2. Ten Statements on Technics

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Abstract

To understand how preeminent scholars and creative practitioners approach the topic of technology today, Nicholas Baer and Annie van den Oever invited them to reflect on a series of questions: What drew them to technology as a matter of inquiry, and how have developments of the past decade extended, shifted, or even challenged their thinking? What is a recent media-technological development that bears on their work, and how does the contemporary mediascape realign the relations between technē, technique, and technology? Which theoretical, historiographical, and methodological approaches are especially generative, and which texts warrant further attention? Finally, how does their work think through (geo)political issues such as power, access, and accountability; participation, engagement, and activism; and racial, social, and environmental justice?

Keywords: film and media studies, philosophy of technology, science and technology studies (STS), media infrastructures, environmental media, artificial intelligence (AI)

André Brock:

When I started studying the internet in the early 2000s, the accepted wisdom was that the default internet user was white, male, middle class, Protestant, and straight. The trouble with accepted wisdoms, however, is that few people attempt to interrogate them. Moreover, the newness of internet use meant that we (I'm including myself in this) treated it as if it were a new form of human-machine sociality, where we could identify humanity as a (insert platform/app here) "user." That left little room for interrogating how those

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users were always already embedded in sociocultural contexts before ever touching a keyboard or mouse.

The phenomenon I've invested my career in is this: Black people have always used information technologies/the internet. Thanks to accepted wisdom and digital divide scholarship, I was often asked "how do you even know they're Black?" So it was only when Black digital practice became hypervisible thanks to Twitter affordances – specifically, the hashtag – that people began to understand that race could be a salient indicator of digital practice and even expertise. These affordances have lost much of their glamour as the furores over George Floyd and COVID have receded to become an infrastructural hum of disquiet. But if I had told you in 2003 that the humble octothorp would become a vital organizing tool for digital information and for social justice … would you have believed me? The hashtag helped to cement the recognition that race is inherently an aspect of technoculture.

Dominique Chateau:
Technique and technology are the topic of numerous debates that presuppose or make explicit a hypothetical mythology of the original – and this comes with philosophical implications, among them the existence of a pre-philosophical time that philosophy would aspire to rediscover; and film-theoretical implications, among them a film ideal for which pre-technical reality provides the model. While it is pertinent to rediscover archaic aspects in the invention of cinema, as Edgar Morin ([1956] 2005) does, these philosophical and theoretical perspectives come with a huge disadvantage for the field of film and media studies. Because they are associated with the denial of representation (as a case of presence, of being, etc.), they do not allow us to understand how and under what conditions a technological device can function as a medium of representation of reality. In other words, these perspectives overlook the crucial function of the technological devices under scrutiny (for instance, in film and media studies) as media which mediate reality in specific ways. As for film: the primary and most important *medium-specific* element of its technological mediation is motion or movement, which, when rendered on screen, produces an effect of presence. (Christian Metz [1991] is right, not Gilles Deleuze [1986, 1989], when it comes to the effect of presence created by the *movies*.) In other words, presence as an effect created by the movies is not unique, mysterious, or ontological; it is constitutive of filmic technology. Presence is the raison d'être of a medium which, even before any narrative situation is represented, constitutes as present what it represents.

While presence is the first and most important factor brought about by film's medium-specific technological mediation, the second factor is the modalities of perception brought about by film or digital technology – see Walter Benjamin's excellent formula: "sense perception altered by technology" (Benjamin 2002, 122). The transformational power of the medium has notable ontological implications. Following Benjamin, we could argue that human ontology is transformed by technology. This second factor has been at the heart of a fierce debate by critics, among them Benjamin himself, who were ambivalent about the effect on perception brought about by technology, and hesitant to frame it along the lines of two familiar themes: either the loss of aura or the gain of cinema as a popular art. Regardless of the outcome of such debates, we may conclude on the basis of the reflections on the two factors examined so far (there are others, of course) that the effect of presence and the shock of the image, montage, and visual effects conspired to define the new medium as an ontological and psychological transformation of the world.

It is from the perspective of such a theoretical approach to the mediation of reality provided by film techniques that we can grasp the practical effectiveness of film. As Gaston Bachelard ([1940] 1968, 119) suggests, this involves accessing a concept of film that represents it as a *superobject* (in French, *surobjet*). For the philosopher, the concept of the superobject implies (entails) the history of concept formation, exemplified by the concept of the atom in theoretical physics. In light of a technological history as in the sciences, the analysis of film understood as a superobject (an object beyond the semantic atoms manipulated in ordinary discussion) opens up a complex parametric interplay: as the phenomenon itself is defined, the basic atom cracks, disseminates, and explodes:

1) first, within the triad of device/medium/apparatus, used to specify the social dimensions of film, and to stress that the medium is the pivot; and that mediation moves from one screen device to another, from IMAX to the smartphone, and from one dispositif to another, from the cinema hall to the living room; and

2) second, within a whole host of terms and concepts – parameters, if you wish – whose consideration directs our attention toward a further decomposition of the superobject in terms of its traits, such as fixed/nomadic, dedicated hall/domestic setting, projection/backlighting, integral medium/hybridization, optical distance/haptic possibility, and so on. In short, the technological superobject called film is the product of critical reflections, not in the negative sense of denial or denigration, but in the positive sense of that human faculty Bachelard calls "polemical reason" ([1938] 2002, 22).

The latter, when it leads to a multiparametric vision, enables us to understand the full richness of technique and technology (particularly in the manner of Gilbert Simondon [2017]). The antinomy of technique and ontology (known as realism) presupposes a pure state of the world or of knowledge, as origin or ideal, obviously without technique. But humanity started off as a social species in which, from the outset, technology was an integral part (see agriculture). Technology is humanity! It is an integral part of human history. There is no dichotomy between humanity and the specific knowledge (techno-logos) that constitutes it: because technique and technology, with their specificity, have never ceased to be decisive for humanity.

Beth Coleman:
My genealogy of technē would be Greeks>Heidegger>Stiegler>Glissant. The term and critical praxis around it have been a point of obsession for me from the beginning of thinking and doing with technology. If one sticks with the awkward translation of "know-how," then the situation of actor-material is foregrounded. The phenomenal aspect of technē is central to the worlds it produces. Yes, already "worlds," as I cannot resist the possibility of liberation technologies. This is clear in my writings, from "Race as Technology" (2009) to "Technology of the Surround" (2021). Within this context, I make the jump from technē to technology as the thing that does a thing. I am not sure I have a conviction or commitment to technique other than as a pale specter between the two beloved, vexing terms.

Feel free to make fun, but ChatGPT is the technological phenomenon that has my attention. And, if we attend to the AI engineering literature, attention is everything. It (ChatGPT) is not *an account* of technē, as the current AI chatbots do not demonstrate "know-how." In fact, the ways they don't know or hallucinate or genuflect are amazing theater but not the ability of technē. I am interested – perhaps we all are interested – as it is the first public demonstration of turning on an AI "lightbulb" or watching the AI gilded Digesting Duck. Equal parts new technology and legerdemain.

Perhaps I was dropped on my head as a baby, but technical apparatuses have always been interesting to me. I am interested in the architecture of how a thing works in relation to the social world of how it works. Obviously, that is the sociotechnological. But the thing that floors me is that thinking those things together continues to be entirely alien on account of disciplinary silos. Machine-learning people duck when the word "social" shows up, and media studies often struggles to move beyond systems of signs (not sure if we have the Frankfurt School to blame for that). I began my graduate

studies in philosophy of technology (a.k.a. comparative literature) while running an art studio, SoundLab, where we made new technologies for the internet age. In my early work on avatars, I was interested in the social world of virtual agency. So, for me, inquiry has continuously been tethered to that obscure object of desire, technology.

As discussed above, I primarily move between technē and technology in my work. I see technique as a secondary aspect. And yet, the contemporary mediascape realigns the semantic forcefield, as one has been surrounded by technology that fails to acknowledge technique. The frequent violence that is the state of social media might have been better acknowledged, if not better managed, if there were industry accountability for technique. It seems the necessity of precise conceptual distinctions of media technologies is even more pressing now. If we think of the advanced automation turn as a "general purpose technology," like electricity or the internet, then the importance of distinguishing military from civic from public is pronounced. And yet, we are distinctly in a state of catch-all panic that only supports a particular narrative of techno-determinism. Film can inhabit the amphibian state of technique and technology without being culturally disruptive, as it is known in temporal, narrative, and dimensional form. The contemporary phase shift of advanced automation is environmental immersive technologies that surround although often invisible. These are a different beast.

I think it is a great time for many more of us to attend to Sylvia Wynter's work, on "After Humanism" (1984). Whether we think of Bruno Latour and actor-network theory (2005) or Geoffrey C. Bowker and Susan Leigh Star's sorting of things (1999), it is crucial to remember where we are on sorting systems, sorting humans, sorting things and the world. In terms of recent changes in technology-shaping research methods, I see a clear shift toward working collaboratively with machine-learning researchers, as well as working hands-on with generative tools. It means my publications are looking like multi-authored papers at ACM (Association for Computing Machinery) conferences as opposed to traditional humanities/STS. It won't stay like that forever, but I am interested to see how critical frameworks and computer science/engineering technē can better cross-pollinate. My creative practice mirrors the scholarly one in the sense that I often take on new tools and work with them in a way that is against the cultural grain. For example, in the project and book *Reality Was Whatever Happened: Octavia Butler AI and Other Possible Worlds* (2023), I train a generative adversarial network (GAN) AI, away from the photo real and human likeness.

On a good day, my work thinks through geopolitical issues in a relational way: power can't be thought without shades of access and accountability.

At this point, participation ends up being a bit of a creepy word for me, as the last two decades of social media have been directed at "participation" in a way that forecloses on consent. In the face of the institutional legacy of hegemony, engagement and activism are mission critical. If we do not speak out against the forecasting of the past as the future, we won't have a future. I think racial/social/environmental justice is part of that, although justice, like participation, has had a tough go of it in this millennium. Methodologically, STS and Black studies are powerful engines for me, and I apply them to technology infrastructure, data studies, and media archaeology. I am working on cities and data and AI & Society. So more recently I have been doing work that sounds like policy studies – trusted data sharing, responsible AI, and so on. But I'm pretty sure it's the same methods of the sociotechnological that I've developed through the works of Lucy Suchman (2007), Michelle Murphy (2017), Rosi Braidotti (2011), Wendy Chun (2008, 2011) … it's a long list. It's nice to have such good company in troubled times.

Shane Denson:
The phenomenon that I have been most interested in lately concerns a broad transformation in the media environment – one that has a lot to do with the media-technological developments that others have pointed out here. Whether it is generative AI, or the aggregative and algorithmic systems of social media, or the more literally environmental technics of geoengineering efforts, what we are witnessing is a shift from past-based or "mnemotechnical" (using Bernard Stiegler's term) to more decisively future-oriented or protentional forms of mediation that effectively lay the groundwork, predictively and in advance, for emergent agencies. This is something that I have described, in my book *Discorrelated Images* (2020), as a shift from "cinematic" media (based in the recording and replay of past events) to "post-cinematic" media (which operate in a generative mode, oftentimes producing new images and other sensory contents in real time). What's at stake here more broadly, however, is hardly confined to audiovisual media. Rather, it concerns the technical operationalization of microtemporalities, allowing contemporary media technologies to bypass subjective consciousness and operate on its very ground – including the presubjective and microtemporal processes of embodied and environmental metabolism (something that I have elaborated on in my more recent book, *Post-Cinematic Bodies* [2023]). Of course, these material and environmental dimensions of media and mediation are not entirely new; we might think of photochemical processes, or environmental reactions, such as oxidation

and decay, along these lines as well. What is new, however, is the precision and control that are enabled by algorithmic media. Operating faster than thought or perception, these media tap into our temporal becoming, tracing out grooves within which phenomenal experience can unfold. Thus, while media have always been environmental (both literally and in the metaphorical sense of "media ecologies"), they would seem to form the total environment today for subjectivities and collectivities that – while not absolutely predetermined – have in an important sense been anticipated and, we might say, "parameterized."

If there was a single *object* that drew me toward thinking about and theorizing technology as a primary area of concern in my work, it was Mary Shelley's Gothic novel *Frankenstein*, first published in 1818 – in the wake of the still recent split between "art" and "technology" in European languages. A long line of feminist thinking has traced the ways that Shelley was attuned to the transformations of gendered embodiment and sociality in relation to the Industrial Revolution. Meanwhile, work in philosophy of technology and in science and technology studies, read alongside (and often in tension with) post-structuralist thinkers, helped me to see how technology's impact could not be reduced to the domain of discourse alone; rather, technology – as I came to see it – had material and environmental impacts that, by way of the body's prepersonal sensitivities, could transform subjective and collective relations to the world. Rather than mere applications of science, industrial-era technologies like the steam engine *led* scientific theorization; thermodynamics developed out of an attempt to theorize these new technologies, which had already reshaped life, labor, and experiences of time and space. Two of my first publications turned to *Frankenstein* in order to think about these dimensions of technology; one of them ("Frankenstein, Bioethics, and Technological Irreversibility" [2007a]) developed a theory of "technological irreversibility" that extrapolated from Shelley's novel in order to think about the transformations of agency at stake in biotechnical interventions, while the other article ("Incorporations: Melodrama and Monstrosity in James Whale's *Frankenstein* and *Bride of Frankenstein*" [2007b]) looked at the role of *Frankenstein* in mediating the media-technical shift from silent to sound film. Together, these twin interests in what can loosely be called technology's ontological dimensions and its cultural-phenomenological ones (as reflected in the estimated 200 filmic adaptations of *Frankenstein*, each responding to new media-technical developments, contexts, and constellations) laid the basis for my first book, *Postnaturalism: Frankenstein, Film, and the Anthropotechnical Interface* (2014).

Since then, I have continued to focus on ways to combine the ontological and the cultural, while recent work has refined and refocused these interests in terms of specifically environmental and aesthetic transductions of agency in relation to technics. In recent thinking, I see some of my earliest attempts to theorize the Frankensteinian dimensions of biotechnology (and the fundamental challenges that biotechnics poses to bioethical questions that rely on pre-existing subjects capable of deliberation) resonating with the rapid developments we are witnessing with respect to generative AI. Because the latter operate predictively and outside the purview of subjective awareness, they are capable of subtly reconfiguring the parameters of subjectivity itself. My argument is not that AI will "outsmart" humans (or similar science-fictional scenarios, based in the idea of technical and artificial "intelligence"), but rather that machine-learning algorithms (e.g., in diffusion models that produce the real-time spectacles of AI art by the likes of Refik Anadol or Ian Cheng) can undercut consciousness, impinging directly on our embodied, metabolic processing of the visual, thus shifting the ground beneath the seeing subject. As a result, I contend, there can be no AI ethics without a prior assessment of AI aesthetics. And I think, ultimately, that this applies to any consequential technological development, which is first a transformation of the broadly aesthetic (i.e., sensory) environment for consciousness. It is certainly the case for contemporary, algorithmic, and future-oriented technologies.

In all of this work, I often find myself thinking about the relations among terms like *technē*, *technique*, and *technology*, and especially what these terms say about historically shifting relations and interfaces between human and technical agencies. As is well known, the term *technology* first enters into European languages around the time of the Industrial Revolution – coinciding roughly with both the steam engine and the advent of philosophical aesthetics. That, to me, is itself worthy of theoretical and historical consideration. The art/technology split drives a wedge right into the heart of a previously more-or-less undifferentiated field of *making*, as framed by both the Latin *ars* and the Greek *technē* before it. Afterwards, art, craft, industrial technology, and other forms of making become at least somewhat more clearly delineated, with significant consequences for various conceptions of individual (authorial, artisanal, and/or industrial) and collective (market-oriented or class-based) agency, among other things. Interestingly, technology originally referred to the quasi-scientific or analytical study of what we later came to name with that term (while many European languages, like German, retain *Technik* as the more common term alongside the less everyday *Technologie*). Originally, *technology* suggests, in a sense, a greater

distance from the direct action of *technique*, which suggests a tool-like or instrumental relation according to which agency resides in the subject (and in this early analytical distance, we perhaps find the seeds of the alienated distance of industrial and postindustrial technology). All of this is of course well known. The reason I recount it here is, first, simply to foreground the contingency of this field of meaning, along with the self-conceptions that it conditions for human agents; second, and related to this basic contingency, I believe we are witnessing another major shift in these relations, or in what Beth Coleman refers to above as the "semantic forcefield" around them. As I have said before, AI and other algorithmic technologies fundamentally redistribute agency; in the form of AI art and related generative, computational forms, they also challenge the split between art and tech, portending a reconvergence or at least reconfiguration of relations. And at the heart of this reconfiguration we find precisely a question of media and mediation, which has always been the tacit common ground between the estranged realms of art and technology – for only in the wake of this estrangement do concepts of communicative, expressive, and artistic media and mediums flourish. Today, with the emergence of futural, generative, and predictive media technologies, we must ask again what a medium is, and what it is a medium *for*.

This is the background for the work I am doing now on serialized media, typification, and generativity, drawing on the still understudied late work of Jean-Paul Sartre, whose 1960 *Critique of Dialectical Reason* Fredric Jameson once referred to as providing "the only genuine philosophy of the media" (Sartre 2004, xxviii). Sartre's fusion of existentialism and Marxism in this late work could be very significant, I think, for theorizing what has variously been termed "cognitive capitalism," the "attention economy," and the like. The resources of phenomenology have not been exhausted, and they are very much needed today, even though the contemporary capture of attention and awareness often operates, as I have said, by way of bypassing consciousness, or eluding the window of phenomenality itself. Sartre's turn away from the solipsistic method that arguably inheres in his early work (and, according to some interpretations, in phenomenology generally) and toward collectivity and the material environment as a repository and constraint on human agency is invaluable today. Clearly, we need to update some of his concepts, such as the "practico-inert" – Sartre's term for the built environment, commodities, and "worked matter" generally, which stores and retains the agency of human praxis and labor while condensing it into inert, objective form. As Sartre shows, such objects exert an important enabling and constraining force in shaping individual and collective existences,

and this alone is worth returning to. But in an age of smart technologies and predictive algorithms, the landscape of worked matter is hardly inert anymore. It is active, predictive, anticipatory, and exhausting. It drains us of our energies, while channeling our conscious and preconscious agencies and identities into pre-defined and pre-formatted categories. This is no longer the practico-inert but rather the *practico-alert*.

What I have been describing here as a shift toward futural modes of mediation, or the shift from Sartre's "practico-inert" to a new, protentional technics of the practico-alert, is in fact all about the consolidation and exercise of power, expressing itself most directly in predictive forms of typification – forms of categorization, whether racializing or gendering, for example, that operate on our bodies and minds in advance of our ability to perceive or act in the world. Sartre's concept of "seriality" – which for him describes the mutually alienated form of social collectivity that emerges around the industrially standardized lifeworld, its built environments, and commodity objects – offers a useful starting point for thinking about this political dimension. Feminist philosopher Iris Marion Young (1994) famously argued for a reconception of gender as a Sartrean seriality – which is to say, as a negatively and materially imposed category, not biologically determined nor voluntarily chosen either. Together with resources drawn from Black studies and Black feminism in particular, including Hortense Spillers's (2003) distinction between body and flesh, and Sylvia Wynters's (2001; Wynter and McKittrick 2015) thinking about the "sociogenic principle" and various "genres of the human," I think there are ample resources for thinking race and racialization under the category of serialization as well. And this line of thinking acquires its full force, I believe, when we take note of the shifting parameters of serialization, which is to say: the shift of media-technical operations and agencies from the memorial to the futural, which allows for the inscription of serialized categories directly into the flesh and the algorithmically computed environment itself.

Amanda Egbe:
Artificial intelligence continues to occupy a central place in my contemplation of the realm of moving images and media in general. The ramifications of AI's impact on creativity resonate with me deeply, especially from my standpoint as a practitioner.

A significant critique that has emerged within the field of AI and computer science around racial bias, articulated by figures like Timnit Gebru, has sought to identify frameworks and strategies from the arts and humanities

that could serve to mitigate concerns related to representation (Jo and Timnit 2020). This line of thinking has guided me to reflect on the nature of datasets employed in AI and how this aligns with concepts like Lev Manovich's "database cinema" (1999). Additionally, it draws parallels to moments in art history, such as Aby Warburg's *Mnemosyne Atlas* ([1924-1929] 2009), prompting me to contemplate how categorization and meaning-making occur. Specifically, I'm interested in exploring how images positioned next to each other influence representation and the dynamics of moving images.

I delve into the relationship between images by reconsidering the context of pre-cinematic technologies like the stereograph, the flipbook, and magic lantern slides, all the while considering the intricacies of bias and representation. This inquiry provides an avenue to examine creativity intertwined with technology, transcending simplistic dichotomies and uncritical media histories. When examining the historical utilization of moving-image technology by Black filmmakers or representations of race, these strategies of managing image relationships offer a pathway to explore the creative capacities of artificial intelligence. Moreover, they open novel avenues for reevaluating the fundamental nature of moving images. This prompts contemplation regarding the permissible and achievable interventions with media technologies, questioning where and in what manner they can be applied.

I initially embarked on my exploration with various image technologies, encompassing photography, video, film, and computing, drawn to smaller formats due to their accessibility. The internet became a location for collectors and enthusiasts to trade media technologies, and this in the digital realm significantly enriched my passion for technology and provided access to items that would have otherwise remained out of reach, alongside enthusiasts' know-how. The interconnected nature of these technologies has been pivotal in sustaining my inquiry. The realm of small technologies and open source has allowed me to prototype ideas and reflect on practices quickly; this goes from depth cameras to 360 cameras, and brings the sense of the media lab to an environment outside of institutions.

The ongoing technological and cultural shifts brought about by digitization continue to influence my perspective deeply. They highlight the essential role of technology in shaping the subjects of research. Additionally, I contemplate utilizing and repurposing diverse materials and mediums as foundational elements for artistic expression. This approach has meant that every novel technology has yielded distinct insights. For instance, the creative aspect of interactivity within computing has facilitated connections between different technologies and materials.

I'm not sure whether precise conceptual distinctions are important for me but, in looking at the overlap of paper and moving-image technologies in my previous research, I am aware that thinking through the concepts of cultural techniques helped me to look differently at how technologies shape and are shaped by subjects, so Bernhard Siegert (2015) (as with Yuriko Furuhata below) in the European context has been helpful, as has Lisa Gitelman's (2014) approach to media history in the North American context.

My friend Claudy Op den Kamp's (2018) work on copyright/intellectual property and reuse has also been very significant to me for considering how reuse plays such an important part in creativity, and how legal aspects can shape distinctions. These distinctions, when I consider film as single screen/cinema, and so on, seem problematic, they seem to be opposable when you consider collective/cooperative approaches. For example, the studio film club associated with Peter Doig reminds me of spaces of communal watching in places like Sierra Leone, or the radical cinema or film groups such as Exploding Cinema in the UK; they utilize all types of technologies of the moving and still image under the umbrella of film. Siegfried Zielinksi's variantology (2006) holds some sway for me when I consider the various approaches of media archaeology, but when I also reflect on approaches of intersectionality, critical race theory, and transnationalism, then there are other aspects of media, related to Blackness and representation, which add another dimension to what we consider a distinct medium. This summer in the UK, there have been two amazing large exhibitions of the work of Carrie Mae Weems and Isaac Julien, artists from the US and UK. From still to moving image and moving image to still, both artists consider the history of film, photography, video, pre-cinematic moving and still image technologies in the context of the Black experience, the gay experience, the gendered experience. Their installation work brings the viewer into a physical, spiritual, emotional, and intellectual engagement with the content, and the questions of technē, technology, and technique. And so, the works of Fred Moten (2017) and Ramon Amaro (2022) at present are resonating with my own research, the not fixing of the Black experience, and how that impacts our reading of media technologies and their use.

For me, media archives and their shifting use; techniques and technologies; reuse; and artificial intelligence are of current importance because they bring into focus the ethics of the image, the embedding of technologies and techniques, and how race can put instability into relief.

Yuriko Furuhata:
Lately, I have been interested in geoengineering, including technologies of cloud seeding and solar radiation management. In my book *Climatic Media* (2022), I examine the early transpacific history of geoengineering in the 1950s by connecting how the desire to manipulate and engineer indoor and outdoor atmospheres led to various weather modification experiments by scientists, architects, and environmental artists in Japan and the United States. These attempts to control and engineer atmospheric phenomena – including everything from the small scale of laboratory experiments to the large scale of the weaponization of hurricanes during the Vietnam War – were also intimately tied to the development of digital computers on both sides of the Pacific. So current debates on anthropogenic climate change and its devastating planetary effects in the form of extreme weather such as heatwaves, along with the concurrent technophilic propositions such as solar geoengineering, present another moment to reflect on this history. This includes of course its geopolitical backgrounds, which I approach from the critical perspective of media studies and science and technology studies.

In my earlier work on Japanese avant-garde cinema and its intermedial experiments with television and photography, I turned to the question of technology by first thinking about the issue of medium specificity of cinema, which was having its moment in film and media studies. I was curious to find out how this issue of medium specificity was articulated by Japanese filmmakers in the 1960s, as they responded to the "threat" of television as the newest medium that could respond much faster to contemporary events and convey sensations of actuality and liveness. I found it particularly evocative that the timing of the Japanese translation of Walter Benjamin's famous essay "The Work of Art in the Age of Its Technological Reproducibility" in 1965 coincided with the rise of *eizō* (technologically mediated image) as a buzzword within Japanese film and art criticism of the time.

Later, I became interested more in the overlap between histories of science, architecture, and digital computing, which led me to think about more mundane technologies, such as mechanical air-conditioning. In dialogue with other scholars in the fast-growing subfield of environmental media studies, I tried to expand the definition of "media" by turning to the materiality of media infrastructures, such as the energy-intensive data centers that support our daily use of digital media via cloud computing. In particular, I focused on the importance of mechanical air-conditioning as a material support of data centers wherein digital computers are constantly chilled and "pampered" in order to operate in the optimal manner. So, the question

of technology for me became intertwined with questions of the materiality of media infrastructure, architecture, and engineering of indoor climates.

In *Climatic Media* and various articles, I've borrowed German media theorist Bernhard Siegert's take on "cultural techniques" (2015) to talk about architectural techniques such as the engineering of the air, for instance, in the case of so-called "dragon holes" that ventilate high-rise buildings in the tropical island of Hong Kong. There, buildings often feature large holes or gaps in the middle of the building. This architectural feature not only brings about the material effect of ventilation, but it also has the symbolic function of responding to local feng shui lore – the need to circulate auspicious energy, which is usually represented by dragons. This is why they're called dragon holes or dragon gates. So, in spite of the post-structuralist bent to Siegert's theory, I thought it nicely captured the material and symbolic dimension of non-mechanical devices and architectural interfaces that operate as media, such as gates and doors.

Similarly, while I remain critical of the Eurocentrism and the conservative political stance of German philosopher Peter Sloterdijk, I found his argument that modernity is defined by what he calls the "explication of the atmosphere" helpful (2009, 56). His point is that modern technological developments, such as the invention of poison gas and nuclear weapons, revealed and made explicit the hitherto implicit lethal potential of the air to be weaponized, which generated a kind of existential insecurity among modern subjects. I ended up complicating Sloterdijk's argument about the singularity of this modernity centered on Europe, by turning instead to the imperial geopolitics of the Japanese empire and its own technological investment in the modification of atmosphere. But his take on technological modernity was quite useful for me to historicize how the modification of the atmosphere became such a central concern among various groups of engineers, architects, scientists, and artists in Japan.

I've already mentioned the example of feng shui-influenced architectural features of "dragon holes" in Hong Kong, but this example is also linked to my comparative thinking about what John Durham Peters has called "a philosophy of elemental media" (2015). I wanted to think about certain Eurocentric and modern assumptions we may bring to concepts such as "elements" or "environment" in media studies by comparing something like the philosophical tradition of feng shui and its five elemental phases to Greek philosophy's four classical elements of fire, water, earth, and air. But my point was not about advocating for an "Eastern" philosophy of elements, since there is no such thing as a unified or continuous mode of thinking. That said, it was a way for me to articulate the genealogy of concepts and

metaphors that we mobilize within media studies. In my work, I also traced parallel discourses of "media ecology" in Japan and North America, and how the concept of ecology borrowed from science has entered humanities and social sciences. In this regard I'm very Foucauldian. I like to historicize the paths that certain concepts such as "ecology," "elements," and "environment" took before they became naturalized in the present, and incorporated in our discussions about media. Because I work primarily with Japanese archival materials, I try to show the convergence and divergence of these paths as part of media histories.

The question of geopolitics is central to my own research, as I often reflect on the colonial legacies and reality of Japan as a former non-Western empire and as an ongoing settler colonial state. I consider my current work to be part of environmental media studies and environmental humanities in general and, in my recent work on the transpacific media history of geosciences and the anthropogenic markers of the Anthropocene, I build on the work of scholars engaging in critical race theory, feminist STS, Indigenous and Pacific Island Studies, as well as transpacific and archipelagic studies. I'm interested in rethinking the problematic figure of "anthropos" at the center of the Anthropocene in relation to the development of scientific modes of seeing and visualizing the "deep time" of Earth's geologic history, and how they intersect with the territorial expansions of Japan and the United States as archipelagic empires in the Pacific during the twentieth century. Ultimately, in my view, questions of media and technology are inseparable from geopolitical conflicts, colonial histories, and climatic conditions.

Tom Gunning:
I have trouble with the term – and the concept – "new" media. It always smacks of an advertising campaign or a dean's fundraising letter. (My friend Noël Carroll once pointed out to me the oxymoron of an advertisement for a "new improved" version of an established cleanser: "Brand New Old Dutch Cleanser.") However, the issue of novelty, innovation – and, indeed, *invention* (which is I think the proper term here), if more than rhetorical – is crucial to understanding the history of media and technology. My point of reference would be a quote from André Bazin from his 1946 essay, "The Myth of Total Cinema," "In short, cinema has not yet been invented!" (1967, 21). I interpret this not as a call for cinema's (or broadly speaking, the technology of the moving image's) aspiration to total realism, but as indicating cinema's inherently open technical nature. Here I follow Gilbert Simondon: "Invention is the taking charge of the system of actuality through the system of virtualities" (2017, 61). Technic must

Fig. 2.1: "Brand New Old Dutch Cleanser."

be understood as keeping open and actualizing possibilities. Technics of media are in a constant process of renewal, not through progressive stages of perfection of a specific goal, but a process of virtualities becoming concrete. The goal of media history and theory must be to discover the novelty inherent in media history and within each device, whether the camera obscura, magic lantern, 3D projection, digital video, or sound cinema.

My thinking is provoked by Martin Heidegger's 1954 essay, "The Question Concerning Technology" (1977b). Heidegger asserts an essential relation between *technē* and *poiēsis*, understanding *technē* not simply as a means to an end, but as a process of revealing (*poiēsis*). However, Heidegger sees "modern technology" as betraying this understanding, becoming instead a "setting upon," a challenging of nature to fulfill operational demands, embodied especially in the concept of *Ge-stell*, "enframing." I see cinema and motion pictures as the technological art par excellence, and framing

would seem to be at its center. Although Heidegger's comments on film are sparse, his 1959 essay "Dialogue on Language" contains a curious discussion of Akira Kurosawa's RASHOMON (1950) posed by his Japanese interlocutor, Tezuka Tomio:

> Regardless of what the aesthetic quality of a Japanese film may turn out to be, the mere fact that our world is set forth in the frame of a film forces that world into the sphere of what you call objectness. The photographic objectification is already a consequence of the ever wider outreach of Europeanization. (Heidegger 1971, 17)

This description would seem to condemn cinema as a tool of modern technology, as enframing, and therefore cutting off film from the possibilities of *poiēsis*. However, "The Question Concerning Technology" avoids a reductive view of technology. The enframing that aspires to ordering everything as available to human use does pose a danger; but Heidegger quotes the poet Hölderlin, "But where danger is, grows / The saving power also" (quoted in Heidegger 1977b, 28). Modern technology, Heidegger claims, brings not only the danger of setting upon the whole world as devised for human use, but also the possibility of *technē* as revealing – as *poiēsis* – something beyond mere human instrumental use. I believe the technological moving image becomes one place where this struggle takes place. Can the moving and projected image offer an encounter between technology and aesthetics?

Wanting to avoid both a mechanical course of progress in media and a reactionary conservatism, I will violate chronology by evoking a relation between *technē* and magic. In his classic anthropological essay, "Magic, Science and Religion," Bronisław Malinowski demonstrated that traditional societies depended on a complex weave between systems of specialist knowledge – tools and techniques (i.e., technology) – and practices of magic. Thus, the rather complex process of constructing outrigger canoes among the Trobriand Islanders employs complex technology, but interweaves it with magical procedures:

> But even with all their systematic knowledge, methodically applied, they are still at the mercy of powerful and incalculable tides, sudden gales during the monsoon season and unknown reefs. And here comes in their magic, performed over the canoe during its construction, carried out at the beginning and in the course of expeditions and resorted to in moments of real danger. (Malinowski 1948, 30)

Both systematic techniques and magic may be seen as means of control over nature; magic recognizes limits to technic and supplements it by *other means.* This traditional society acknowledges powers beyond rational prediction, and plunges into a logic of images, metaphors, and analogies. It is here I would claim that Heidegger's understanding of *technē* as *poiēsis* appears. It acknowledges the vagaries of the world rather than simply asserting dominance over them, and participates in these unpredictable energies and events through an invocation of analogies through spell and rituals.

Gilbert Simondon's understanding of the technical, expounded in his 1958 book, *On the Mode of Existence of Technical Objects* (2017), posits a magical world view preceding a fundamental split in thinking, which parallels (expresses) the split between the object and the subject which are united in magic. While I have doubts about this schema as an actual historical periodization, the contrast in ideal types seems to me illuminating. The technical, understood not simply as a series of operational devices for the domination of nature, but as the interrelation of what Simondon calls "technical ensembles," while radically different from the fixed system of magic, nonetheless approaches the world as a system of networks. Technic in Simondon's view is not a matter of isolated technical objects, but rather their interrelation within a milieu. The key to the technical, beyond seeing it as a tool in the domination of nature and humanity, lies, then, in its embrace of the virtual, a view of a potential totality. I believe the key to what is commonly called "new media" lies in its fundamental relation to the virtual; in cinema this indicates the possibility of mutability in the image. This corresponds to the concept of information as Simondon takes it from cybernetics: renewal through the unpredictable. Here lies the affinity between the technical and the avant-garde, which explores media's ability (as Simondon puts it) not to copy the world but to extend it.

Jeffrey West Kirkwood:
In the wake of recent consumer-facing evolutions in machine learning and transformer architecture, there's been a perilous sense that humanistic inquiry has been ejected from its most sovereign domain: questions of meaning. The ability of generative AI to probabilistically invent texts that seem to replicate human conventions of writing using large language models (LLMs) based on immense training sets has led to an ostensible victory parade for the most obnoxious forms of positivism. "Not only can the fragile reserve of human language be quantified, it can be technically reproduced!" Hurray. But what techno-triumphalism and humanist dejection alike often seem to ignore is that intelligence (human or otherwise) was always artificial. The

question of both mind and meaning are questions of technics. In what we might refer to as "the revenge of humanism," however, I would argue that technics must be seen foremost as a question of meaning.

This is perhaps a puzzling suggestion from someone who, like me, works in a tradition of German theory, equally misinterpreted, celebrated, and reviled for its "anti-hermeneutic" positions and insistence on a "technological a priori." A brief detour to some older territory of a prioris might help to begin to clarify. In his 1786 text, *Metaphysical Foundations of Natural Science*, Immanuel Kant offered an incendiary assessment of which areas of study could ever hope to be considered sciences (watch out, biology and chemistry, Kant says you're not sciences!). One of the unlucky disciplines to be excluded from the hallowed category was psychology. Kant claimed that the object (the mind) and the subject (also a mind) of observation cannot be adequately differentiated, and additionally, "mathematics is not applicable to the phenomena of inner sense and their laws" (2004, 7). A proper science, which could make a priori claims, would need to have an independent, physical object that it could mathematize. As Kant framed it, a scientific psychology would need "to take the *law of continuity* in the flux of inner changes into account" in a way analogous to how mathematics explains the relationship of the "straight line" to "the whole of geometry" (2004, 7). In other words, a scientific explanation of the psyche had to be externally measurable, and thus discretized, but also able to account for and reproduce the continuities of inner life that were broken down in that same process of measure. This, I would contend, offers a groundwork for understanding the place of technics at the very heart of human meaning-making.

For better or worse, Kant's dismissals were not heeded. The greater part of the nineteenth century, following Johann Friedrich Herbart's landmark 1824 text, *Psychologie als Wissenschaft*, was a riot of attempts to empirically measure the functions of the mind, and philosophy departments even found themselves under siege by experimental psychologists who were beginning to occupy their chair positions in an early prelude to the STEM fields takeover. This was a feat accomplished through the development of machines and, specifically, proto-cinematic instruments like the fall tachistoscope and chronoscope, which delivered and measured the responses to rapid stimuli, dismantling the complexities of inner life into quantifiable intervals between input and output. In my book, *Endless Intervals: Cinema, Psychology, and Semiotechnics around 1900* (2022a), I detail the way that psychology became a science at the point that the mind became a technical object – discretized, operationalized, and sequenced. This was an instance of what Tom Gunning describes in Gilbert Simondon's *On*

the Mode of Existence of Technical Objects (2017) as "virtualities becoming concrete." What nineteenth-century psychophysicists could still not account for, however, was how the concrete could then become virtual, that is, how the line could describe all of geometry, how the discrete could be made continuous, and how purely technical sequences could produce something like the supple forms of meaning that define a mind. As I argue in *Endless Intervals*, it was early cinema and its artful regulation and management of the technical absences central to the experience of moving images that alloyed technics and semiosis.

Already by the late nineteenth century, an aspiration took shape to explain how systems of discrete functions that defined the mind as a machine could signify for a larger unity that was not reducible to the bare stopping and starting of dead mechanisms. As but one instance, Ernst Kapp drew equally on Hegel and the theoretical engineering titan Franz Reuleaux to argue in his remarkable 1877 magnum opus, *Elements of a Philosophy of Technology: On the Evolutionary History of Culture*, that human consciousness, bodily autonomy, and cultural systems of signification all emerged from a dialectical interaction with technologies through a process of what he called "organ projection." In the introduction to the 2018 edition of that volume, my co-editor Leif Weatherby and I showed that not only was the purely operational sense of the German term *Technik* established by Kapp foundational to later understandings of the human that would follow, in work by everyone from Sigmund Freud to Friedrich Kittler to Donna Haraway, but that no conception of human culture or meaning was possible in the absence of technics.

It's not a shocking proposition to someone familiar with the vaguely defined terrain of media theory that technics underlies, or is at the very least inseparably interwoven with, any viable notion of meaning-making. Martin Heidegger, borrowing (or more likely stealing!) the term *Weltbild* from an acrimonious debate between physicists Ernst Mach and Max Planck in 1908 that I describe in the article, "Ernst Mach and the Technological Fact of Counterfactuals" (2018), famously argued that the very coherence of any idea of the world relies on the revelations afforded by period-specific technologies (Heidegger 1977a). Kittler, likewise, placed technical systems epistemically prior to all hermeneutics, and Simondon established that "before the great development of technics, culture incorporated the principal types of technics that give rise to lived experience, in the form of schemas, symbols, qualities, and analogies" (2017, 19-20). There is no before technics, and any imagined realm outside of the regimes of distinction-making it enables is an abyss – undifferentiated, unrecorded, uncommunicated,

meaningless. At the same time, acknowledging the epistemically primary character of technical systems that manufacture, impose, and reproduce distinctions in a universe otherwise lacking difference is not sufficient on its own to account for signification, mind, or meaning. To make technics meaningful rather than a mysterious domain of technological noumena requires an explanation for how the absences instituted by discretized technological operations can signify. It demands a semiotics or, as I explored in *Endless Intervals*, a semiotechnics.

I introduced the term "semiotechnics" to explain how the sequenced stops and starts of psychotechnical mechanisms in the lead-up to the twentieth century also introduced the possibility of something like machine signification, and thus offered a bridge to the computational era. Kittler had already used the term *Semiotechnik* throughout his work, starting as early as his 1978 "Über die Sozialisation Wilhelm Meisters," in *Dichtung als Sozialisationsspiel: Studien zu Goethe und Gottfried Keller* (2013a). Yet, for him the term identified purely semiotic techniques and practices as distinct from technical media. He writes in "Media and Drugs in Pynchon's Second World War," for instance, "When conditions of totalizing semiotechnics prevail, the only real question involves the media they implement" (2013b, 86). The Lacanian strain internal to Kittler's theoretical program did indeed allow him to see within technics the cut-producing function of physical media that was the precondition for semiosis. But his preoccupation was generally with where that happened in the real rather than how the absence produced by those cuts simultaneously signified as such and cascaded into systems of signs bound to technical media. It has been the subsequent generation of theorists of *Kulturtechnik*, and most notably Bernhard Siegert (2015), that has decisively reoriented the study of technics to the indissoluble bond between the symbolic and the technically differentiated real.

The question remains, however, what a bunch of cinematic devices and steampunk psyches have to tell us about technics and meaning in the computational era. You'll not be surprised to hear that I think the answer is "a lot, actually." It's beyond dispute that, as Kittler wrote, "All code operations [...] come down to absolutely local string manipulations, that is, I'm afraid, to signifiers of voltage differences" (2013b, 223). In a linear view of the relationship between hardware and the symbolic, that's definitely true. But we could say that times have changed a bit, and that the exponential proliferation of semiotic differences generated within transformation layers responsible for the new appearance of artificial psychic autonomy now drive voltage differences whose purpose is to pattern, package, and create ever more differences, even sometimes at the expense of meaning. This is

something I have discussed at length in my article "From Work to Proof-of-Work: Meaning and Value after Blockchain" (2022b), which contends that computation has inverted the relationship between value and efficiency that was essential to the industrial era.

What we are witnessing in the technics of machine learning is a negative feedback loop of symbols reinserted into the real, which generates an overabundance of symbols that are transformed and are reinserted into the real. This is, to distort the much-quoted line from Gregory Bateson, *differences that make too many differences* (cf. Bateson 2000, 315). A mind-bending amount of compute and processing power has been put to work on manufacturing symbolic distinctions that will be processed and fed back into language models, which will detect new totally meaningless, but soon to be world-defining distinctions. This is generative surplus we identified in our special issue of *Critical Inquiry* on "Surplus Data" (Halpern et al. 2022). And it represents a financialization of the massive difference-making engine at the core of computational technics that stands to keep the processors hot and the climate even hotter.

Laura Mulvey:
There have been two moments in my life, one in the 1970s and one in the 1990s, when an encounter with a technology changed my thinking about cinema and the direction of my work with it. The first notable moment came about through my encounter with 16mm film in the 1970s. I understand, first of all, that as 16mm had been around since the early 1930s, it was far from "new" in the 70s; and that for many theorists of technology 16mm cameras, projectors, and so on, are simply smaller versions of 35mm and would thus also fail to qualify as "new." But, I am suggesting here, once discovered by artists, radical documentary groups, etc., and especially once enhanced by sync sound in the 1960s, 16mm "afforded" a *technē* that brought an alternative film world into being. Might a technology, perhaps, be endowed with newness, with novelty, when adapted for innovative aesthetic or political purposes?

The idea of 16mm as a facilitator for a new kind of filmmaking began to arrive in the UK from the US and Europe in the late 1960s and early 1970s. In my essay "Visual Pleasure and Narrative Cinema" (1975), as a counterpoint to my critique of Hollywood, I noted that a new women's cinema had begun to emerge, specifically enabled, liberated even, by 16mm. The feminist avant-garde movement had and still has special importance for me personally, but many other innovative, experimental, and radical strands of filmmaking emerged around the same time due to this lighter, cheaper, more accessible

gauge. Tom Gunning mentions, in the last line of his statement, "the affinity between the technical and the avant-garde, which explores media's ability [...] not to copy the world but to extend it." For a short period of time, a conscious attempt was concentrated around this technology to extend a vision and understanding of the world and also to change it.

To expand on this point: at least for this movement, 16mm technology was never simply instrumental. A unifying commitment (across a wide range: artists, socialist collectives, new narrative, etc.) was to the specificity of the medium: to reflect on and to foreground film's materiality. When I look back, specificity and materiality included all aspects of film technology (camera, film strip, processing, editing, projection, to name only the most obvious). In this sense, the 16mm-driven movement used its technological infrastructure to reflect on: (a) process, how the film image comes into being, and (b) how process might affect the coming into being of meaning. This was where its technological self-reflexivity primarily lay.

We were slightly wary of the term "technology" in those days, anxious to avoid any hint of technological determinism. The emphasis was rather on ideology's contribution to the subject's positioning within dominant, industrial film. The terms "specificity" and "materiality," on the other hand, had associations with modernity and with Marxism.

A final personal note on this: 16mm technology, and the milieu that grew up around it in the 1970s UK, enabled my move and my collaborator Peter Wollen's move away from writing about film theoretically and into making theoretical films. I'll try to apply the terms offered by this volume. For Peter and me, 16mm constituted a *technē*, a conceptual vocabulary, as it were, in which imagination and technology constantly informed each other. Furthermore, our films, especially our early, more theoretical ones, could only actually have been realized by the extraordinary skill of our cinematographer, Diane Tammes, and her mastery of the extremely difficult "techniques" involved, for instance, in executing complicated and extended 360-degree pans. "Technique" might be used simply to evoke procedure. But in Diane's case, vision and a commitment to experiment, pushing the technology to its limits of possibility, so enhanced basic procedural skills that the term "technique" returns once again to *technē*.

If that first 1970s moment involved shared principles, a sense of community and collaborative work, my second moment was much more isolated. It came about in the mid-1990s when I began to view films, made on celluloid, on digital devices. It was an experience of making strange, which confused habits of thought and reconfigured the familiar into "something else." And out of this dialogue between old and new technologies, as it were,

different and unexpected ways of understanding film and film history seemed to open up. It revolved around individual, speculative spectatorship as I experimented, on my own, with new ways of watching, on DVDs, films that had been shot on celluloid. The new technology, these experiences, completely transformed my understanding of film spectatorship and ultimately led to my 2006 book *Death 24x a Second: Stillness and the Moving Image.* The ridiculously simple digital remote control gave me, the spectator, an unprecedented interaction and interplay with, as it seemed, the cinema itself. I could still the moving image and then bring stillness back into motion, a fusion of the Medusa's and Pygmalion's powers over the human figure. These powers over stillness and movement conjured up for me (anachronistically, of course) the mysterious and contradictory technology at the cinema's heart: the enigmatic relation between the stillness of the film strip's individual frames and the illusion of movement produced by a projector.

This kind of fascination with film's materiality led, this time, to paradox, uncertainty, and ultimately to the uncanny – a specific "affect" that I came to associate with celluloid as a medium. Although film historians tend to reject the idea that cinema was abruptly "born" in 1895, I began to think that – perhaps – something technologically unprecedented haunted that moment, never achieved before, and which now, in another technological age, would quite rapidly disappear. In spite of its precedents, its proto-cinematic experiments, it was only celluloid film and its projection that fused the photograph's capture of reality with the optical illusion that brought stillness (inorganic, inanimate) to life (deceptively organic, animate). For me, this fusion was redolent of the uncanny that Freud associated with the psyche's anxieties about uncertain boundaries between the living and the dead, and that Jentsch associated with the shudder at confusions between lifelike automata and living human beings.

By and large, my experiments with new forms of spectatorship took me toward a preoccupation with images of time, ways in which film has a privileged relation to temporality, and ways in which digital tools could make these material and aesthetic attributes visible, even tangible. Furthermore, the wholeness of particular movies could easily be fragmented into highly charged moments, emotionally compelling scenes, and so on. New kinds of critical, scholarly, and cinephile "writings" emerged out of these novel technical possibilities, leading to the development of the innovative genre of the "video essay." It was in this context that I first came across the concept "affordance." The idea that a new technology could "afford" something new to a culture, rather than determining it, opened up ways of thinking much more

dialectically between the two. Technology could, indeed, be transformative but the framework of intellectual and political initiatives – even desires and dreams – was also expanding, adding complexities and new, unexpected ways of thinking.

I find it difficult to still think within this dialectical framework nowadays, as the really NEW new technologies march forward. This is, obviously, a cliché at a moment when the Anthropocene age may be accelerating into crisis. But the new technologies looming over the future are particularly hard for someone of my age to conceptualize. Born in 1941, I sympathize with ordinary people who, several centuries ago, had to try to "think" the earth's movement around the sun. I am reminded of Jean-Louis Comolli's evocation of the first impact of the machines of the visible: "Decentered, in panic, thrown into confusion by all this new magic of the visible, the human eye finds itself affected with a series of limits and doubts" (2015, 285). For me, the specter of technological determinism returns, not as a concept but as a historical force. I have tried to pin down the difficulty of conceptualizing contemporary visual media and communication into three points, summing up "limits and doubts," as they move beyond the human eye to the human mind: scale (the mass-on-mass of images stored in cyberspace), instantaneity (the speed with which images and communications are made and exchanged, their hyper-acceleration), and dematerialization (the invisibility of creative and communicative processes). All these stumbling blocks culminate with the particular difficulty of grasping the theoretical and practical implications of AI.

These kinds of issues demand innovative ideas and revolutionary thinking that, probably, only younger generations of scholars and intellectuals can conjure up, and are evoked by the discussions collected here on AI, for instance. But the discussions also intimate that the history of film theory and film aesthetics can still offer this new world traditions and precedents – if only imaginatively and allegorically.

Jean-Christophe Plantin:
The problem for me is that there are too many new technologies all the time! Since I study digital platforms and tech companies, I am often asked for an opinion about the latest thing in town – ChatGPT, AI, Metaverse, and so on. I genuinely do not have an opinion on any of these, simply because I need plenty of time to think about it. I actually became a researcher to be able to pause reality and to take some distance, to analyze it, and so forth, as opposed to, say, a journalist. While I am indebted in my work to great thinkers such as Judy Wajcman (2014), Sarah Sharma (2014), and Nicole

Starosielski (2015), who all have in their own work debunked the myth of a general acceleration of technology to emphasize instead the social construction (and multiple mediations) of time, my first reaction every time is that technology always comes too fast and too often. I like to be very late with new technology.

That being said, I have spent quite a bit of time recently thinking about the concept of infrastructure, and trying to flesh out why the concept is interesting to contemporary technical objects such as data and platforms. While I am very wary of describing everything as infrastructure, as it can dilute the strength of the concept, I still think that it has many things to bring. A first one is the emphasis on the material basis of media. Following John Durham Peters (2015), Lisa Parks (Parks, Velkova, and De Ridder 2023), and many others, I currently study how tech giants (Amazon, Meta, Google, etc.) are changing the material basis of the internet (by designing their own data centers or subsea cables) and what this means for our everyday digital lives. Infrastructure is not just literal here ("networking infrastructure"); using it as an analytical concept allows me to flesh out the imaginary of these technological changes, and their implications in terms of space, standards, or temporality. Another example of the relevance of the concept is that it invites us to look at who provides the labor of maintenance of media technology, instead of for whose benefit. I did some ethnographic fieldwork in a data archive in the US a few years ago, and this focus on invisible labor in infrastructure (following STS-feminist thinkers such as Susan Leigh Star [Bowker and Star 1999] or Maria Puig de la Bellacasa [2017]) led me to reveal the key contribution of data processors who effectively "clean" the datasets they receive to make them reusable by others. While their job is crucial to data and knowledge circulation, their work is not acknowledged – neither well rewarded nor felt as rewarding. These are two examples of the relevance of this perspective.

I arrived only reluctantly – and almost by accident – to the study of digital technologies. My background was in sociology, then philosophy with a strong focus on post-structuralist theories. I became fascinated, like many others at the time, by the concept of rhizome and other forms of spatial thinking, geophilosophy, and so on. At the center of this interest was the concept of cartography, and in a Master's dissertation I even inquired what Foucault and Deleuze had to say about this concept. I wanted to continue this reflection at the Department of Philosophy at Université Paris 8 (the cradle of "French theory"), but the department … lost my application. In the meantime, I realized that much of my interest in cartography had a fantastic online existence and was empirically fascinating, and I decided to study participatory cartography online instead. The Department of

Communication Studies at the same university thankfully did not lose my application (!), and I studied the topic there. But, in the end, I only study technology as a proxy for other things, such as how people use media to challenge a political status quo, how platforms exploit and commodify ever-greater forms of life, and so forth.

Much of my conceptualization of technology is directly influenced by graduate school readings: the early Bernard Stiegler (2018), André Leroi-Gourhan (2022), and Gilbert Simondon (2017). The first two authors led me to think of technology not as a tool but as something inherently constitutive of the social world, and to put it within a longer historical context. Simondon goes further and highlights the relational nature of technologies, and the necessity to constantly think of the relations of dependence, attraction, and repulsion, which technologies develop in relation to their social and technical contexts. He was also a philosopher who was not afraid of long technical descriptions which I (painfully) admire. When it comes down to the social impact of digital technologies, this is a combined perspective that I find crucial in order to go beyond the focus on recent or discrete pieces of technology.

When it comes to method, I am actually going the opposite route. I started my research career by using recent forms of network analysis to study online environments (revolving around the work of Richard Rogers [2019] and others at the University of Amsterdam). I still study mostly online, or at least digital objects, but I now almost exclusively use traditional methods, such as text analysis, participatory observations, and interviews. I get so much pleasure collecting data in this less mediated way! I especially enjoy interviewing people: I have fond memories of the interactions that I have had via interviews, and think about them very often.

The two bodies of work that matter the most to me right now to talk about this are those engaging with social and environmental justice. When I ask in my work how networking infrastructure is reproducing a global division of power and an exclusion/exploitation of minorities, then my influences will be (among many) Ruha Benjamin (2019), Safiya Noble (2018), André Brock (2020), or Charlton McIlwain (2020). When I think about how to include the struggle for just environmental futures within infrastructures, the works of (among many) Nicole Starosielski (2015) on subsea cables, Jennifer Gabrys (2016) and Max Liboiron (2021) on waste, Anne Pasek (2019), Patrick Bresnihan and Patrick Brodie (2023) and Mél Hogan (2023) on data centers, and Rahul Mukherjee (2023) on electromagnetic vibrations, are crucial. These are the two bodies of work, already taken up by brilliant researchers, that I think matter the most right now.

References and Further Reading

Amaro, Ramon. 2022. *The Black Technical Object: On Machine Learning and the Aspiration of Black Being.* London: Sternberg Press.

Bachelard, Gaston. (1938) 2002. *The Formation of the Scientific Mind: A Contribution to a Psychoanalysis of Objective Knowledge*. Translated by Mary McAllester Jones. Manchester: Clinamen Press.

—. (1940) 1968. *The Philosophy of No: A Philosophy of the New Scientific Mind*. Translated by G.C. Waterston. New York: Orion.

Bateson, Gregory. 2000. *Steps to an Ecology of Mind*. Chicago and London: University of Chicago Press.

Bazin, André. 1967. "The Myth of Total Cinema." In *What Is Cinema?* Vol. 1, translated by Hugh Gray, 17-22. Berkeley, Los Angeles, and London: University of California Press.

Bellacasa, María Puig de la. 2017. *Matters of Care: Speculative Ethics in More than Human Worlds.* Minneapolis: University of Minnesota Press.

Benjamin, Ruha. 2019. *Race After Technology: Abolitionist Tools for the New Jim Code.* Medford, MA, and Cambridge: Polity.

Benjamin, Walter. 2002. "The Work of Art in the Age of Its Technological Reproducibility: Second Version" [1936]. Translated by Edmund Jephcott and Harry Zohn. In *Selected Writings*. Vol. 3, 1935-1938, edited by Howard Eiland and Michael W. Jennings, 101-133. Cambridge, MA: Harvard University Press.

Bowker, Geoffrey C., and Susan Leigh Star. 1999. *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA, and London: MIT Press.

Braidotti, Rosi. 2011. *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory*. New York: Columbia University Press.

Bresnihan, Patrick, and Patrick Brodie. 2023. "Data Sinks, Carbon Services: Waste, Storage and Energy Cultures on Ireland's Peat Bogs." *New Media & Society* 25, no. 2 (February): 361-83. https://doi.org/10.1177/14614448221149948.

Brock, André L, Jr. 2020. *Distributed Blackness: African American Cybercultures*. New York: New York University Press.

Chun, Wendy Hui Kyong. 2008. "The Enduring Ephemeral, or the Future Is a Memory." *Critical Inquiry* 35, no. 1 (Autumn): 148-171.

—. 2011. *Programmed Visions: Software and Memory.* Cambridge, MA: MIT Press.

Coleman, Beth. 2009. "Race as Technology." *Camera Obscura* 24, no. 1 (70): 177-207.

—. 2011. *Hello Avatar: Rise of the Networked Generation*. Cambridge, MA, and London: MIT Press.

—. 2021. "Technology of the Surround." *Catalyst: Feminism, Theory, Technoscience* 7, no. 2: 1-21.

—. 2023. *Reality Was Whatever Happened: Octavia Butler AI and Other Possible Worlds*. Berlin: K. Verlag.

Comolli, Jean-Louis. 2015. "Machines of the Visible." In *Cinema against Spectacle: Technique and Ideology Revisited*, edited and translated by Daniel Fairfax, 283-289. Amsterdam: Amsterdam University Press.

Deleuze, Gilles. (1983) 1986. *Cinema 1: The Movement-Image.* Translated by Hugh Tomlinson and Barbara Habberjam. Minneapolis: University of Minnesota Press.

—. (1985) 1989. *Cinema 2: The Time-Image*. Translated by Hugh Tomlinson and Robert Galeta. Minneapolis: University of Minnesota Press.

Denson, Shane. 2007a. "Frankenstein, Bioethics, and Technological Irreversibility." In *Studies in Irreversibility: Texts and Contexts*, edited by Benjamin Schreier, 134-166. Newcastle: Cambridge Scholars Publishing.

—. 2007b. "Incorporations: Melodrama and Monstrosity in James Whale's *Frankenstein* and *Bride of Frankenstein*." In *Melodrama! The Mode of Excess from Early America to Hollywood*, edited by Frank Kelleter, Barbara Krah, and Ruth Mayer, 209-228. Heidelberg: Universitätsverlag Winter.

—. 2014. *Postnaturalism: Frankenstein, Film, and the Anthropotechnical Interface*. Bielefeld: transcript.

—. 2020. *Discorrelated Images*. Durham, NC, and London: Duke University Press.

—. 2023. *Post-Cinematic Bodies*. Lüneburg: meson press.

Egbe, Amanda. 2023. "Paper Tensions: From Flipbooks to Scanners – The Role of Paper in Moving Image Practices." In *The Materiality of the Archive: Creative Practice in Context*, edited by Sue Breakell and Wendy Russell, 186-198. London: Routledge.

Furuhata, Yuriko. 2022. *Climatic Media: Transpacific Experiments in Atmospheric Control*. Durham, NC, and London: Duke University Press.

Gabrys, Jennifer. 2016. *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet*. Minneapolis: University of Minnesota Press.

Gitelman, Lisa. 2014. *Paper Knowledge: Toward a Media History of Documents*. Durham, NC: Duke University Press.

Grossi, Giancarlo, and Andrea Pinotti. 2022. "Introduction: The Image between Presence and Absence." *AN-ICON. Studies in Environmental Images* 1: 4-16.

Halpern, Orit, Patrick Jagoda, Jeffrey West Kirkwood, and Leif Weatherby. 2022. "Surplus Data: An Introduction." *Critical Inquiry* 48 (Winter): 197-210.

Heidegger, Martin. 1971. "A Dialogue on Language" [1959]. In *On the Way to Language,* translated by Peter D. Hertz, 1-54. New York, Evanston, San Francisco, and London: Harper & Row.

—. 1977a. "Der Ursprung des Kunstwerkes" [1935-1936]. In *Gesamtausgabe*. Vol. 5, edited by Friedrich-Wilhelm von Herrmann. Frankfurt am Main: Vittorio Klostermann.

—. 1977b. "The Question Concerning Technology" [1954]. In *The Question Concerning Technology and Other Essays*, translated by William Lovitt, 3-35. New York and London: Garland.

Herbart, Johann Friedrich. 1824. *Psychologie als Wissenschaft, neu gegründet auf Erfahrung, Metaphysik, und Mathematik*. Vol. 1. Königsberg: Unzer.

Hogan, Mél. 2023. "'Environmental Media' in the Cloud: The Making of Critical Data Center Art." *New Media & Society* 25, no. 2 (February): 384-404. https://doi.org/10.1177/14614448221149942.

Jo, Eun Seo, and Gebru Timnit. 2020. "Lessons from Archives: Strategies for Collecting Sociocultural Data in Machine Learning." In *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, 306-316. New York: Association for Computing Machinery.

Kant, Immanuel. 2004. *Metaphysical Foundations of Natural Science* [1786]. Translated by Michael Friedman. Cambridge: Cambridge University Press.

Kapp, Ernst. 2018. *Elements of a Philosophy of Technology: On the Evolutionary History of Culture* [1877]. Edited by Jeffrey West Kirkwood and Leif Weatherby. Translated by Lauren K. Wolfe. Minneapolis: University of Minnesota Press.

Kirkwood, Jeffrey West. 2018. "Ernst Mach and the Technological Fact of Counterfactuals." *Zeitschrift für Medien- und Kulturforschung* (*ZMK*) 9, no. 1: 13-32.

—. 2022a. *Endless Intervals: Cinema, Psychology, and Semiotechnics around 1900*. Minneapolis: University of Minnesota Press.

—. 2022b. "From Work to Proof-of-Work: Meaning and Surplus after Blockchain." *Critical Inquiry* 48: 360-380.

Kittler, Friedrich A. 2013a. *Dichtung als Sozialisationsspiel: Studien zu Goethe und Gottfried Keller* [1978]. Göttingen: Vandenhoeck & Ruprecht.

—. 2013b. *The Truth of the Technological World*. Translated by Erik Butler. Stanford, CA: Stanford University Press.

Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford and New York: Oxford University Press.

Leroi-Gourhan, André. 2022. *Le geste et la parole – Tome 1*. Paris: Albin Michel.

Liboiron, Max. 2021. *Pollution Is Colonialism.* Durham, NC: Duke University Press.

Malinowski, Bronisław. 1948. "Magic, Science and Religion." In *Magic, Science and Religion and Other Essays*, edited by Robert Redfield, 1-71. Glencoe, IL: Free Press.

Manovich, Lev. 1999. "Database as Symbolic Form." *Convergence* 5, no. 2 (June): 80-99.

McIlwain, Charlton D. 2020. *Black Software: The Internet & Racial Justice, from the AfroNet to Black Lives Matter*. New York: Oxford University Press.

Metz, Christian. 1991. *Film Language: A Semiotics of the Cinema*. Translated by Michael Taylor. Chicago: University of Chicago Press.

Morin, Edgar. (1956) 2005. *The Cinema, or The Imaginary Man*. Translated by Lorraine Mortimer. Minneapolis and London: University of Minnesota Press.

Moten, Fred. 2017. *Black and Blur.* Durham, NC: Duke University Press.

Mukherjee, Rahul. 2023. "Sensitivity and Sensing: Toward a Processual Media Theory of Electromagnetic Vibrations." *Critical Inquiry* 49, no. 3 (Spring): 462-485.

Mulvey, Laura. 1975. "Visual Pleasure and Narrative Cinema." *Screen* 16, no. 3 (October): 6-18.

—. 2006. *Death 24x a Second: Stillness and the Moving Image*. London: Reaktion.

Murphy, Michelle. 2017. *The Economization of Life*. Durham, NC: Duke University Press.

Noble, Safiya Umoja. 2018. *Algorithms of Oppression: How Search Engines Reinforce Racism.* New York: New York University Press.

Op den Kamp, Claudy. 2018. *The Greatest Films Never Seen: The Film Archive and the Copyright Smokescreen.* Amsterdam: Amsterdam University Press.

Parks, Lisa, Julia Velkova, and Sander De Ridder, eds. 2023. *Media Backends: Digital Infrastructures and Sociotechnical Relations.* Urbana, IL: University of Illinois Press.

Pasek, Anne. 2019. "Managing Carbon and Data Flows: Fungible Forms of Mediation in the Cloud." *Culture Machine* 16. https://hcommons.org/deposits/item/hc:34475/.

Peters, John Durham. 2015. *The Marvelous Clouds: Toward a Philosophy of Elemental Media*. Chicago and London: University of Chicago Press.

Rogers, Richard. 2019. *Doing Digital Methods.* Thousand Oaks, CA: SAGE.

Sartre, Jean-Paul. 2004. *Critique of Dialectical Reason* [1960]. Vol. 1. Edited by Jonathan Rée. Translated by Alan Sheridan-Smith. London and New York: Verso.

Sharma, Sarah. 2014. *In the Meantime: Temporality and Cultural Politics.* Durham, NC: Duke University Press.

Siegert, Bernhard. 2015. *Cultural Techniques: Grids, Filters, Doors, and Other Articulations of the Real*. Translated by Geoffrey Winthrop-Young. New York: Fordham University Press.

Simondon, Gilbert. 2017. *On the Mode of Existence of Technical Objects* [1958]. Translated by Cecile Malaspina and John Rogove. Minneapolis: Univocal.

Sloterdijk, Peter. 2009. *Terror from the Air.* Translated by Amy Patton and Steve Corcoran. Cambridge, MA: MIT Press.

Spillers, Hortense. 2003. "Mama's Baby, Papa's Maybe: An American Grammar Book." In *Black, White, and in Color: Essays on American Literature and Culture*, 203-229. Chicago: University of Chicago Press.

Starosielski, Nicole. 2015. *The Undersea Network*. Durham, NC: Duke University Press.

Stiegler, Bernard. 2018. *La technique et le temps: 1. La faute d'Épiméthée. 2. La désorientation 3. Le temps du cinéma et la question du mal-être*. Paris: Fayard.

Suchman, Lucy. 2007. *Human-Machine Reconfigurations: Plans and Situated Actions*. Cambridge: Cambridge University Press.

Sutherland, Tonia, and Gailyn Bopp. 2023. "The Pacific Futures of Subsea Data Centers." *New Media & Society* 25, no. 2 (February): 345-60.

Wajcman, Judy. 2014. *Pressed for Time: The Acceleration of Life in Digital Capitalism.* Chicago and London: University of Chicago Press.

Warburg, Aby. (1924-1929) 2009. "The Absorption of the Expressive Values of the Past." Translated by Matthew Rampley. *Art in Translation* 1, no. 2 (July): 273-283.

Wynter, Sylvia. 1984. "The Ceremony Must Be Found: After Humanism." *boundary 2* 12, no. 3; 13, no. 1: 19-70.

—. 1999. "*Proud Flesh* Inter/Views: Sylvia Wynter." *Proud Flesh: New Afrikan Journal of Culture, Politics & Consciousness* 4: 1-35.

—. 2001. "Towards the Sociogenic Principle: Fanon, Identity, the Puzzle of Conscious Experience." In *National Identities and Socio-Political Changes in Latin America*, edited by Antonio Gomez-Moriana and Mercedes F. Duran-Cogan, 30-66. New York: Routledge.

Wynter, Sylvia, and Katherine McKittrick. 2015. "Unparalleled Catastrophe for Our Species? Or, to Give Humanness a Different Future: Conversations." In *On Being Human as Praxis*, edited by Katherine McKittrick and Sylvia Wynter, 9-89. Durham, NC: Duke University Press.

Young, Iris Marion. 1994. "Gender as Seriality: Thinking about Women as a Social Collective." *Signs: Journal of Women in Culture and Society* 19, no. 3: 713-738.

Zielinski, Siegfried. 2006. *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means*. Translated by Gloria Custance. Cambridge, MA: MIT Press.

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