedom versus rules—that is the basic structure of this text. A new realm is proclaimed, with its own rules beyond the old world and its institutions. »We are forming our own Social Contract. This governance will arise according to the conditions of our world, not yours. Our world is different.«²⁸ But it is precisely this new realm that appears to be threatened. Rhetorically, the text figures its self-aggrandizement through a paradox: the claimed sovereignty is, on closer inspection, quite questionable. »You claim there are problems among us that you need to solve. You use this claim as an excuse to invade our precincts.«²⁹ This is precisely what must be rejected. Don't regulate us, says the text, as it were, and this makes it relevant to this day. Autonomy is demanded: »Your legal concepts of property, expression, identity, movement, and context do not apply to us.«³⁰ The argument for this independence of all established infrastructures and laws of the real world is the incorporeality of cyberspace as the home of the supposedly pure mind, combined with the promise of freedom and equality for all.

Cyberspace consists of transactions, relationships, and thought itself, arrayed like a standing wave in the web of our communications. Ours is a world that is both everywhere and nowhere, but it is not where bodies live. We are creating a world that all may enter without privilege or prejudice accorded by race, economic power, military force, or station of birth.³¹

That is why this text is the declaration of hope for the utopia of the Internet par excellence. The new infrastructure of communication is to be one that transcends social hierarchies. Freedom and equality as high ethical and political values thus create a self-confidence that wants to take on the entire old world. But one must not be deceived by this rhetoric. Barlow pretends that the inhabitants of cyberspace do not have bodies and do not need social security numbers, employment contracts

27 Barlow, John Perry (1996): A Declaration of the Independence of Cyberspace. Online: <https://www.eff.org/cyberspace-independence> (last access: 18.04.2025).

28 Ibid.

29 Ibid.

30 Ibid.

31 Ibid.

or identity cards. He cleverly excludes economic dependence, for example, on chip manufacturers and power supplies, i.e. the material infrastructure of the Internet. Servers, cables, codes and protocols are being overlooked. Today the global power of corporations such as Alphabet, Apple, Meta, Microsoft and Nvidia or even Tesla is coming into focus, but also the ecological costs of server farms for the Internet. Every search query has an ecological footprint, streaming requires electricity. Google's European headquarters are not arbitrarily located in Finland, by the sea, to have enough cooling water. In Frankfurt am Main the enormous heat generated by the servers is being considered for heating apartments. The electricity consumption just for the current generative AIs has already reached about the size of the consumption of France in one year. Blockchain and digital currencies are no less energy-intensive. This infrastructural penetration of the real world was masked by the emphasis on freedom in the early days of the Internet. The emergence of global digital powers, which does not follow the utopia of decentralized, rather anti-capitalist breaking of monopolies, was also not reflected on as a possibility—and yet William Gibson's epoch-making cyberpunk novel *Newromancer* (1984) expresses precisely this:

Like an origami trick in liquid neon, his distanceless home unfolded [...], a transparent chessboard in 3-D, infinitely extended. The inner eye opened to the stepped, bright red pyramid of the Eastern Seaboard Fission Authority, rising luminously behind the green cubes of the Mitsubishi Bank of America. High above and very far away, he saw the spiral arms of military systems, forever out of his reach.³²

The utopia of the Internet has always been accompanied by dystopia. However, Barlow's rhetoric is particularly effective in hope. His manifesto ends with a wish: »We will create a civilization of the mind in cyberspace. May it be more humane and fair than the world your governments have made before.« However, this better world through the new infrastructure of communication cannot be guaranteed or promised but only hoped for.

From this last sentence, one reads this text differently. Its strong schematization (old/new spiritual/material) seems contrived and thus ignores the fact that even cyborgs and hackers are not mere ghosts but, as social beings, have always been part of the real world. As great as the hope was, the Internet does not exclude economic interests and power. Consequently, the digital infrastructure is also characterized by

32 »Wie ein Origami-Trick in flüssigem Neon entfaltete sich seinen distanzlose Heimat, [...] ein transparentes Schachbrett in 3-D, unendlich ausgedehnt. Das innere Auge öffnete sich zur abgestuften, knallroten Pyramide der Eastern Seaboard Fission Authority, die leuchtend hinter den grünen Würfeln der Mitsubishi Bank of America aufragte. Hoch oben und sehr weit weg sah er die Spiralarme militärischer Systeme, für immer unerreichbar für ihn.«; Gibson, William (1987): *Neuromancer*, München: Heyne, p. 77.

asymmetry and hierarchies. Although interactive participation is potentially possible for everyone, it is only possible under conditions that have already invented their own economy of sales and big data. Barlow's manifesto is therefore a good example of what Sascha Dickel and Jan-Felix Schrape highlighted as the »Logic of Digital Utopianism«.³³ The success of the media utopia is on the one hand due to the spread of technology but is also based on the ability to connect to ethical, economic and political discourses which are always addressed simultaneously. Utopias thus have a social function within the digital discourse—they are to a certain extent a rhetorical form of self-assurance, according to the two authors.

Beyond this discourse, numerous projects in the *digital humanities* have shown that recoding the infrastructures of book printing into digital editions and new knowledge possibilities require some rethinking on the basis of digital data, be it the creation of data collections or the recoding of printed texts into XML.³⁴ This change of practices and thought styles, but also of communication about scientific objects, requires not only interdisciplinary cooperation but also particularly complex coordination. Successful projects, beyond the digitization offensives of regional, state and university libraries, should be highlighted as *best practice*. In my field of German literary studies, for example, the online collection of Heine's works in the Heinrich Heine Portal of the University of Trier, which has existed for a long time and where the critical Düsseldorf edition can be compared with other editions as well as with original writings, is worth mentioning.³⁵ Heinrich von Kleist's works are now also available as a privately organized, exemplary critical edition.³⁶ Gabriele Radecke's digitization project of *Fontane's Notebooks* is also noteworthy, as she first had to find digital ways of representation for different types and colours of pen, for scribbles in the margins, scribbles in between and even for pages that had been torn out (and inserted elsewhere).³⁷ Another project will be briefly discussed in more detail, due to its special design.

As the head of the *Campus Medius* project, Simon Ganahl worked for years with programmers and graphic designers to create a multi-perspective depiction of the events of three days in Vienna in 1933. *Mapping Austrofascism* is about the visit of several German National Socialists to Vienna in May 1933 in the context of the »Türkenbefreiungsfeier« (Celebration of the Liberation from the Turks) and the counter-

33 Schrape, Jan-Felix/Dickel, Sascha (2017): »The Logic of Digital Utopianism«, in: NanoEthics. Studies of New and Emerging Technologies 11, pp. 47–58.

34 Cf. Jannis, Fotis/Kohle, Hubertus/Rehbein, Malte (eds.) (2017): Digital Humanities. Eine Einführung, Stuttgart: Niemeyer.

35 Cf. online: <http://www.hhp.uni-trier.de/Projekte/HHP/werke> (last access: 18.04.2025).

36 Cf. online: <https://kleist-digital.de> (last access: 18.04.2025).

37 Cf. online: <https://fontane-nb.dariah.eu/index.html> (last access: 18.04.2025).

reactions, for example from the communist side. Marches, headlines, radio broadcasts, propaganda films—all of this takes place simultaneously at various locations in Vienna over the course of three days. Ganahl's project, which is presented in detail in his habilitation thesis of 2022,³⁸ not only offers a topographical map of contemporary Vienna but also distinguishes between topology and topography as modes of access.³⁹ Drawing on actor-network theory and Foucault's concept of the *dispositif*, the project reflects on historical events as a network and includes not only people but also the cinema, film cameras and radio broadcasts as »agency« (Latour). The project emphasizes the dependence of representation from specific perspectives. It offers different modes of access and networking, for example the alternatives of bird's-eye view, street view and panoramic view, each with different links to text, image and sound material. Ganahl summarizes this by the term »Medienerfahrung« (media experience), by way of which we are supposed to become aware of what exactly the practices and their associated possibilities are and what advantages and disadvantages each of them has. This way, the representation itself is reflected upon as a filtering of perspective. The bird's-eye view of the map of Vienna with its marked locations is not evaluated as a supposedly neutral view but is distinguished by its suggestion as a supposedly objective overview of a quasi-divine perspective. Of course, such a project also provides the possibility of directly integrating archive material, such as historical radio broadcasts, thus contextualizing it anew. Ganahl does not see himself as the author but as the »curator« of the material. His project shows how today digital possibilities of mapping both digitize material collection while at the same time reflecting this digital form of presentation as an infrastructure of knowledge.

As we can learn from Ganahl's reflections, the representation of the infrastructure of knowledge is always accompanied by a withdrawal of knowledge. That not-knowing itself is a necessary reflective category has been in the world since Socrates' famous ironic epigraph that the only thing he knows is that he knows nothing. But while critical reflection has its place in the humanities, the digital infrastructure seems to think too little about not-knowing, despite all the fake news and data exploitation. This is necessary, for example, in the case of the latest media revolution through generative AIs since the public accessibility of ChatGPT. This is not an attempt to describe the history and background of this new emergence of knowledge but to conclude by highlighting the proximity of knowledge and non-knowledge based on personal experience.

For a seminar on Clemens Brentano's early Romantic novel *Godwi* (1801/02) I wanted to use the introductory session to point out to the dangers of using AI for students and to check for myself how far the new text machines have developed.

38 Ganahl, Simon (2022): *Campus Medius. Digitales Kartographieren in den Kultur- und Medienwissenschaften*, Bielefeld: transcript.

39 Cf. online: <https://mapping-austrofascism.campusmedius.net> (last access: 18.04.2025).

After experimenting with *Perplexity* and *ChatGPT4* I discovered *myjotbot*, an AI application that generates ad hoc suggestions for the continuation of the sentences while you are writing as well as possible next topics in a column to the right.⁴⁰ This writing experience was quite irritating, but there is no denying that there also appear useful (and sometimes surprising) suggestions (the Tab key immediately accepts the suggestion). What is astonishing is that this AI presents itself to be a master of the subject matter. The choice of the generally rather unknown, very complex novel by young Clemens Brentano in no way influenced the seemingly certain knowledge the AI proclaims. The machine formulates in a certain, at a first glance well-informed tone. Of course it cannot know that the older research consistently stated Brentano's dependence on Friedrich Schlegel's ideas on early Romantic universal poetry, while today's analyses recognize an independent aesthetic that deliberately distances itself from the early Romantic circle, even if it adopts and uses figures of thought and keywords.⁴¹ *Godwi*, for example, calls itself a »verwilderter Roman« (unkempt novel) in its subtitle, an allusion to the figure of the arabesque, which for Friedrich Schlegel stands both for the winding paths of the imagination and for the Romantic novel itself. *Godwi* is a very complex novel, the first part of which is structured as an epistolary novel, while the second, set many years later, is narrated by the editor of the letters and alleged author of *Godwi*. The fact that this author dies in the course of the narration and then continues to be narrated by his character Godwi is only a small part of many extravagances. In terms of content, it deals with topics that may be considered psychoanalytical today; all family and love relationships are disturbed and refer to traumata, not least those of absent or rejecting mothers. The AI formulates full-bodied statements in this regard, which could be quite exciting when being read as theses, but they are not formulated as such but as supposedly objective facts. The example I finally presented to the seminar is the following passage formulated by the AI:

Godwi's development is a journey through conflict and self-discovery which forms the heart of this novel. At first, Godwi seems to be a plaything of his circumstances—driven by passions and a seemingly aimless search for identity. But over time, he begins to confront the profound questions of his existence: Who am I? What drives me? It becomes clear that his outward crushes are reflections of inner conflicts.⁴²

40 Cf. online: <https://www.myjotbot.com> (last access: 20.04.2025).

41 Cf. Bickenbach, Matthias (2018): »Noch« nicht einmal Optik studiert«. Clemens Brentanos Medienästhetik und ihre Abweichung von der Frühromantik«, in: Volker C. Dörr/Rolf J. Goebel (eds.): *Literatur in der Medienkonkurrenz: Medientranspositionen 1800, 1900, 2000*, Bielefeld: transcript, pp. 49–66.

42 AI text generated with myjotbot.com, February 2024: »Die Entwicklung von Godwi ist eine Reise durch Konflikt und Selbstfindung, die das Herzstück dieses Romans bildet. Zunächst

This reads well, but the devil is in the details. The individual formulations sound *too good*, so to speak. The image of the »journey through conflict and self-discovery«, for example, is too good to be true. Godwi travels only in the first part of the novel. He sets out on an initially »aimless search« which is of course »driven by passions«. You can see it that way, but the AI reshapes it into a course that is not appropriate to the novel. In particular, the phrase »over the time, he begins« is grossly misleading. *Godwi* is not a novel of development. Between Part 1, in which little time passes, and Part 2, there is a leap in time of around 20 years. There is no progression but rather a stage A and a stage B of Godwi, who is a very different character in the second part than in the first one, as the fictitious letter editor named Maria also notes. In retrospect, the fact that he rearranged and partly mixed letters with his own ones destroys their fictitious authenticity. The novel virtually deconstructs the possibility of a biography. It rather dissolves the text into several perspectives and depictions, a mechanism that is presented as the definition of the Romantic in Chapter eight.

The now older Godwi, on the other hand, no longer asks himself who he is and what drives him. In short, the AI suggests a skewed, false image of the novel, and even if a sentence such as the one that the »outward crushes are reflections of inner conflicts« sounds nice, this does not represent knowledge of the novel. It is not only questionable which infatuations (»Schwärmereien«) are meant here, but also whether the term is appropriate here at all, since the figure of the *Schwärmer* (*dreamer*), especially in Christoph Martin Wieland's work much earlier, represents the immature youth who confuses fantasy with reality—a concept that was productive in 1764, but no longer in the Romantic period and certainly not with regard to the character of Godwi from the first line of his first letter. The supposed knowledge of the novel claimed by the AI thus leads to an undifferentiated knowledge of the novel. The AI text must rather be considered a knowledge of what is wanted to be heard, an elegant, not very differentiated overview that is rhetorically convincing in that it is linguistically consistent. But understood as non-knowledge of the novel, the AI text presents a fruitful task regarding the question of reading and understanding texts, precisely because the infrastructure of the large language models simulates plausible statements. They thus combine knowledge and non-knowledge in a specific way, and the differentiation between them will increasingly become a task for future research.

scheint Godwi ein Spielball seiner Umstände zu sein – getrieben von Leidenschaften und einer scheinbar ziellosen Suche nach Identität. Doch mit der Zeit beginnt er, sich den tiefgreifenden Fragen seines Daseins zu stellen: Wer bin ich? Was treibt mich an? Es wird deutlich, dass seine äußerlichen Schwärmereien Spiegelungen innerer Konflikte sind.«

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