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SCHWERPUNKT Schalten und Walten

Mit Beiträgen von

Max Bense, Pauline Chasseray-Peraldi, Emanuele Coccia, Noémie Etienne, Alexander R. Galloway, Nicole C. Karafyllis, Adam Knowles, Ulrich Meurer, Lisa Parks, Kathrin Peters, Claus Pias, William Stewart, Christina Vagt, Alexander Waszynski

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Schwerpunkt: Schalten und Walten

Dear readers,

What you are about to read is the very last issue of the ZMK. Since our overall research enterprise, the IKKM, has to cease all of its activities due to the end of its twelve years' funding by the German federal government, the ZMK will also come to an end. Its last topic, *Schalten und Walten* has also been the subject of the concluding biannual conference of the IKKM, and we hope it will be a fitting topic to resume the research of the IKKM on *Operative Ontologies*.

Although this final issue is in English, we decided to leave its title in German: *Schalten und Walten*. As it is the case for the name of the IKKM, (*Internationales Kolleg für Kulturtechnikforschung und Medienphilosophie*), the term seems untranslatable to us, not only for the poetic reason of the rhyming sound of the words. *Switching and Ruling* might be accepted as English versions, but quite an unbridgeable difference remains. In German, *Schalten und Walten* is a rather common and quite widespread idiom that can be found in everyday life. Whoever, the idiom stipulates, is able to execute *Schalten und Walten* has the power to act, has freedom of decision and power of disposition.

Although both terms are mentioned together and belong together in the German expression *Schalten und Walten*, they are nevertheless complements to each other. They both refer to the exercise and existence of domination, disposal or power, but they nonetheless designate two quite different modes of being. *Schalten* is not so much sheer command over something, but government or management. It is linked to control, intervention and change, in short: it is operative and goes along with distinctive measures and cause-and-effect relations. The English equivalent *switching* reflects this more or less adequately.

Walten, on the other hand, is not articulated. It is not divisible, is not based on distinctions or decisions and does not come in the form of interventions or distinct operations. *Walten* is not a technique of domination, but rather dominance or dominion as a given state of being, a form of existence without outside, without any question, or alternative to it. *Walten* has neither origins nor causes. Where the German language seperates *Walten* from *Schalten* precisely by drawing them together, the English *ruling* includes both sides, both that which is simply there and therefore rules, and the technique of domination, such as the setting of rules.

Schalten und Walten, to us, seems to be a core double concept of what we have called *Operative Ontologies*, since *Operative Ontologies* as we have pursued them at the IKKM are grounded in one leading observation: assessing our situation today, we cannot ignore the fact that whatever is given in our environment is more and

more down to technical operations. Whatever exists is made, and the making of what exists requires tools and techniques, in short: (technical) media. This sharply contrasts the ways natural things exist, by *physis*, i.e. growing by themselves into being. Things like synthetic organisms do not reveal themselves in their own right and by their own agency but are called into existence by technology. The ruling (*Walten*) of nature as well as the ruling of the social reside under the command of technology, which as increasingly digitized technology is based on switching operations (*Schalten*). This holds true more and more for the natural and social things themselves as well, which are at hand to us only by technologies of engineering, design, management, and prediction, as for instance the achievements of bioengineering or the computational models of planet Earth teach us. Not only has nature itself turned into a »standing reserve« (*Bestand*) to a degree that Heidegger was unable to dream of, but this standing reserve is pervaded by technical (and increasingly digital) operations which determine how and what things are.

The condition that whatever exists is not simply present or given, but has been called into being through media and their operations in the most general sense demands a reconsideration of the traditional ontological questions (of the type *What is 'x'?*, or *Why is there something instead of nothing at all?*) and a radical remodeling of ontology: the difference between the ontological and the ontic re-enters the ontic. Although the term *Operative Ontologies* sounds self-contradictory—either operative, and hence ontic, or ontological, it seems—, any attempt to adequately describe the prevailing situation challenges exactly the paradoxical interrelation of the ontological and the ontic. The last issue of the ZMK is thus devoted to the exploration of the ways in which ontic and embodied operations establish ontological orders. Although the paradigm of operations which defines the highly technologized ontology of the 21st century is the electronic switching operation (*Schalten*), the topic embraces many ways and concrete situations in which objects are *switched* into being.

Since the industrial age and the possibility to digitally design objects only made obvious the technological processing of the ontological, *Schalten und Walten* refers to a broad variety of operations. The proposed move towards *Operative Ontologies* within media philosophy assumes that different ways of generating or manufacturing also propel different modes of being. Hence, *Operative Ontologies* inquire into the generative and procedural, the medial and the instrumental, the technical and the operative aspects of the *givenness* of that which is given. They investigate the given with regard to the procedures through which and with the help of which it has been made possible, produced, set up, brought into the world and called into being—or in short: *switched on*—in the first place. Through the technical modes and operations of calling something into being the respective mode of being is placed under material conditions.

This is why the topic of *Schalten und Walten* is so suitable to conclude the eleven years of the ZMK and the IKKM six-year research program on *Operative Ontologies*. The latter was structured along polar, complementary or gradual pairs of operations, which in themselves function as dualities or duplicities. Opening and closing, framing and sewing, appearing and disappearing, coupling and separating, compressing and dispersing, pointing and causing, reproduction and multiplication, or recursion and reflection were each examined as interrelated couples of ontological operations. As a continuation of and finale to this pairing method, we now turn towards *Schalten und Walten*.

So far, though, it might appear as if the concept of *Operative Ontologies* was based on a sound asymmetry between *Schalten* and *Walten*: whatever used to be accepted as just being given, for instance nature, or *physis*, is now increasingly dominated by being called into being through technologies, and mainly digital technologies. *Schalten* prevails to the detriment of *Walten*, it seems. *Walten*, in contrast, is obviously nothing more than a residual category. This asymmetry could be very much in conformity with the foundings of (especially »German«) media theory. None other than Friedrich Kittler himself coined the famous sentence: only what is switchable is at all. We cannot deny that this statement is true in more than one respect. To give just one example, we could say that all electric and electronic images only exist by virtue of their ability to be switched (and to switch), and that hence in the world of the image, only that which is switchable exists at all.

But nonetheless, the concept of *Operative Ontologies* does not necessarily imply the vanishing of the mode of existence of *Walten*. We can show this with reference to an early precursor of Kittler's powerful statement. As early as in 1969, not just by mere coincidence in the year of the flight to the moon, the philosopher and aesthetician Max Bense wrote the following lines:

> »Civilization is not a state, but a process (obviously an allusion to Norbert Elias). A process we prefer. It shifts the world from a metaphorical state to a mathematical one, and it will not stop transforming problematic realms into calculable ones. Only worlds that can be anticipated are programmable, only those that can be programmed are constructible and habitable in a human way«.

In their simple radicality and with respect to the ongoing production of desasters and catastrophes of all kinds from natural hazards to violations of human rights even in the increasingly controlled world, Bense's sentences today can probably only be justified historically. But let us take them seriously for once. In this case we can say that in its nearly twelve years' existance the IKKM has struggled continuously to work on adjusting this point of view and supply a suitable alternative. Nevertheless, this alternative should not ignore anything of what Bense's sentence, in all its dogmatism and stubbornness, nonetheless correctly describes.

We can grasp this with the help of the concepts of *Schalten* and *Walten*. All we have to do is read what Bense captures with the *metaphorical state* and the *problematic areas* as what we mean by *Walten* here. On the other hand, according to Bense, the state that can be calculated, anticipated, programmed and constructed would be the opposite or complement. By the way, concepts, conceptual thought and the conceptual world, are to be included into Bense's mathematical state, in so far as they are *clara et distincta concepta*, logically sharp and precisely operable concepts, the *p* and *q* of analytical philosophy, for example. Anyway, in the sense of our research context, we can compare them with what we call *Schalten* here.

The world has got under a mode of switching, and everything that is has been brought into being by operations of switching. Whatever is, is a result of switching operations. This gives rise to concern oneself with the *operative ontology* of switching. And it is precisely here that the path taken by the IKKM in its research diverges from what Bense is proposing. For the IKKM has resolved not to exclude or overcome what is metaphorical for Bense, the problematic, the contingent, the historical and, in short, the material, but, on the contrary, to integrate it.

In short, our findings indicate that the operation of switching cannot be done without *Walten*. In order to be effective in the world, to be precisely operative, they must be implemented into the world. Bense's construable worlds must first be built, erected and even furnished. They are literally contaminated with the material and metaphorical worlds. And when viewed in light, the mathematical state of the world itself or the programmable, switchable mode of existence, is also by no means a bodiless and immaterial one. Calculation, programming and anticipation themselves require an apparatus. They depend on instruments and tools, on computers, for example. They remain attached and even stuck on the *res extensa*. That is exactly the difference between traditional ontology and *operative ontology* as we imagine it.

For Bense, aesthetics and anthropology are undoubtedly metaphorical undertakings. In relation to the human body as a ruling carrier of philosophical operations—which means: switchings—however, there have already been extensive efforts to promote and research the different bodies of thought. These investigations focus on the material conditions and the interactions between philosophical and organic operations, switchings and rulings. Media philosophy now adds to this the consideration of the technical and medial bodies.

We would like to show this briefly by a very simple and everyday cultural technique—the venetian blinds. Logically or conceptually, one could say that the venetian blinds as a cultural technique make a distinction between the inside and outside, which they themselves embody at the same time. The venetian blinds are also a switch; they let the light in or out, make the outside visible from the inside or not. They regulate the access to what we see or do not see through it. As for

the extent this kind of access to something determines its state or mode of being—a basic conviction of media philosophy—the venetian blinds thus also transform the world, namely the world of the visible, from a simply given state into a regulated state. The venetian blinds would be a very simple Bense apparatus.

And it would be all the more so as the venetian blinds repeat the regulation that they impose on the world of light and visibility. They make their own function, which they perform in the medium of light, visible precisely in light. They make visible the invisible, the medium, namely light. On the inside of the distinction, in the space in which we find ourselves and which they delimit from the outside, venetian blinds create light and dark stripes. In this way they repeat and show the binary distinction between the visible and the invisible, and the inside and the outside, which they themselves implement. In this respect, the venetian blinds are not only a recursive, but to some extent a reflexive, a logical-philosophical machine in the realm of *Schalten*.

In fact, however, the highlight of the venetian blinds lies precisely in the fact that they are not just this, but a metaphorical and problematic machine in the sense of Bense as well. The nice thing about the venetian blinds is that they know intermediate states between open and closed. The stripes of visibility and light are changeable, manipulable. Exactly this change between the states is what the venetian blinds, in contrast to a simple window shutter, executes. Thus the venetian blinds also generate a time of their own, which is more than, and different from, the mere, sharp, reversible and even expansionless distinction between before and after. The adjustment of the venetian blinds, like any operation, for example that of the departure of a ship, has a course. It takes hold of time and costs time. The venetian blinds do not simply implement the logical operations of separation, differentiation and repetition, but the aesthetic operations of coupling and transition between states or even transmission. They are, in short, a metaphorical machine, and yet and at the same time still a switch, technical and, if you like, mathematical and logical in caracter and function.

In addition, of course, the venetian blinds themselves have a body that extends in space. This is shown by the fact that it wears and wears out, that the handling lines can tear, the lamellas can bend and must be cleaned regularly. It is also directed at our biological bodies, it requires a certain handling. Only these transfers and overlaps of different bodies and materials make the venetian blinds a philosophical apparatus in the sense of media philosophy.

What applies to the venetian blinds probably applies to all switches. They all consist of something material, metal, plastic, semiconductors or other materials. They produce not only mathematical distinctions, logical negations, but also metaphorical contacts, touches and transitions, but also heat and sometimes noise. They generate the *Eigenzeit*, which they need for their execution, and reach out

into space. If complex semiconductor circuits can finally take over thought processes such as arithmetic or even speech, then they are still bodies of thought.

So *Schalten* on its turn brings with it *Walten* like its own shadow, and, of course, media theory is interested in this remaining ontological shadow of digitization and of mediatization in general. But there is even more than the necessary pertinence of *Walte*n even under digital conditions. *Walten* is not only the unavoidable substrate of *Schalten*, it can also emerge from it. One striking example can be seen in what Raymond Williams called the *flow*. The flux of images on TV is, due to the switchability of the screen picture, continuously and constantly interrupted in a most abrupt way by switching over to other images, most heterogenuous image types, TV genres, broadcast formats. They interfere with each other in a way to only leave caleidoscopic meaningless fragments, tiny bits and pieces of what used to be for instance, news, advertising, wheater forecasts, sports, shows, episodes, fictions, live transmissions, announcements, wrap ups, and so forth. There is no coherence of whatsoever quality, especially if it comes to semantics, to meaning or to any form of Gestalt. The term of coherence (or of interruption) loses any significance. Switching operates, as Hartmut Winkler once put it, an operation directed against any kind of context and hence of text.

But, Williams observes, a strange kind of rhythm, or of surfing on the surface of the fragmented sequence of distinctions and of switching operations that comes into being. Based on highly frequent interruptions, a *flow* of plasticity and viscosity arises, a state of experience or even existence, a mode of being, which integrates viewers, images, switchable pictures, sounds, and the world beyond. *Flow* is a bodily and hence physical, material phenomenon, not just a structure or a sequence of otherwise disembodied distinctions. It hence brings *physis* back into the game. *Flow* emerges from switching, *Schalten*, but it rules in the sense of *Walten*.

What can be found in the switchable picture may also emerge elsewhere. The Maltese Cross in the movie camera (and projector) could also be adressed here, or, even more general, language. In what André Martinet called *la double articulation du langage*, the articulation or segmentation of what has already been articulated or fragmented, the coherent dominion of sense emerges as both an artifact, and hence on the side of switching, and an unavoidably and unquestionably ruling condition of existence. Signals, discernable and switchable entities, as they emerge from ruling noise may on their turn, if sequenced, generate a kind of second order flow-like noise and as such turn into given conditions of existence. The cloud, or looped CCTV Systems, or the pervasion of the habitat with computers, and hence switches, may be regarded in a comparable way as modes of turning *Schalten* into *Walten*.

In this sense, with the topic of *Schalten* und *Walten*, the last issue of the ZMK endeavors to investigate the entry or implementation of the mathematical, switch-

able (or conceptual) world into the metaphorical, ruling (or material) world. It is not the replacement of one topic by the other, which is our topic, but rather their coupling and their turning into each other. Thus we suggest that some *Walten* always prevails in all *Schalten*. If only what is switchable can exist, then all *Schalten* requires a *Walten* which it itself generates.

Weimar, February 2020 *The Editors*

Das Museum für zeitgenössische Natur

Emanuele Coccia

Lange Zeit hat die akademische Kultur eine Vorstellung von Kunst vermittelt, die der Vorstellung vom Leben in den Naturkundemuseen ähnelt: Kunstwerke erscheinen wie ausgestorbene Arten, die nur noch in Vitrinen existieren, isoliert vom Rest der Welt, eingefroren in einer Umgebung und einem Kontext, die nicht mehr ihre eigenen sind. In solchen Räumen sind Kunstwerke dazu verurteilt, nicht mehr Alltagsobjekte zu sein, sondern Gegenstand eines Kultes, der jedem Objekt nichts anderes mehr zugesteht, als schön zu sein.

Ebenso vermittelt die akademische Kultur seit Langem eine Naturvorstellung, die dem Zustand der in den Museen eingesperrten Kunst in nichts nachsteht. Die Natur »lebt« nicht: sie muss erhalten und geschützt werden, das heißt in dem Zustand gehalten werden, in dem sie sich befand, als das erste menschliche Auge sie erblickte. Sie gilt als vergänglich, wie eine künstlerische Bewegung. Das Paradoxon ist offensichtlich: auf der einen Seite wird Natur als Ursprung von allem betrachtet, auf der anderen kann sie doch nicht allein überleben. Wie ein künstlerisches Objekt wird Natur als zerbrechlich angesehen: Sie schließt alles Existierende ein und doch soll sie der Aufsicht eines ihrer Teile, der Menschheit, unterworfen sein.

Wir wiederholen oft, dass Kunst und Natur zwei unterschiedliche, ja gegensätzliche Sphären sind, die jeweils durch die Autonomie der anderen bestimmt werden. Und doch verwechseln wir sie in der Praxis ständig. Einige kulturelle Institutionen ermöglichen es – das Naturkundemuseum oder der Naturpark –, dass wir die Natur aus jeder kulturellen und künstlerischen Realität ausschließen dürfen. Bedingt durch die Analogien zu den Lebensformen wird es möglich, dass wir die Kunst zu etwas, das an der Sphäre der Natur nicht teilhaben kann, machen können.

Anstatt diesen konzeptuellen Chiasmus zu bereinigen, schlage ich vor, alle spekulativen Konsequenzen daraus zu ziehen und *die Natur als eine permanente Institution* und die *Kunst als die Sphäre zu denken, in der das Leben das Maximum seiner Biodiversität produziert.*

Der Schlüssel zu dieser Radikalisierung ist die Idee der Zeitgenossenschaft. Die Natur ist bei uns immer kulturell zeitgenössisch, in dem Sinne, dass wir zu allen nicht-menschlichen Spezies immer natürlich zeitgenössisch sind. In der Zeitge-

nossenschaft werden Kultur und Natur austauschbar: Die zeitgenössische Natur ist nur eine flüchtige Etappe in der Kunst der Biodiversität, so wie die zeitgenössische Kunst nur der Ausdruck einer Natur ist, die nicht über die Gegenwart und ihre Weissagung hinausgehen will.

Um über die Zeitgenossenschaft der Natur nachzudenken, ist es notwendig, zu der Seinsweise der Pflanzen zurückzukehren. Durch die Beobachtung ihrer Existenz könnten wir verstehen, warum wir verpflichtet sind, das Nichtmenschliche genau so zu denken, wie wir das Menschliche denken.

Niemand bemerkt sie, niemand kümmert sich um sie. Wir kennen kaum ihre Namen, wir erkennen ihre Würde als Lebewesen kaum an. Wir sind empört über das Aussterben und die Misshandlung von Tieren, aber der Ekel ist selten und versteckt, dass unser Leben von ihrer Tötung abhängt und wir uns täglich von ihren Leichen ernähren.

Seit Jahrhunderten sind sie, wenn auch auf negative Weise, das Modell für die Konstruktion des sozialen und politischen Raumes. Die Wälder, die freie Assoziation von Pflanzen und Bäumen, waren das, was die Städte außerhalb ihres Körpers belassen mussten. Jahrhundertelang nahmen die Städte sie in Gefangenschaft, in Form von Gärten und Landschaftsparks. Doch keine Stadt wäre ohne Pflanzen möglich. Wir leben in ihren Körpern und durch ihre Körper. Ohne die Körper aller Kultur- oder Wildpflanzen, die uns Leben geben, wäre die Existenz aller Frauen und Männer, die in den Städten leben, nicht möglich. Die Stadt wird von jenen monospezifischen Wäldern oder Gärten genährt, die die Landwirtschaft weiterhin als vorstädtische Räume betrachtet. Es kann nicht nur keinen Unterschied zwischen der Stadt und dem Wald geben, da sie beide Mitglieder desselben Körpers, desselben interspezifischen Leviathans sind: Jede Stadt ist nur der sichtbare Teil eines größeren land- oder forstwirtschaftlichen Projekts, was die Bedingung ihrer Möglichkeit ist, auch wenn dieses Projekt außerhalb ihres Körpers liegt.

Pflanzen haben buchstäblich die Welt, in der wir leben, geschaffen. Wenn sie überall sind und den wesentlichen Teil der Anatomie dieses irdischen Leviathans ausmachen, den wir gewöhnlich Gaïa nennen, dann deshalb, weil sie sein embryonales Gewebe sind. Durch die Eroberung der Erdoberfläche und die Ausbreitung über den ganzen Planeten haben die Pflanzen die sauerstoffreiche Atmosphäre erzeugt (und erzeugen sie auch weiterhin), die das Leben aller »höheren« Tiere ermöglicht hat: Die so genannten höheren Tiere können nur leben, weil sie das Sekundärprodukt und die Exkremente des pflanzlichen Stoffwechsels, den Sauerstoff, atmen. Außerdem sind Pflanzen direkt oder indirekt für die Produktion der Biomasse unseres Planeten verantwortlich. Sie machen nicht nur ca. 85% der eukaryotischen Biomasse auf dem Planeten aus, Pflanzen sind auch die energetische Voraussetzung für die Existenzmöglichkeit und für die Ernährung aller höheren Tiere. In der Tat ermöglichen die Pflanzen, indem sie einen von den Cyanobak-

terien erfundenen Mechanismus in größerem Maßstab ausnutzen, die Umwandlung der Sonnenenergie (die mächtigste Energiequelle für das Leben auf diesem Planeten) in lebende Materie: Organisches Leben ist nur die Folge dieser Fähigkeit, Sonnenenergie in Form von chemischen Bindungen komplexer Moleküle zu speichern und so die Sonne in eine belebte Masse zu verwandeln. Und erst durch die von den Pflanzen entwickelte Variante dieses Prozesses, lebende Materie aus Sonnenenergie zu erzeugen, ist das Leben auf dem Planeten nicht mehr quantitativ und qualitativ nur eine Randerscheinung, sondern sein Hauptmerkmal, sein eigentliches Wesen, geworden. Sich zu ernähren bedeutet für die Pflanzen, dieses Licht zu suchen und zu finden, das sie in den Mineralkörper von Gaïa geblasen haben. Die Nahrung ist nichts anderes als dieser Handel mit Licht, das von Körper zu Körper, von Spezies zu Spezies übertragen wird, von Reich zu Reich, und das weiterhin den Planeten mit Sonnenlicht bestrahlt und Tag für Tag Kontinuität und Nähe zwischen Erde und Sonne gewährleistet.

Wenn Pflanzen die Welt, in der wir leben, geschaffen haben, dann ist Gaïa eine pflanzliche Einheit: Es ist ein Garten, viel mehr als eine Menagerie, und nur weil Gaïa ein Garten ist, können wir darin leben. Alle kosmologischen Spekulationen müssen die Form einer botanischen Reflexion annehmen. Aber in diesem Garten sind die Pflanzen nicht (oder nicht nur) der Inhalt oder die Bewohner: Sie sind die Gärtner selbst. Wie alle anderen lebenden Arten sind wir Gegenstand der Pflanzengärtnerei. Wir sind eines ihrer landwirtschaftlichen und kulturellen Produkte. Mit anderen Worten: Sie sind nicht die Landschaft, sie sind die ersten Landschaftsarchitekten. Oder, um es provokanter auszudrücken, es gibt keine Landschaft, weil alles, auch scheinbar unbewegliche Lebewesen, das Gesicht der Welt ständig prägt. Was wir Landschaft nennen, ist das Ergebnis der Arbeit vieler verschiedener Landschaftsarchitekten. Was wir Garten nennen, ist nur eine Armee von Gärtnern.

Zu behaupten, dass die Welt ein Garten ist, bedeutet zunächst einmal, dass die Erde selbst den Status eines Artefaktes hat, dass sie also etwas an der Grenze zwischen Natur und Kultur ist. Die Welt ist eine kulturelle Produktion aller Lebewesen, die sie bewohnen, und nicht nur die transzendentale Voraussetzung für die Möglichkeit des Lebens. Gaïa ist Floras Tochter. Oder besser: Sie ist nur Floras kosmische Puppe.

Überlegungen zu Pflanzen können in der Tat verallgemeinert werden und sind wertvoll, um eine neue Perspektive der gegenwärtigen ökologischen Krise zu gewinnen und sie von bestimmten äußerst schädlichen Vorurteilen zu befreien, einschließlich der Vorstellung, dass die Erde von ihrem Ursprung her ein Planet ist, der dazu bestimmt ist, Leben aufzunehmen. In Wirklichkeit war für das Erscheinen von Leben auf dem Planeten eine lange Evolution notwendig; während dieser Evolution spielten die Lebewesen selbst eine große Rolle. Es waren ihre Handlungen und das Leben selbst, die die Erde in einen bewohnbaren Planeten

verwandelt haben. Der Planet ist kein natürlicher und ontologisch ausgezeichneter Raum für das Leben: Dank eines äußerst interessanten Paradoxons haben die Lebewesen die Erde in Gaïa verwandelt. Auch heute noch macht jedes Lebewesen auf seiner Oberfläche Leben für andere möglich (oder unmöglich). Anstatt sich an die Existenzbedingungen anzupassen, die die Welt ihr auferlegt, manipuliert jede lebende Spezies die Welt so, dass ihr Leben möglich wird. Jedes Lebewesen verändert durch die einfache Tatsache des Lebens unwiderruflich die Welt um sich herum und damit den gesamten Planeten. So war es die Eroberung des Kontinents durch die Gefäßpflanzen, die die Konsistenz der Atmosphäre irreversibel verändert hat und sie sauerstoffreich und für aerobe Tiere bewohnbar gemacht hat. Es sind die Pilze, Würmer und die gesamte Mikroflora und Mikrofauna des Bodens, die das Pflanzenleben ermöglichen. Diese Überlegungen sollen weder den Mythos der universellen Harmonie wiederherstellen, noch die globale Vernetzung aller Lebewesen bekräftigen. Es geht um die Möglichkeit zu denken, dass die gegenseitige Beziehung zwischen den Lebewesen sowie die Beziehung zwischen den Lebewesen und der Umgebung immer eine technische Beziehung ist, eine Beziehung der Manipulation, der Neubearbeitung. Wie alle lebenden Spezies können wir nicht aufhören, die Welt zu manipulieren: Wir können nur unsere Tätigkeit der Veränderung der Umwelt verändern. Wir (und alle Lebewesen) können unsere Praxis, die Welt zu erschaffen, nicht aufhalten. Die Beziehung zwischen Lebewesen und Umwelt ist immer eine architektonische Gestaltungsbeziehung. Und die Beziehung zwischen den Arten ist auch eine Design-Beziehung: Jede Art verhandelt weiterhin ihr Leben und ihre Umwelt mit anderen Arten, um ein mögliches Gleichgewicht zu definieren. Indem jedes Lebewesen versucht, die Welt nach seinem eigenen Bild und Gleichnis zu strukturieren, greift es in die Umwelt und in das Leben der anderen ein: Was wir »Verschmutzung« nennen, ist einfach die Unmöglichkeit für jedes Lebewesen, in seiner eigenen Nische zu bleiben. Jede Spezies ist ein Architekt und Weltdesigner und ist auch Architekt und Weltdesigner anderer Spezies. Das bedeutet, dass die Umgebung, in der jede Art lebt, in den allermeisten Fällen ein Raum ist, der von anderen Arten für andere Arten entworfen wurde. Jede Art ist irgendwie heimlich und missbräuchlich in ihrer Umgebung, jede Art stört die andere.

Nehmen wir das Beispiel der Atmung. Die Menschheit kam auf die Welt, nachdem die Erde bereits von anderen Spezies entworfen und verändert worden war, deren Hauptzweck nicht darin bestand, menschliches Leben zu ermöglichen. Atmen bedeutet, sich einer Welt zu stellen, die andere produziert haben, und diese von anderen entworfene und gebaute Welt in unsere erste Höhle zu verwandeln. Der Weltraum, das, was wir hartnäckig weiterhin als »natürliche Umgebung« bezeichnen, ist niemals natürlich: Er ist immer ein Artefakt, das von anderen Arten für andere Arten entworfen und gebaut wurde. Das bedeutet zunächst einmal,

dass die Beziehung, die jede Art mit dem umgebenden Raum hat, untrennbar mit der Beziehung verbunden ist, die jede von ihnen mit anderen Arten hat. Mit anderen Worten, die Beziehung zur physischen und nicht-lebenden Umwelt ist nie rein physisch, physiologisch, chemisch, sondern immer politisch. Außerdem, gerade weil die Beziehung, die jedes Individuum einer Spezies mit den anderen Individuen derselben Art unterhält, vollkommen isomorph in Bezug auf die Beziehung ist, die es mit dem umgebenden Raum unterhält, gibt es nie eine rein »soziale« Politik, die an sich keine technologische Beziehung zu den anderen ist, nie eine soziale Beziehung, die nicht Architektur und Konzeption des Lebens der anderen ist. Wir gehen niemals eine Beziehung mit anderen ein, es sei denn, es ist ein Versuch, ein Leben möglich oder unmöglich (gemeinsam) zu machen, so wie beim Bau eines Hauses oder eines Instruments.

Was wir Design oder Architektur nennen, ist nicht die Beziehung einer einzigen irdischen Spezies (der menschlichen Spezies) zu sich selbst und der materiellen Welt, sondern die Beziehung, die zwei oder drei Spezies, oder besser gesagt, die transzendentale Form aller Spezies, zusammenhält. Im Gegensatz zu dem, was Jakob von Uexküll dachte, ist die Welt trotz der unterschiedlichen Wahrnehmungs- und Betrachtungsweisen der Welt eins, und die Welt ist vor allem für alle Lebewesen dasselbe. Jede weltanschauliche Aktivität einer Spezies erschüttert die Welt der anderen Spezies; jedes Mal, wenn eine Spezies ihre eigene Welt produziert, produziert sie indirekt auch die Welt der anderen. Jedes Mal, wenn eine Biene, eine Eiche, ein Bakterium ihre Umgebung verändert, um ihr Leben zu ermöglichen, verändern sie die Umgebung anderer. Es gibt keine andere Beziehung zwischen den Arten, die nicht stets eine architektonische, technische, manipulative und sich gegenseitig verändernde Beziehung ist.

Deshalb ist schließlich jede Architektur immer auch eine Form von Landwirtschaft oder Viehzucht: Die Welt zu verändern bedeutet nicht nur, den äußeren Raum zu meißeln, sondern auch in das Leben und das biologische Schicksal von tausend anderen Lebewesen einzugreifen. Umgekehrt sind Landwirtschaft und Viehzucht keine Tätigkeiten, die ausschließlich der menschlichen Technik vorbehalten sind, sondern die gewöhnliche Beziehung, die zwischen allen Arten besteht.

Das offensichtlichste Beispiel für die interspezifische technische Beziehung ist diejenige, die jede Pflanze durch Blüten mit anderen Pflanzen herstellt. Blumen sind keine echten Organe, sondern ein Komplex von modifizierten Organen, deren Aufgabe die Fortpflanzung ist. Im Gegensatz zu anderen Arten sind bei der geschlechtlichen Fortpflanzung nicht nur zwei Individuen der gleichen Art beteiligt, sondern auch Individuen aus anderen Reichen, wie z.B. Insekten. Mit Hilfe der Blumen üben die Pflanzen eine Art »umgekehrte Landwirtschaft« (oder »umgekehrte Züchtung«) aus: Eine Art entscheidet sich, ihr biologisches Schicksal einer anderen Art anzuvertrauen, die zu einem anderen Reich gehört. Durch

Blumen verwandeln Pflanzen ein Insekt, ein Tier (Mensch oder nicht), den Wind oder das Wasser in Genetiker, Züchter, Bauern, deren Macht es ist, zu entscheiden, wer sich mit wem sexuell vereinigt, und somit das biologische und ökologische Schicksal der betreffenden Pflanzenart bestimmt. Sex wird zu einer Art Mischökologie, und vor allem wird er Teil einer interspezifischen (und nicht intraspezifischen) Beziehung, die mit jedem Mechanismus der natürlichen und sexuellen Selektion zu brechen scheint. Es gibt keine natürliche Auslese mehr, denn wie bei der landwirtschaftlichen oder tierzüchterischen Tätigkeit des Menschen bestimmt eine Art künstlich das Schicksal einer anderen. Es gibt keine sexuelle Selektion mehr, weil es kein Urteil über ein Individuum derselben Art über ein Individuum einer anderen Gattung gibt, sondern eine interspezifische Konkurrenz, bei der das Geschlecht des einen mit anderen Interessen und Zwecken vermischt wird.

Aus dieser Perspektive betrachtet wird die Welt zu einer Art agro-ökologischem Raum, in dem jede Art Gärtner oder Bauer einer anderen sein kann, oder vielmehr Land oder Arten, die von einer anderen angebaut werden. Anders ausgedrückt, die Welt ist ein riesiger Garten, in dem jeder Einzelne der Gärtner anderer Arten oder der Garten anderer ist. Der irdische Leviathan, den wir Gaïa nennen, ist weniger die einfache physische Ansammlung aller Körper als vielmehr die Beziehung der gegenseitigen Kultivierung, die Arten aus verschiedenen Reichen verbindet, die nie durch eine Logik des einfachen Nutzens definiert ist.

Unter diesem Gesichtspunkt gibt es keine natürlichen Ökosysteme, denn alles ist technischer Raum, eine Beziehung der landwirtschaftlichen Gestaltung. Es gibt nur interspezifische Städte, riesige interspezifische Stadträume.

Vor allem aber ist es die Idee der natürlichen Evolution, die nicht mehr akzeptiert werden kann. Die Evolutionstheorie verbindet die Akzeptanz der Transformation der lebenden Spezies, die Fähigkeit sich zu entwickeln, die Form zu verändern, mit einer Verweigerung der Kontrolle jeder Spezies über diese Veränderungen, ihrer Macht, über ihr eigenes Schicksal und das der anderen zu entscheiden. Die »historische« Bewegung, die in der Lage ist, nicht nur die Oberfläche des Planeten, den Lauf der Gewässer und Winde, die Zusammensetzung des Bodens und den Rhythmus des Klimas zu verändern, sondern auch und vor allem den Körper, das Gesicht, die Form und das Schicksal aller Arten, ist eine blinde Bewegung, die von der Aktion der einzelnen Arten abgezogen und in eine völlig verborgene, fast göttliche Logik eingeschrieben ist, die es jeder Art erlauben würde, das zu erhalten, was ihr und der Erde passt, um sich nach und nach zu verbessern. Die Logik des Nutzens hinter jedem Evolutionsschritt ist die des lokalen und globalen Nutzens.

Dieses Überbleibsel der Teleologie hat einen theologischen Ursprung. Aber was dies möglich macht, ist nicht so sehr die Schuld, die die Biologie oder Ökologie

der christlichen Theologie schuldig ist, sondern die Hartnäckigkeit, mit der Letztere leugnet, dass Arten einen architektonischen und genetischen Agenten in der physischen und biologischen Welt haben können. Wenn wir diese vielfältige und weit verbreitete Agentur akzeptieren, wenn wir akzeptieren, dass alles in der Natur künstlich ist und alles Künstliche durch mehrere Arten künstlich ist, wird die Geschichte der Erde viel mehr der Geschichte der menschlichen Kunst ähneln als der heutigen Naturgeschichte. Die Natur hat nicht nur historische Tiefe, sondern jede ihrer Stufen, jede ihrer Inkarnationen ist eine Art »Interspezifische Biennale«, eine Installation, die darauf wartet, durch Hunderte von anderen ersetzt zu werden. Jeder Wald entspricht einer Museumsausstellung. Was wir die natürliche Welt nennen, hat den gleichen Status wie die Kunst. Gaïa ist eine konstante künstlerische und architektonische Multi-Spezies-Performance.

Im Herzen der Natur, als einer Realität, die ständig der Künstlichkeit aller Arten ausgesetzt ist, folgt die Abfolge der Formen in den Körpern der natürlichen Wesen wie auch in den Landschaften der Erde der gleichen Logik dessen, was wir in der menschlichen Kultur »Mode« nennen. Die Ökologie muss zu einer Studie über die Mode der Natur, über ihre Jahreszeiten werden, die über eine längere Zeitspanne als die unsere zu berechnen sind. Von diesem Standpunkt aus gesehen ist die Natur das, was per Definition zur Zeitgenossenschaft fähig ist. Jede Landschaft ist das Äquivalent einer Modekollektion oder einer zeitgenössischen Modenschau.

Unter dieser Prämisse möchte ich einen Vorschlag machen: ein neuer Museumstyp, das *Museum für zeitgenössische Natur.* In den letzten fünfzig Jahren hat sich der Charakter des Museums grundlegend geändert. Von einer Institution, die sich der Bewahrung und Pflege des künstlerischen, architektonischen und handwerklichen Erbes eines bestimmten politischen oder geographischen Kontextes widmet, deren Aufgabe es war, zu erhalten, zu bewahren, zu schützen, aber auch zu zeigen und sichtbar zu machen, was von Menschen innerhalb einer Nation produziert wird, sind wir zu einem neuen Typ von Museum übergegangen, dessen Aufgabe nicht mehr die Bewahrung der Vergangenheit, sondern die aktive und bewusste Produktion der Zukunft ist. Diese Art von Museen und Stiftungen – vom MOMA bis zum Centre Georges Pompidou, vom Hamburger Bahnhof bis zum Walker Art Center, von der Fondation Cartier bis zur Biennale von Venedig – hat die Aufgabe, die Zukunft zu erahnen und durch dieses Werk der Weissagung Zeit zu produzieren. Die Ausstellungen, die uns oft einen Einblick in das Werk sehr junger Künstler geben, erinnern nicht an die Geschichte, sondern helfen uns bei der Orientierung in der zeitgenössischen Kultur.

Wir sollten anfangen, an etwas Ähnliches für Naturkundemuseen, Zoos und vor allem für botanische Gärten zu denken. Dies sind zentrale Institutionen, die zu der Definition unserer Vorstellung von der nicht-menschlichen Natur beitragen.

Sie sind der Spiegel, das Spiegelbild unseres Denkens über die nicht-menschlichen Spezies, ihre mehr als tausendjährige Geschichte, die Art und Weise, wie wir miteinander und mit dem Raum umgehen. Diese Institutionen sind heute in zweierlei Hinsicht gefährdet. Zum einen werden sie im Anthropozän zu bloßen Archiven, zu Zeugen einer inzwischen verschwundenen Natur (Archive einer unwiederbringlich fehlenden Natur, wie in den Arbeiten von Susan Schuppli oder wie sie Etienne Turpin und Anna-Sophie Springer in *Disappearing Legacies: The World as Forest* konzipiert haben). Oft werden diese Räume zu einer Form der nostalgischen Beschwörung einer Welt oder kosmischer Nischen, die der Mensch noch nicht betreten hat. Es ist eine Art Archäologie der Wildnis, von der man mehr träumt als von der Realität.

Die zweite Gefahr besteht darin, weiterhin falsche Vorstellungen über die absolut unüberwindbare Kluft zwischen menschlicher und nichtmenschlicher Kultur zu verbreiten. Tatsächlich präsentieren diese Institutionen weiterhin das Leben und die Geschichte von Nichtmenschen auf der Grundlage, dass sie nicht menschlich sind. Sie versuchen auf jeden Fall, ihre Nicht-Humanität, ihre Nicht-Staatsbürgerschaft, die Tatsache, dass sie nicht zur Polis, zu den Städten, zum politischen Raum gehören, darzustellen. Tatsächlich basieren Naturmuseen, Zoos und botanische Gärten weiterhin auf dem menschlichen Exzeptionalismus.

Gegen diese beiden Risiken müssen Institutionen, die sich der zeitgenössischen Natur widmen, abgesichert sein. Neue Institutionen müssen von der Prämisse ausgehen, dass das Anthropozän nicht nur eine Tragödie, sondern auch eine Chance ist. Das Anthropozän ist auch der Beweis für eine nicht nur theoretische, sondern auch praktische, natürliche Untrennbarkeit zwischen dem Menschlichen und dem Nichtmenschlichen. Es gibt nicht nur keine rein »natürlichen« Wildnisgebiete mehr, sondern es kann auch keine Städte als rein menschliche, rein intraspezifische Umgebungen mehr geben.

Gegen das Paradigma der Nostalgie und des Neokolonialismus, der Rückkehr zu den vormodernen Kulturen, in denen die Natur noch unberührt vom Menschen wäre und die Menschheit einen direkteren, natürlicheren und unmittelbareren Kontakt mit dem Nichtmenschlichen hätte, werden diese Institutionen es uns ermöglichen zu verstehen, dass das Anthropozän auch mit dem Moment zusammenfällt, in dem die Humanwissenschaft mehr denn je dem Nichtmenschlichen ausgesetzt ist: Wir haben noch nie so viel Wissen über die nichtmenschliche Welt gehabt. Die Wissenschaft (Wissen, aber auch Technik und Kunst) war nie weniger menschlich als heute. Wir können nur durch die Vermittlung dieses Wissens nicht menschlich sein, ohne uns einer allmenschlichen Geschichte vergangener Zivilisationen hinzugeben.

Es bedeutet auch, dass uns die Natur nie zuvor als eine Reihe von Künsten und Techniken in perfekter Kontinuität mit unseren eigenen erschienen ist. Und auf

der Grundlage dieser technischen Kontinuität mit der Natur muss das Museum für zeitgenössische Natur agieren.

Sein Umfang wird eine Art Hybrid zwischen den alten Museen, Zoos oder botanischen Gärten, aber auch der Stadt selbst sein. Die Kunst in diesen Institutionen wird mit einer Art interspezifischer Stadtplanung, mit einer multispezifischen Landschaftsarchitektur zusammenfallen müssen.

Durch die Zusammenführung von Wissenschaft, Architektur, Design und Kunst wird das Museum für zeitgenössische Natur über die Stadt (verstanden als ein Raum, der mehrheitlich von Männern und Frauen besetzt ist), das White Box Museum, den Zoo oder den Wald (als Räume, in denen der Mensch keinen Platz hat) hinausgehen. Ziel wird es sein, mit Formen des Zusammenlebens und der Koexistenz von Welten zu experimentieren, die nicht unbedingt bereits von den Naturwissenschaften erfunden wurden.

Sie müssen die Förderer einer »ökosurrealistischen« (aber nicht unbedingt ökomodernen) Kultur sein, die in der Lage ist, sich die Natur über ihre Grenzen hinaus vorzustellen. Durch das Zusammenbringen von Künstlern, Wissenschaftlern, Designern, Architekten, Landwirten und Züchtern wird es darum gehen, auf halbem Wege zwischen Stadt, Garten, Plantage und Scheune, wo jedes der lebenden Produkte für andere und für sich selbst arbeitet, multispezifische Assoziationen aufzubauen. In dieser tugendhaften Übung der Imagination, sowohl ästhetisch als auch natürlich, wird die Kunst an sich interspezifisch, in dem doppelten Sinne, dass sie sich auf nicht-menschliche Spezies bezieht (wie im Garten oder in der Küche), aber auch, dass sie immer auf einer gegenseitigen Assoziation zwischen Menschen und anderen Spezies basiert. Die Kunst selbst wird die Praxis der Herstellung eines interspezifischen Leviathans sein.

Es wird nicht darum gehen, innerhalb der Stadt vom Rest getrennte Räume zu zeichnen, damit sich die Natur in einem »ananthropischen« Zustand ausdrücken kann, noch wird es darum gehen, die Natur wie ein Kunstwerk zu arrangieren. Die Bewegung, die z.B. in Stefano Boeris *Vertical Forest* entstanden ist, sollte erweitert und radikalisiert werden. Anstatt die Natur als das zu denken, was der Geschichte und der Moderne vorausgeht, ist die Moderne in ihrem ikonischsten Symbol, dem Turm, dem Wolkenkratzer, das, was uns zur Natur führt: Die Natur ist für uns immer zeitgenössisch, sie ist nicht etwas, das in einer uralten Vergangenheit existiert. Anstatt den Wald als das zu denken, was außerhalb der Stadt ist, wird der Wald hier zum ersten Bewohner des Hauses und der Stadt: Die Institution ist es, die die Gleichzeitigkeit der Natur ermöglicht.

Es geht darum, die Stadt, aber auch den landwirtschaftlichen Raum neu zu denken, indem wir uns von dem Exzeptionalismus befreien, der die Landwirtschaft zu einer rein menschlichen Tatsache macht. Die zeitgenössische Natur ist der Raum der gegenseitigen Ko-Kultivierung aller Arten, viel mehr als der der

Ko-Evolution. Jede Spezies entscheidet über das evolutionäre Schicksal der anderen: Sie ist sowohl Künstlerin als auch Kuratorin. Jede Spezies ist gleichzeitig ein Kunstwerk und die Leistung der Spezies, deren Evolution sie ist, aber auch das Stück einer Ausstellung, deren Kuratoren die Spezies sind, die ihre Entstehung verursacht haben.

Through the Looking Glass

Dioramas, Bodies, and Performances in New York

Noémie Étienne

Dioramas are museum displays that resemble photographs. Defined by their multi-mediality (uniting painting, sculpture, lightening but also collected material culture, casting or taxidermy), dioramas are devices belonging to the fields of natural history, anthropology, history, but also to popular culture in fairs and malls since the 19th century. Often made in order to reproduce a scene in a mimetic way, they are inventing a reality that never existed, as Umberto Eco already argued.[1] Moreover, dioramas are complex three-dimensional installations made of a variety of materials, such as paint, wood, plaster, fur, iron, or paper. Even though dioramas necessarily involve a mixture of media and material, they inevitably become an image from a chosen angle when reproduced in an article such as this one. Thus, when they are photographed, dioramas look like two-dimensional pictures. Their multimedia and multidimensional characteristics are masked by their reproduction.

As a likely consequence of these phenomena, the sense of sight has been a central element in the study of dioramas by scholars coming from a variety of disciplines. In media history, dioramas are frequently presented as an anticipation of cinema.[2] Alison Griffiths suggests that each diorama might be considered a film scene.[3] With reference to Walter Benjamin and the panorama, Jonathan Crary emphasizes the emergence in the 19th century of a mobile spectator whose shifting

1 See for instance Stephen Christopher Quinn: Windows on Nature. The Great Habitat Dioramas of the American Museum of Natural History, New York 2006; Umberto Eco: Travels in Hyperreality: Essays, trans. by William Weaver, San Diego/New York/London 1986, pp. 3–58. For a critic of such displays, see Donna Haraway: Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908–1936, in: Social Text 11 (1984), pp. 20–64.

2 See for example Birgit Verwiebe: Lichtspiele: Vom Mondscheintransparent zum Diorama, Stuttgart 1997.

3 Alison Griffiths: Wondrous Difference: Cinema, Anthropology & Turn-of-the-Century Visual Culture, New York 2002, p. 49. See also Erkki Huhtamo: Illusions in Motion: Media Archaeology of the Moving Panorama and Related Spectacles, Cambridge 2013; Jonathan Crary: Techniques of the Observer, Cambridge 1991, p. 112.

perception presents things in their multitude rather than their singularity.[4] However, the spectator described in the books cited above is often a moving eye without real embodiment.

In this article, I would like to provide an additional perspective for the study of dioramas. As I will suggest, bodies and performances are also key in the approach of the topic. I will argue that bodies are not only represented in anthropological dioramas through plaster or wax figures, but that real, alive human bodies are central to the production and reception of such displays. In terms of methodology, I was inspired by the concept of the *contact zone*, developed by Marie Louis Pratt.[5] The content of this paper draws on my most recent book, in which I studied the anthropological dioramas made for two museums in the United States: The Museum of Natural History in New York; and the New York State Museum in Albany (the capital of New York State). Two men, with different levels of fame, were in charge of such dioramas: the famous anthropologist Franz Boas in New York; and the Native American (Seneca) anthropologist Arthur C. Parker in Albany.[6]

Differentiating regimes of perspective is useful for establishing a typology of dioramas: first, picture-dioramas are front-facing and often behind glass, and they have a large painting as their background. Many conform to this pattern, including all those created by Arthur C. Parker at Albany. A perspective is created by the construction and landscape, and this unavoidable point of view suggests a fixed spectator. Second, display-case dioramas, such as the many dioramas fabricated by Franz Boas in New York, are installations that the visitor can walk around, and they therefore afford numerous points of view. Third, milieu dioramas are truly immersive ensembles in which spectators, upon entering them, are decentered, and participative, as in the model described by Julie Reiss and Claire Bishop in relation to contemporary art installations.[7]

In the first part of the article, I would like to shed light on the different ways human bodies are involved in the fabrication of such displays. In the second part, I will demonstrate how physical contact was also key to their reception, and even something expected and encouraged in the museums. Finally, as I will show in the third part of this article, dioramas themselves were not only museum displays in the first decades of the 20th century, but also the settings for performances that

4 Crary: Techniques of the Observer (as note 3), pp. 20–21.

5 Mary Louise Pratt: Arts of the Contact Zone, in: Profession 1991, pp. 33–40.

6 For a larger introduction and contextualization of dioramas, see Noémie Étienne: Les autres et les ancêtres. Les dioramas de Franz Boas et Arthur C. Parker à New York, 1900, Dijon 2020.

7 Julie Reiss: From Margin to Center: The Spaces of Installation Art, Cambridge 1999. See also Claire Bishop: Installation Art: A Critical History, London 2005.

are today only recorded in photographs. These images have been largely fabricated by the communication and pedagogy department of the American Museum of Natural History around 1910–1930, and are by no means a neutral record of activities. As any kind of source, they have to be understood not only as direct traces of activities, but also as highly staged moments that a variety of actors wanted to be recorded. Nevertheless, this material informs us on the priorities of the museum and the expected reception of dioramas at the time. My argument is that the issue of contact was—and still is—essential, albeit rarely noted by scholars. Dioramas are contact zones and potentially conflict zones. Thus, I intend to dissociate the diorama from the history of photography and cinema, two media with which it is often compared, in order to underline its materiality, its three-dimensionality, and the politics of its fabrication.

1. Bodies in the Making

Anthropological dioramas feature human figures in the way of mannequins. The people represented in such displays are manipulating objects, focusing on activities more or less familiar to the spectator. Franz Boas is a German anthropologist known for having imported such dioramas to the United States at the end of the 19th century. In this context, Boas created two different kind of life groups: picture-dioramas and display-case dioramas, focusing mostly on native populations from the Northwestern Coast of the United States. For Boas, the groups were a bridge to further learning while also being entertainment. They had to be »attractive as well as instructive,«[8] since the first guaranteed the second, and teach the visitor the function of certain artefacts and ceremonies. Thus, the spatial display of the collections was to be both ludic and pedagogic, following a double mandate subsequently reaffirmed by a number of North American museum practitioners who took the American Museum of Natural History as their model.[9]

Plaster mannequins were meant to teach the meaning of objects. Morris Ketchum Jesup, director of the American Museum of Natural History from 1881 to 1908, directly compared the plaster figures within the dioramas with exhibition labels: »Most of the work in the plaster shop is intended to furnish figures which are needed to elucidate the meaning of specimens; that is to say, they serve the

8 Frederic A. Lucas: The Story of Museum Groups. Part 1, in: American Museum Journal 14/1 (1914), p. 6.

9 Henry Fairfield Osborn: The Museum of the Future, in: American Museum Journal 11/7 (1911), pp. 223–26; Maurice A. Bigelow: The Educational Value of the American Museum of Natural History, in: American Museum Journal 11/7 (1911), pp. 234–235.

same purpose as descriptive labels.«[10] In 1911, Frederic A. Lucas, the director of the museum, emphasized again that educational value was found in the relationship of the objects and the figures who used to stage them: »In our ethnological halls you see not only the objects used by strange and far-off people, but the people themselves engaged in the occupations of everyday life.«[11] These displays made artefacts less dependent of evolutionist discourse, contextualizing and foregrounding their function while also »musealizing« them as specimen to be preserved and explained.

Interestingly enough, this physical interaction with the object in order to reveal—that is, fix—its meaning recalls the etymology of the word *display,* which comes from the medieval Latin *displicare,* meaning »deploy« but also »unfold«.[12] In her book on 17th century Roman palaces, Gail Feigenbaum shows that the display of objects such as tapestries, garments, and furniture is the performance by which different social, secular, and religious groups inhabit their apartments and show off their possessions. To exhibit is a practice belonging to the body (of the figure and the spectator) in movement; the word *display* is a verb of both action and result.[13] The diorama gives form to the etymology of the word *display,* unfolding the meaning of an object by deploying fabricated bodies to put it to work.

Native bodies were at the center of such displays. Indeed, the anthropological dioramas of the American Museum of Natural History created by Franz Boas were representing Native Americans performing ritual dances or using tools. Boas used photography to prepare his dioramas, and documented the ceremonies he aimed to picture.[14] At least three images are known for the group representing crafts associated with the cedar tree, one of the first dioramas installed by Boas in the American Museum of Natural History in the late 19th century. These photographs were taken by Oregon C. Hastings, a Canadian commercial photographer based at Fort Rupert in British Columbia and a friend of the Tlingit ethnologist George Hunt, who collaborated with Boas on a study of Kwakwaka'wakw culture, a First Nations people in British Columbia. The first image shows a woman, photo-

10 Report by Morris Ketchum Jesup, 18 May 1898, New York, AMNH, Library Archives, Administrative Files, New York.

11 Frederic A. Lucas: Evolution of the Educational Spirit in Museums, in: American Museum Journal 11/7 (1911), p. 228.

12 Gail Feigenbaum: Introduction: Art and Display in Principle and in Practice, in: Gail Feigenbaum and Francesco Freddolini (eds.): The Display of Art in Roman Palaces, 1550–1750, Los Angeles 2014, p. 11.

13 »A dynamic concept of display is embodied in the thought and performance leading to and responding to the arrangement of things. Display, as opposed to collecting, assumes change.« Ibid., p. 15.

14 On Boas and photography, see Ira Jacknis: Franz Boas and Photography, in: Studies in Visual Communication 10/1 (1984), pp. 2–60.

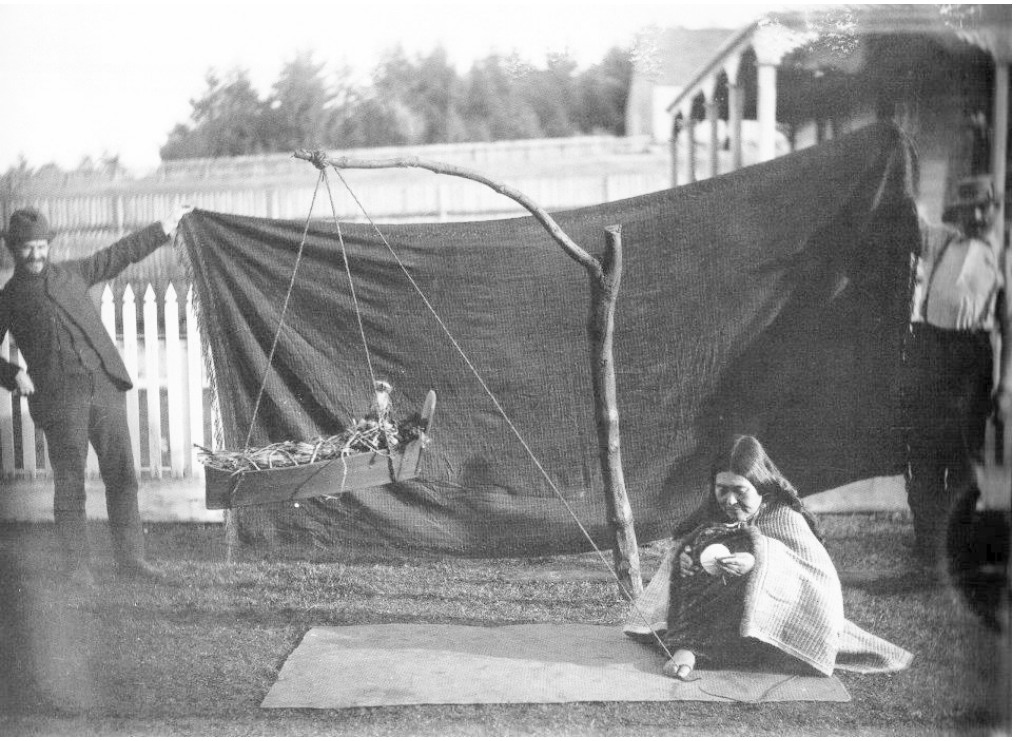

Fig. 1. *A Kwakwaka'wakw Woman Weaving, with Franz Boas and George Hunt Standing behind Her,* Tsaxis (Fort Rupert), British Columbia, 1894.

graphed in profile, shredding cedar bark in front of a large dark blanket.[15] The second shows a similar scene taken from behind the woman, while the man holding up the blanket can be viewed on the right. The third is more explicit about the staging of the image, since the two men holding the blanket (Boas and Hunt) are visible and smiling (Fig. 1). This image reveals the stage machinery of the project. The two people holding the blanket are visible while the woman goes about her activity pretending to ignore their presence. In the background is a form of colonial architecture, perhaps a veranda, where we can see a series of columns, along with picket fences and houses.

The bodies involved in the production of the dioramas are not only the ones fictionally staged of the Native women, but the ones of the anthropologists themselves. Indeed, anthropologists used their own bodies to explain the function of an object or a pose during a ceremony. The anthropologist Aaron Glass studied

15 Ibid., pp. 33–34.

Fig. 2. Franz Boas, *Hamat'sa Coming Out Of Secret Room: Ceremony for Expelling Cannibals* 1895.

the photographs of Franz Boas taken during the construction of the *Hamat'sa Life Group* in 1895, which premiered that same year at the Cotton States and International Exposition (Atlanta World's Fair) before its permanent installation at the National Museum in Washington, D.C. (Fig. 2). The point of departure for this diorama was the field research that Boas had done the previous year on the ceremonies and regalia of the Kwakwaka'wakw. In an effort to communicate to his colleagues the iconography of the initiation ceremony represented in the group, Boas himself imitated the poses that he wished the figures to be given in the corridors of the museum (Fig. 3).[16] Thus, the anthropologist transmitted information not only through the photographs and notes taken during an expedition the previous year to Fort Rupert, Vancouver Island, but also by miming the way in which he wished to see the movements represented.[17]

16 Aaron Glass: On the Circulation of Ethnographic Knowledge, in: Material World (blog), 22 October 2006, under: https://www.materialworldblog.com/2006/10/on-the-circulation-of-ethnographic-knowledge/ (December 20 2019). See also Aaron Glass: Frozen Poses: Hamat'sa Dioramas, Recursive Representation, Making of a Kwakwaka'wakw Icon, in: Christopher Morton and Elizabeth Edwards (eds.): Photography, Anthropology and History: Expanding the Frame, Farnham 2009, pp. 89–116.

17 Alice Beck Kehoe: Boas as Hamat'sa: Appropriate for the Medal for Exemplary Service to Anthropology Award?, in: Anthropology News 47/2 (2006), pp. 4–5. See also Julie

Fig. 3. *Franz Boas Posing for Figure in an Exhibit Entitled »Hamats'a Coming Out of secret room,«* c. 1895.

In addition to anthropologists and models, other people were also involved in the making of dioramas, as a case study of the dioramas made under the supervision of Arthur C. Parker at the New York State Museum in Albany will show.[18] When it was impossible to obtain all the objects necessary for the full realization of a diorama, Arthur C. Parker took the liberty of fabricating them. The example of the garments is particularly striking in this context, since the plaster figures that used to exhibit various specimens (masks, baskets, and so on) also required shoes and garments to clothe them. In this context, he asked two Seneca-Oneida women, Alice Shongo and her daughter Maude (later Maude Shongo Hurd), who were hired to make these accessories. To make this clothing, forgotten techniques had to be relearned. Thus, Parker wrote to Julia Crouse, another Native woman involved in the fabrication of clothes for the dioramas: »Moose hair embroidery is not difficult. We have samples of the work which plainly show the method.«[19] Indeed, museum holdings served as an archive of authentic exemplars and traditional knowledge.

Dioramas present men and women performing manual activities, some of which had partly fallen out of practice. They exhibit historical objects collected by anthropologists in the field and the fabricated pieces commissioned by the museum. In addition, figures of the contemporary Native American craftswomen who had produced some of the items on display were integrated into the installation. Parker made a cast of Maude Shongo during one of her visits to the museum to study its collection of craft work. Her plaster effigy appeared as a basket weav-

Brown: Contesting Images: Photography and the World's Columbian Exposition, Tucson 1994.

18 Noémie Étienne: Memory in Action. Clothing, Art, and Authenticity in Anthropological Dioramas (New York, 1900), in: Material Culture Review 2014, pp. 46–59.

19 Letter from Arthur Parker to Julia Crouse, 6 January 1910, Albany, NYSM, Life Groups, file 9.

er in the *Iroquois Industries* diorama and was surrounded by the baskets she herself had woven. In a vertiginous play of interreflections, dioramas preserved craft knowledge and displayed contemporary objects produced through its revival while also exhibiting the fabricated likenesses of the women and men who made them.

2. Boarding the Canoe

Multiple bodies are involved in the production of anthropological dioramas. First, dioramas are showing mannequins representing people. Second, such displays are made through the physical involvement of scientists, models, artists, and artisans. Furthermore, the bodies of the beholders are also an expected dimension of their reception: indeed, dioramas are the theater of multiple performances, some of them left unrecorded and forgotten today. In the second part of this article, one main case-study will allow me to exemplify this point: the example of a milieu diorama built around a Haida canoe and constructed in the American Museum of Natural History around 1910, four years after Franz Boas left the museum to become a professor at Columbia University in New York. At this time, the canoe was populated by plaster mannequins made by the sculptor Sigurd Neandross. As I will show, children were expected to enter this specific display, allowing a direct and playful contact with the scene (Fig. 4).

The American Museum of Natural history bought the huge canoe at the center of this display in 1881 in British Columbia.[20] By 1884, it was hung from the ceiling of a hall, which is how canoes had generally been exhibited in European curiosity cabinets since the 17th century. The same form of installation was chosen for the Canadian pavilion in the Crystal Palace in 1851, for instance, which was created under the direction of the German architect and theoretician Gottfried Semper, who foregrounded objects made by the First Nations and hung a large canoe from the ceiling.[21]

In New York, the very size of the canoe—about twenty meters long—led the museum to try a number of different means of display.[22] In 1908, at the suggestion

20 The Great Canoe in the Grand Gallery, American Museum of Natural History, under: https://www.amnh.org/explore/news-blogs/on-exhibit-posts/the-great-canoe-in-the-grand-gallery (December 20 2019).

21 Alina Payne: From Ornament to Object: Genealogies of Architectural Modernism, New Haven/London 2012, pp. 52–53.

22 »The monstrous boat hung for many years from the ceiling of the hall, taking its present place in 1908.« Mary Cynthia Dickerson: Herculean Task in Museum Exhibition: Foreword regarding the Ceremonial Canoe Scene in the North Pacific Hall, in: American Museum Journal 10/8 (1910), p. 227.

Fig. 4. *Children viewing the Great Canoe,* 1911.

of the soldier and adventurer George T. Emmons, who had taken part in the Jesup North Pacific Expedition (1897–1902) organized by the American Museum of Natural History, the canoe was transported to the central hall to be part of a diorama. Emmons, Clark Wissler (Boas's successor), and the museum director Hermon Bumpus wanted to use this object as »a great open exhibition case in which to set forth the primitive culture of the Northwest Coast Indians.«[23] As with other similar displays, the installation was originally intended to bring a number of different items together in a single space and allow »attractive use of the rich Northwest Coast materials in the possession of the Museum.«[24] The display underwent considerable change during the 20th century, in particular in its relation to the public. There were nevertheless periods when it was possible to enter this diorama. In a photo dating to 1911, the year in which the group was inaugurated, children are climbing into the canoe (Fig. 4).

23 Ibid.
24 Ibid.

In the 1950s, however, the museum put barriers in place to prevent people from accessing the canoe. Thereafter, in accordance with the patrimonial regime that separates objects from the public, the only people who could touch it were the restorers. In the early years of the 21st century, the canoe was again hung from the ceiling—in the Grand Gallery, where it can still be seen today. Touch, even when forbidden, remained an integral part of the reception of the canoe. Holden Caulfield, the young protagonist of J. D. Salinger's novel *The Catcher in the Rye* (1951), recounts his fascination with the canoe, which is intimately linked with involuntary but real and repeated contacts with the object:

»I loved that damn museum. I remember you had to go through the Indian Room to get to the auditorium. […] Then you'd pass by this long, long, Indian war canoe, about as long as three goddam Cadillacs in a row, with about twenty Indians in it, some of them paddling, some of them just standing around looking tough, and they all had war paint all over their faces. There was one very spooky guy in the back of the canoe, with a mask on. He was the witch doctor. He gave me the creeps, but I liked him anyway. Another thing, if you touched one of the paddles or anything while you were passing, one of the guards would say to you, ›Don't touch anything, children,‹ but he always said it in a nice voice, not like a goddam cop or anything.«[25]

Thus, even long after direct interaction with the canoe was prohibited by the museum, the memories of its reception are connected to furtive, subtle (yet illegal) physical contact.

The numerous photographs in the museum's archives featuring children testify both to the pedagogical efforts of the American Museum of Natural History (and other museums on the East Coast of the United States) and to the importance attributed by the museum to keeping an archive of its activities. The dioramas were one of the high points of organized school visits, as we know from the photographs of the time but also from the memories of many New Yorkers. The dioramas afforded an experience mediated by touch and play. Around the turn-of-the-century, this ludic dimension was essential. The narrativization of objects in dioramas, achieved through the bodies of figures and visitors, maps onto the way in which the mannequins themselves were ›brought into play‹. This distinguishes the diorama from other media such as painting or photography: the diorama involves a sort of performance, whether physical or symbolic. The diorama represents an action and is the locus of an experience: the spectators' interactions with it are partly anticipated by the artists and curators of the museum.

25 J. D. Salinger: The Catcher in the Rye, New York 1962, pp. 126–27.

This type of interplay was ludic, pedagogic, and entertaining. It was also certainly political. Milieu dioramas in particular were places where non-Native adults and children were able to observe but also to interact with (often misrepresented) Indigenous culture. In the late 19th century, Native Americans, as an abstract concept rather than a living and plural reality, gained authenticity (but without loss of exoticism) and were moved from the status of »alien savages« to that of »first Americans.«[26] Between 1880 and 1920, the massive and continuous arrival of immigrants, notably from Southern and Eastern Europe, profoundly transformed North American society. Defining »Americanness« had become a priority, and one of the mechanisms for this was the establishment of a direct line of descent between Native Americans and the »New« Americans.[27] That rhetoric became possible only when white people began to see Native Americans as less menacing—that is, once a large part had been killed or confined to reservations. The 1880s marked the end of the most intense armed conflict between Native Americans and the U.S. government. Precisely at this time, the United States saw a proliferation in popular culture of performances and spectacles featuring white people—and sometimes Native Americans too—»playing Indian.«[28] Studying the phenomenon, scholars such as Philip Deloria and Rayna Green argue that constructing and reenacting the characters of »the Indian« and »Indianness« in performances, costumes, and holiday camps made it possible to create and develop a specifically American identity.[29] Anthropological dioramas created in the United States around 1900 were among the devices that—like other phenomena such as musicals, historical reconstitutions, and reenactments—paved the way for the assimilation and appropriation of Native American culture and history into the development of an American identity.

26 »By an ironic semantic twist, by the end of the 19th century, the same Euro-Americans who had once viewed American Indians as alien savages came to embrace them as the true, the natural, the ›first Americans,‹ icons of the nation and its territory.« Alan Trachtenberg: Shades of Hiawatha: Staging Indians, Making Americans, 1880–1930, New York 2004, p. 10.

27 Leah Dilworth: Imagining Indians in the Southwest: Persistent Visions of a Primitive Past, Washington, D.C. 1996, p. 184.

28 Rayna Green: The Tribe Called Wannabee: Indian in America and Europe, in: Folklore 99/1 (1988), pp. 35–36.

29 Philip J. Deloria: Playing Indian, New Haven 1998.

3. Dioramas and/as Performance

Unlike milieu dioramas, which the spectator can enter, picture dioramas and display-case dioramas are frontal installations where the interplay with the scene is not happening physically. Yet many displays showing mannequins and anthropological artefacts in a mimetic setting are complicating this typology: They show the variety of displays created in New York in the first decades of the 20th century in order to be activated by the beholder's body. In the third part of this article, I will argue that such displays are connected to other forms of activities typical of the period, like tourism and scouting. On the one hand, such dioramas are generating movements such as travels to the Southwest. On the other hand, actions are also taking places in the museum itself, transforming such installations into a setting for performances that have not always been recorded.

One of such installations presented a tepee, which could be seen in the Hall of American Indians at the American Museum of Natural History in 1907, the date at which it was photographed. The two photographs documenting it show the opening in the tepee through which people are looking at the scene unfolding inside. In the first image, a group of children—monitored by one of the museum guides—peers in. For the second image, the photographer positioned himself and his camera in front of the opening so that we all can see a woman preparing a fire. Inside the tepee, the figures seem to look out at the spectator as if they have been surprised at their activities. In this example, the display is animated when visitors activate the object with their imagination and perceive the figures reacting to their arrival. Such staging resembles those at the universal expositions and world's fairs of the 19th century, where visitors watched autochthonous performers demonstrate everyday activities.

Another activity at the frontier between performances, observation, learning and interacting with Indigenous people at the time is tourism. At the end of the 19th century, visits were organized for tourist to the Southwest of the United States, in order to observe performances and dances that were described as particularly interesting and preserved, such as the Moki or Hopi Snake Dances in Arizona. In this context, the tourist can also be playing at the frontier of the specimen, and, while doing so, posing for photography. Between 1895 and 1896, the art historian Aby Warburg traveled throughout the United States. He came from Germany for his brother's wedding, disembarking in New York, where he met Franz Boas. In 1896, he visited the Southwest, in particular Arizona, New Mexico, and California. During his trip, he had himself photographed with a Kachina mask on his head but not lowered over his face, which gave him a borderline interaction with the object that could be described as ›touristic.‹ He located himself symbolically

Fig. 5. *Doing Indian Dances,* Hall of Plains Indians, 1939.

between participation and observation, creating an experience for himself that was at once ludic, simulated, and real.

Moreover, tourism generated dioramas as much as dioramas generated tourism. In 1923, while a patient at the Bellevue sanatorium in Kreuzlingen, Switzerland, Warburg gave a lecture about his trip to the United States.[30] Warburg had attended an Antelope Dance performance in the Pueblo de San Ildefonso in New Mexico, not far from Santa Fe, during which the dancers' movements reenacted those of their totem animal. When Warburg returned to Arizona after his stay in California, in late March 1896, he and his guide visited the villages of Walpi and Oraibi and witnessed a Kachina Maize Dance. During the 1890s, Warburg also attended a series of performances that were given recognition in the national

30 Aby M. Warburg: Schlangenritual: Ein Reisebericht, Berlin 1988. That book is a translation of A Lecture on Serpent Ritual, in: Journal of the Warburg Institute 2 (1938–39), pp. 222–292, which is itself a translation of a compilation of Warburg's lecture notes from 1923.

press.[31] Warburg did not witness the Snake Dance, which is held every August alternately in the villages of Walpi and Oraibi. His knowledge of the ceremony was garnered from images in books and in particular from the tourist brochures he owned, but also likely from dioramas. In 1923, when Warburg was giving his lecture at Kreutzlingen, dioramas representing the Hopi Snake Dance were omnipresent in museums and certainly contributed to the interest of Warburg and his audience in the ceremony. Indeed, the Snake Dance quickly became a must for dioramas created after the First World War.[32] Seemingly every institution had to have one, whether miniature or life-size. Their view might have stimulated Warburg and others to go west and develop their own experience of the scenes dioramas depicted.

In the museum, performances were also realized in front of dioramas. These are parts of the display that are mainly lost to us today, but dioramas were often the stages of actions orchestrated in order to invite mostly non-native children to integrate part of native culture. Indeed, after the pedagogical reforms undertaken around the turn of the century, children constituted the institution's key audience. In a revealing fashion, a photo from 1939, titled *Doing Indian Dances,* shows the same tepee I mentioned earlier, but this time the children are pictured (Fig. 5). Girls and boys are dancing in front of the tepee. On their heads they wear paper headdresses, and they are brandishing cardboard weapons. The scene is caricatural, but it shows the bodily exercises favored by the museum in imitation of Native American practices. This game was not only organized inside the museum, it was photographed there. Dioramas were no longer a form of display; rather, they became decor, a sort of backdrop to the children's play that the museum wanted to be recorded.

The images of costumed young children in front of a tepee are reminiscent of other contemporary projects that involved children, such as the Boy Scouts of America, which was founded by Ernest Thompson Seton in 1910. Seton also organized summer camps for young girls and boys; a photo of one of the camps shows a group of children in front of a tepee. The name of this imaginary tribe, Sinaway (away with sin), accurately articulates Seton's objectives: »playing Indians« made it possible for young people to rediscover an authentic world far from a civilization that he considered »a failure.«[33]

31 Dilworth: Imagining Indians in the Southwest (as note 27), p. 21.

32 Ibid., pp. 21–75.

33 »Our system has broken down. […] Our civilization is a failure. Whenever pushed to its logical conclusion, it makes one millionaire and a million paupers. There is no complete happiness under its blight.« Ernest Thompson Seton: Gospel of the Red Man: An Indian Bible, Garden City 1939, p. 117, quoted in Dilworth: Imagining Indians in the Southwest (as note 27), p. 99, see also p. 103.

Finally, a last example is shedding light on how the reception of dioramas implies a physical, bodily, movement-oriented response. To conclude this third part, I would like to suggest that the dioramas seen at the Museum of Natural History in New York had repercussion a couple of decades later in another museum in the city, namely the Museum of Modern Art. In 1941, the exhibition *Indian Art of the United States*, curated by Frederic H. Douglass and René d'Harnoncourt, opened at the MoMA and underlined the link between Native American objects and Euro-American culture.[34] In contemporary discourse about this exhibition, but also in the historiography as it has developed since the 1990s, dioramas have been presented as the model of display that was avoided. Alfred H. Barr Jr., MoMA's first director, later described the 1941 exhibition as a major museographical innovation that had avoided both »the purely aesthetic isolation and the waxworks of the habitat group.«[35] For art historians such as Susan L. Meyn and W. Jackson Rushing, their abandonment was a breakthrough, inaugurating a new mode of existence for ethnographic objects as art. Meyn writes,

»Even though there had been discussions about presenting ethnographic items for their inherent aesthetic qualities, particularly in the Southwest and at the Museum of Northern Arizona, the 1931 exposition displayed Indian objects—baskets, pottery, weaving, quillwork, and easel paintings—as art. Objects in the exhibit were not shown in a typical, scientific museum setting—that is, a natural history diorama.«[36]

Yet the rupture between dioramas and the exhibitions instituted by the Indian Arts and Crafts Board was by no means as simple as one might think. Indeed, it is worth noting that d'Harnoncourt's 1941 exhibition at the MoMA also included performances, such as that of the sand painters. Photographs of this performance are similar to those taken of the dioramas at the American Museum of Natural History about twenty years before, and suggest that dioramas had an (most likely unwanted) echo in a museum such as the MoMA. And even if this show is well known for being somehow a rupture with earlier, more ethnographic or nature historical displays, it is interesting to note that actually such performances repro-

34 Frederic H. Douglas and René d'Harnoncourt: Indian Art of the United States, New York 1941, p. 8.

35 Statement by Alfred H. Barr Jr., in: René d'Harnoncourt, 1901–1968: A Tribute, New York 1968, n.p.; quoted in W. Jackson Rushing: Marketing the Affinity of the Primitive and the Modern: René d'Harnoncourt and *Indian Art of the United States*, in: Janet Catherine Berlo (ed.): The Early Years of Native American Art History: The Politics of Scholarship and Collecting, Seattle 1992, p. 194.

36 Susan Labry Meyn: More than Curiosities: A Grassroots History of the Indian Arts and Crafts Board and Its Precursors, 1920–1942, Lanham 2001, p. 59.

duced earlier traditional dioramas from the Museum of Natural History, just a little down north in the city. In this context, the performers imitate the diorama as much as the diorama imitates the performers.

4. Conclusion

Dioramas created in New York around 1900 are way more than bi-dimensional images whose fabrication is anticipating the invention of photographs or movies. They are tri-dimensional, multimedia displays whose physicality should be considered. First of all, their making includes different kinds of bodies, such as the ones of the models and anthropologists who made them, be it through casts, clothes productions, or bodily transmission of knowledge. Second, their reception is also physically acted out by the beholders, as the existence of so many photographic documents produced inside the institution attest. Children in particular were expected to interact with the plaster mannequins and even with the material culture preserved in the museum. Indeed, dioramas generated actions: the beholders experienced a simulacrum of native culture in front of dioramas through the reenactment of prototypical dances and ceremonies, and even travelled further away in order to visit some of the places depicted in the museum.

Furthermore, I suggest in this article a broader definition of the diorama, not only as a multimedia installation mixing sculpture and painting in a mimetic scene, but also as a place of physical, bodily experience. Around 1900 in the United States, the actors involved in the making of such displays called them »Life Groups« rather than »dioramas.« For instance, Boas used the words »life groups« or »installation«[37] to describe the examples mentioned above. In the view of his contemporaries, what such displays have all in common is a mix of instruction and entertainment. Indeed, the installations mentioned above were produced in order to address this concern: allowing a pedagogical yet entertaining mediation of knowledge in the museum. Furthermore, all of them are connected to a potentially active, contact-based form of reception. Defining the diorama in a historically correct perspective should therefore not only be made through a formal analysis aiming to underline visual similitudes between displays, but can be even more productive (and exact) when approached through the lens of the time, namely as a place for performances allowing both teaching and playing, knowledge production and mediation.

37 Claude Imbert: Boas, de Berlin à New York, in: Michel Espagne and Isabelle Kalinowski (eds.): Franz Boas: Le travail du regard, Paris 2013, p. 16.

To conclude, I would like to share an anecdote showing how diorama are still materially embodying memories. Indeed, their archival dimension (as noted in the example from Albany) is still generating performances today. Even if the context has drastically changed, and if certain of such displays are currently dismantled or strongly criticized,[38] other dioramas function as sources for Native communities. Indeed, dioramas do not only have a materiality but a form of temporality and exist over time. In 2019, I attended a talk in New York given by the Kwakwakaw'kaw activist Andy Everson (a descent of George Hunt whom I mentioned earlier in his work with Boas).[39] Everson explained that he and his community were actually reenacting Boas's dioramas as part of their own culture that had been greatly attacked and destroyed between the early 20th century and today. As they were lacking sources and records, he suggested observing such dioramas as archives in order to reproduce some of the ceremonies lost in time—despite the fact that, as we have seen, such displays were highly staged. However, as mimetic displays made by an important anthropologist working in connection with a native informant, Boas's dioramas are considered today as valuable enough to be used as information sources. In this case, the performance potential of the dioramas I studied in this article is reactivated one more time. Because of their mimetic dimension, they further generate the reproduction of certain gestures by Native people. As much as dioramas were imitating—and therefore, as Eco stated, inventing (hyperreal) actions and performances, they were—and still are—producing new realities.

Picture credits:

Fig. 1: New York, American Museum of Natural History. Photo: Oregon C. Hastings. American Museum of Natural History Library, image no. 11604.

Fig. 2: National Anthropological Archives, Smithsonian, Wahsington DC.

Fig. 3: The Smithsonian Museum, Washington DC.

Fig. 4: New York, American Museum of Natural History. Photo: Julius Kirschner. American Museum of Natural History Library, image no. 33596.

Fig. 5: New York, American Museum of Natural History. Photo: Thane Bierwer. American Museum of Natural History Library, image no. 291194.

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38 See for instance Ana Fota: What is Wrong with this Diorama? You Can Read All About It, in: New York Times, March 20, 2019, under: https://www.nytimes.com/2019/03/20/arts/design/natural-history-museum-diorama.html (December 20 2019).

39 Andy Everson: A Book of Treasures: Utilizing Hunt-Boas Texts in the Contemporary Kwakwa̱ka̱'wakw Potlatch, Symposium *Field/Fair/Museum,* February 15 2019, Bard Graduate Center, NYC, under: https://www.bgc.bard.edu/events/925/15-feb-2019-symposium-field (December 20 2019).

Fig. 1

Global Networking and the Contrapuntal Node

The Project Mercury Earth Station in Zanzibar, 1959–64[1]

Lisa Parks

The photos on the opposite page reveal the ruins of a US satellite tracking station on Zanzibar (see Figure 1), a semi-autonomous island that is now part of Tanzania and home to a community of citizens of African, Arab, and European descent. In 1960 the US government and British protectorate of Zanzibar, signed an agreement that allowed US contractors working for the National Aeronautics and Space Administration (NASA) to build an earth station that would support Project Mercury, the first US manned satellite mission.[2] The facilities, which cost $3 million USD[3] were constructed in the villages of Tunguu and Chwaka on the cusp of Zanzibar's revolution for political independence. Ruled for centuries by the Sultan of Oman, and a site of slave trade until 1897, the island became a British protectorate in 1890. Sir George Mooring, who served as the British Resident from 1959–1964 handled the Mercury station matter on behalf of the Sultan of Zanzibar, Sayyid Sir Abdullah bin Khalifa Al-Said, who reigned from 1911–1960. By the late 1950s, a medley of opposition leaders and parties, including the Zanzibar Nationalist Party, the Zanzibar and Pembe Peoples Party, Umma Party, and the Afro-Shirazi Party, challenged the dynasty's legacy of socio-economic and racial oppression. Because of this, the Project Mercury station's construction was embroiled in a web of political conflicts and concerns.[4]

1 I am grateful to the IKKM for a fellowship in May–July 2018, during which time I drafted this article. I also thank Matthew Graydon and Harun Maye for their helpful assistance, and IKKM fellows for their helpful questions and comments on an early version.

2 Enclosure No. 1 (Final Agreement for Mercury station in Zanzibar), Embassy of the United States of America, No. 115, signed by John Hay Whitney, Oct. 14, 1960. Folder 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

3 Hedrick Smith: U.S. Will Remove Zanzibar Station, in: The New York Times (April 8, 1964), https://www.nytimes.com/1964/04/08/us-will-remove-zanzibar-station.html (31 May 2018).

4 For further discussion see Don Petterson: Revolution in Zanzibar: An American's Cold War Tale, Boulder 2002.

I became interested in the history of this earth station during a research trip to Tanzania in January 2018. I went to Tanzania and Zanzibar to continue media infrastructure research I had conducted in neighboring Zambia from 2012 to 2016, and, specifically, to try and understand more about the various facilities and labor practices involved in moving internet traffic from undersea cable landings off the coast of Tanzania, through national fibre optic systems to local communities in southern Africa's rural interior. I stumbled upon the Project Mercury ruins somewhat by accident. After a site visit and informal interviews with individuals who now live in that area, I decided to probe further and submitted Freedom of Information Act (FOIA) requests to the US State Department, NASA, and the USIA, and gathered and reviewed archival records. I suggest that these ruins (see Figure 1) incarnate a significant moment in the history of global networked communication, a moment in which the US further elaborated diplomatic, technical, and financial processes for installing interlinked telemetry and tracking stations in and across others' sovereign territories.[5] This, of course, was not the first time the US had installed tracking stations. In 1957, in response to Sputnik's launch, the US military established a chain of satellite tracking stations known as the Minitrack Network across Cuba, Panama, Ecuador, Peru, and Chile to monitor the Project Vanguard satellite, which exploded on its launch pad.[6] As Pedro Ignacio Alonso reminds us, many satellite earth stations have been installed in the »global south.«[7] Yet as Christine Evans and Lars Lungren observe in their research on Inter-sputnik, the international history of earth station development and the collaborations it required remain relatively unknown in media and communication studies.[8] To address this gap, Alonso calls for a »space archaeology« that considers »things moving,« ranging from relayed signals to orbiting satellites, and suggests that earth station infrastructure »moved in different directions and at different speeds« and generated »a framework for our current ecology of communication […].«[9]

5 Saul Gass: Project Mercury's Man-in-Space Real-Time Computer System: You Have a Go, at Least Seven Orbits, in: IEEE Annals of the History of Computing 21/4 (1999), p. 37.

6 Pedro Ignacio Alonso: NASA in Chile: Technology and Branding of a Satellite-Tracking Station, in: Design Issues 33/2 (April 2017), pp. 31–42.

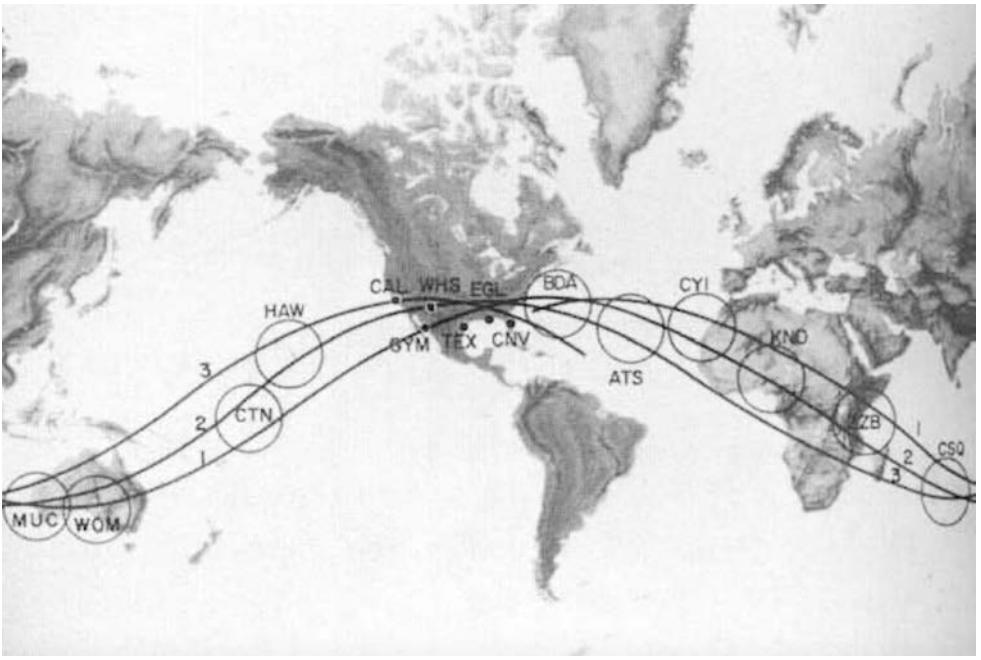
7 Pedro Ignacio Alonso: Introduction: Towards an Archaeology of Things Moving, in: Pedro Ignacio Alonso (ed.): Space Race Archaeologies, Berlin 2016, p. 7. Also see Peter Redfield: Space in the Tropics: From Convicts to Rockets in French Guiana, Berkeley 2000.

8 Christine Evans and Lars Lungren: Dividing the Cosmos? INTELSAT, Intersputnik, and the development of transnational satellite communications infrastructures during the Cold War, in: Mari Pajala and Alice Lovejoy (eds.): Remapping Cold War Media: Institutions, Infrastructures, Networks, Exchanges, Bloomington, Indiana 2020.

9 Alonso: Introduction (as note 7), p. 6.

To contribute to this space archaeology, this article focuses on the development of the Project Mercury earth station in Zanzibar during the period, 1959–1964. To historicize the earth station's establishment, I adopt a nodal approach and combine archaeological, archival, and phenomenological methods in an effort to bring forth the geopolitical and sociotechnical relations that resulted in the Zanzibar station. My discussion moves from a general description of Mercury's »world-wide tracking« network, to an analysis of Zanzibari opposition to the station, to a recounting of the building of the station in the midst of this opposition. This earth station, not only contributed to the science of satellite tracking and telemetry, it was an essential node in the first »world wide tracking network« to rely on real-time computing to monitor a manned satellite.[10] What is not as well known, however, is the precarious geopolitical fulcrum upon which the Zanzibar Mercury station's precise measurements were taken. Given this, I define the station as a *contrapuntal node*—as a site opposed by local publics—to raise questions about the histories and materialities of other network facilities that have been built against peoples' will. While network extensions and occupations have been structural to colonial power, Africans' responses to and involvement in the formation of particular network nodes is much lesser known. These material relations are significant as they helped to shape early global real-time computing networks that became precursors of the internet and world wide web. As Wendy Chun argues in her crucial research on network cultures, the democratic potential of communication technologies stems from vulnerabilities rather than control. She urges critics to engage with multiple layers and dimensions of networks and to »refuse easy assertions of freedom at one level that cover unfreedom at another.«[11] Building on Chun's proposition, in this article I reframe the investigation of network dialectics of freedom and control in relation to the material construction of a node and excavate the social struggles that give life to global networking.

10 Gass: Project Mercury's Man-in-Space Real-Time Computer System (as note 5), p. 37.
11 Wendy Chun: Control and Freedom: Power and Paranoia in the Age of Fibre Optics, Cambridge, MA 2008, p. 297.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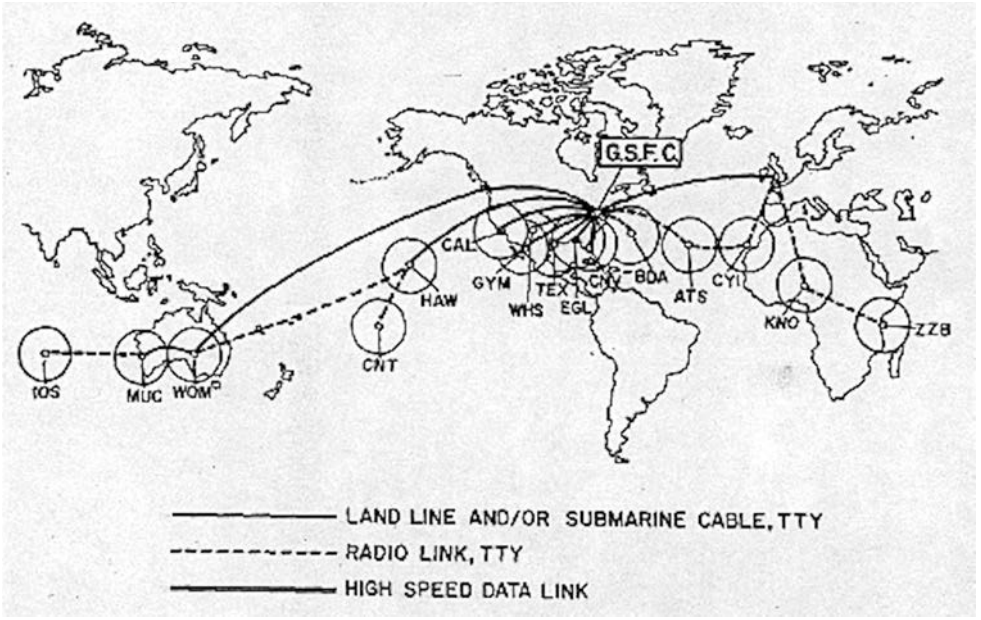
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1. Project Mercury's »Worldwide Tracking Network«

A total of eighteen earth stations made up the Project Mercury Network. Fourteen of them were range stations, among them two ships in the Atlantic and Indian Oceans, situated along the track of Mercury's orbit and had to be constructed on a tight schedule (see Figure 2). To build these stations the US entered agreements with seven countries: Australia, Bermuda, Mexico, Spain/Canary Islands, UK/Nigeria, UK/Zanzibar, Kanton/Polynesia. Stations in these countries »made radar observations of the spacecraft position, communicated by voice with the astronaut, received telemetry signals from the spacecraft […]« and were integral to the global network's operation.[12] Each station had a range of 700 nautical miles (1,300 km) and a satellite pass typically lasted seven minutes.[13] Observations from each station were Teletyped and sent by land line, submarine cable, or radio link to the Goddard Space Flight Center computers for orbital refinement.[14] The circuit map (see Figure 3) reveals that this real-time computing network was far from uniform and was contingent upon a hodge podge of segments, including submarine cables, landlines, radio and high-speed data links, and two »alternate routes.«

Since so many earth stations had to be newly constructed on a simultaneous schedule, NASA contracted Western Electric Company to administer this process and hire subcontractors. IBM developed computing systems, Bendix Corporation installed radar, telemetry and display equipment, and Burns and Roe handled engineering and construction of fourteen tracking stations around the world.[15] Foreign locations were selected after site visits and assessments by teams of State Department representatives and teams of Burns and Roe surveyors. While State Department officials met with local authorities to address political considerations, siting of the station, labor, and financial issues, survey teams »spent several days at each prospective site checking soil conditions, topography, water, sewage disposal, communications, transportation, electric power, and climate.«[16] The team then prepared a comprehensive report on each site explaining the basis for selection and suggesting equipment design and location. They also provided preferred and alternate locations for each ground station. Since Mercury was a *manned* satellite, these stations were considered »lifelines,« and redundancies were built in at every level.

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12 Gass: Project Mercury's Man-in-Space Real-Time Computer System (as note 5), p. 43.

13 John Catchpole, Project Mercury – NASA's First Manned Space Programme, (Chichester, UK: Springer Praxis, 2001), pp. 121, 126.

14 Gass: Project Mercury's Man-in-Space Real-Time Computer System (as note 5), p. 43.

15 Ibid., p. 40.

16 Niles R. Heller, et al: MERCURY PROJECT SUMMARY (NASA SP-45), in: NASA History website, undated, https://history.nasa.gov/SP-45/ch8.htm (31 May 2018).

2. Project Mercury in Zanzibar

Plans for the Mercury station in Zanzibar commenced in August 1959. Following a site visit by a Burns and Roe staff, the US State Department began drafting an agreement with Britain and Zanzibar modeled on the one signed by the Canary Islands and Spain. The agreement enabled the US to construct, install, equip, and operate two facilities on the island of Zanzibar—a tracking/receiving station in Tunguu and transmission station in Chwaka. It stipulated that the US would lease the land, pay for road construction, operate power generators on site, and work with the island's Cable and Wireless authorities to secure a radio frequency allocation and run telecommunication cables to the two sites. Given multiple layers of bureaucratic review and discussion, the contract was not signed until more than a year later, in October 1960, even though construction of the station began in April.[17]

US records from NASA, the US State Department, and USIA reveal a tense and challenging political environment in Zanzibar during the agreement's development and station construction, and highlight local political leaders' and parties' opposition to the Mercury station. By 1959 multiple parties were asserting Zanzibar's political independence, and the Mercury station became a key issue. Concerned that the station was a actually US military project or a »rocket base,« 10,000 Zanzibaris participated in a protest against the installation in June 1960.[18] Zanzibar Nationalist Party (ZNP) leader Ali Mushin condemned the station's establishment, described it as a »danger to the whole of Africa,«[19] and insisted Zanzibar should not become a »›pawn‹ in imperialists' struggle.«[20] The ZNP asked Britain to revoke permission given to the US government to install the station, even though the agreement had not yet been signed. On July 10, 1960, at a ZNP demonstration attended by 4000 people, a rocket was burned in effigy and party leaders demanded the US abandon »its base.«[21] Opponents drew political cartoons protesting the station on neighborhood walls. Some Zanzibaris were so opposed to the US out-

17 Overall Mercury Network Schedule, undated, available at: https://history.nasa.gov/SP-45/fig8.15.htm, (23 December 2019).

18 Memo from Dar es Salaam (Duggan) to Secretary of State, June 15, 1960, Folder: Zanzibar Communications Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

19 Ibid.

20 Ibid.

21 Secret: Project Mercury Installations in Africa, Bloc, Cairo and African Reactions, July 15, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

Fig. 4

post that they sabotaged what they thought to be Mercury-related equipment, cutting four communication cables.

The ZNP integrated news about Mercury in its pamphlets, posters, and press stories,[22] and the party's demonstrations were interwoven with a broader pan-Africanist movement against the militarization of Africa. Delegates at a July 1960 Pan-African union conference in Cairo, demanded that all military and satellite tracking stations be eliminated from Africa due to concerns about militarization.[23] In October 1960, Wera Ambito, representative of Kenya African National Union, exclaimed, »these bases will be used to suppress our national movement for freedom and independence and therefore we will persistently oppose them.«[24]

22 Ibid.

23 News story in *Tanganikya Standard*, July 2, 1960, referenced in: Secret: Project Mercury Installations in Africa, Bloc, Cairo and African Reactions, July 15, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

24 Kenya Nationalist Scores U.S. Bases, Oct. 19, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

Apparently unwilling to recognize that Zanzibaris, and Africans more broadly, might have legitimate reasons for opposing the Mercury station (e.g. struggles against colonization; not wanting to give up fifty acres of precious farm land), US officials interpreted Zanzibaris' opposition through the rubric of the Cold War, and characterized the resistance as the result of »bloc« propaganda and influence by what US officials referred to as »ChiComs,« Chinese communists. A July 15, 1960 US State Department memo marked »secret« recounted anti-Mercury propaganda coming from Moscow, Bejing/Peking, East Germany, and Cairo. The memo highlighted a Russian broadcast that applauded »the peoples of Zanzibar [who] took practical steps against the [US] plot by damaging the equipment intended for launching missiles while it was being unloaded from ships.«[25] Chinese organizations, the memo continued, sent messages congratulating Zanzibaris for demonstrating »against the U.S. imperialist attempt to establish a rocket base on Zanzibar.«[26] In July 1960 the Soviets allegedly published another report describing Mercury stations as »fronts« for military activity.[27] According to the US State Department, »bloc propaganda« repeatedly invoked US deception around the U-2 spy plane incident in May 1960. The Soviets shot down a US U-2 spy plane illegally flying through Soviet air space. Initially, US officials lied about the U-2 mission and claimed it was a NASA weather plane, leading »bloc propaganda« to conclude that just »as NASA weather planes concealed U-2 espionage so [the] MERCURY program conceals [a] sinister purpose.«[28]

In late August 1960, Western Electric's Zanzibar site manager, Paul Pedersen, reported a »steady and strong anti-Mercury campaign […] kept very much alive in certain local papers, edited and distributed with official assistance from the Chinese communists […].«[29] Pedersen anticipated that with upcoming Zanzibari

25 Secret: Project Mercury Installations in Africa, Bloc, Cairo and African Reactions, July 15, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives. Also see Airgram from Amconsul Dar es Salam (Duggan) to Department of State, Oct 4, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

26 Ibid.

27 Attachment A (transcription of Soviet report): U.S. Bases Network Threatens Peoples: Missile Base in Zanzibar, July 2, 1960, Folder: 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

28 Secretary of State Memo, Sept. 3, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

29 Letter to Goethius from Pederson, Aug. 26, 1960, Folder 1960, 14. Scientific Research &

elections in January 1961, it may be challenging for British hosts to »counteract Nationalists' demand that Mercury get out and stay out.«[30] Given this, he suggested outfitting »another« ship off the island's coast to take the place of the Zanzibar earth station if needed.[31] Other ships were already deployed in the Atlantic and Indian Oceans as part of Project Mercury's global network.

While socialist movements in East Africa may have been influenced and supported by the Soviets and Chinese, it is important to recognize Zanzibari and pan-Africanist political imaginaries and agencies rather than simply absorb them into East/West »blocs« and Cold War geopolitical strategies. Months after the Mercury station was constructed, in May 1961, ZNP leader, Ali Muhsin continued to critique the Project Mercury station, claiming that »no amount of imperialist's whitewashing […] could alter the views of the Zanzibar people against the base« and that those in Zanzibar are aware of the »dangers of neo-colonialism.«[32] Building on this position, the ZNP publication, *ZANEWS*, published a August 1961 article entitled, »Against Rocketizing Zanzibar,« which indicated leader Abdulrahman Mohamed Babu attended a memorial in Japan to honor victims of the US atomic bombings in Hiroshima and Nagasaki during World War II, and pointed out the Mercury station could make the island a target of similar such »extermination.«[33] Such discourses suggest that Zanzibaris' opposition to the Mercury station appeared to be grounded as much in anti-colonialism and anti-militarization as in »bloc« alliances.

In addition to reading Zanzibaris comments through the framework of the Cold War, US officials responded to the opposition by publicizing the »civilian« and »scientific« nature of Project Mercury.[34] US staff were advised to indicate, »there is nothing secret about this project which is a civilian project concerned with manned space flight and is of a pure research character.«[35] A 1961 USIA Infoguide

Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

30 Ibid.

31 Ibid.

32 Consulate General Despatch No 239, May 2, 1961, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

33 Memo from American Consul – Zanzibar including transcription of complete text of lead article in Aug. 9, 1961 edition of ZNP publication, ZANEWS, Aug 14, 1961, Folder: Zanzibar Communications Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

34 Pedro Ignacio Alonso: NASA in Chile: Technology and Branding of a Satellite-Tracking Station, in: Design Issues 33/2 (2017), pp. 31–42.

35 Memo to Tully from Schmertz, July 2, 1960, Folder: 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

stressed the importance of mentioning that Mercury is »civilian in character and direction« and that tracking stations »are open to visits by the public.« The guide emphasized that US »defense« only plays a »supporting role« and »the term missile should not be used in publicity.«[36] A March 1961 USIA Infoguide urged: »We should emphasize at all times the purposes of Mercury. This is a valid scientific program, not a stunt.«[37] Finally, a USIS memo that belittled the Zanzibari opposition pointed to confusion among Africans about different space technologies, stating »the African is hard to convince of this technical difference between satellites, rockets, missiles and warheads. In translation the difficulty is compounded.«[38]

Perhaps African confusion was warranted, however, given that both US military facilities and aircraft *were* used to support Project Mercury, complicating designation of it as purely »civilian« and »scientific.« Seeking to resolve such confusions, NASA's staff felt an information campaign should have come much earlier and claimed, the »Zanzibar ›flap‹ would not have happened if USIA had been able to soften up the island with a six month campaign of careful, discreet dissemination of information about the project.«[39] Given Zanzibari opposition to the Mercury station, British Resident Mooring asked that no US publicity or informational counter-campaign be circulated as he was concerned this would stoke the flames before the January 1961 election and take Zanzibar's viable struggle for political independence process off-course. Beyond this, US records make clear that a *second*, lesser known, US military earth station *had been* established on Zanzibar

36 USIA Infoguide no. 61–66, June 12, 1961, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

37 USIA Infoguide re: Project Mercury to All USIS Posts, Mar 13, 1961, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

38 USIS Lagos to USIS Khartoum, Aug 15, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives. Also see Note for Policy: Zanzibar File, July 18, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

39 Memo to Ehrman from Belcher, July 28, 1960. Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives. There were disagreements, however, about dissemination of local publicity about Mercury in Zanzibar. NASA and the State Department felt that no publicity should be circulated until an agreement was signed between the US and UK, but officials in NASA-IAA and USIA felt it should have come earlier to build Zanzibari support for and acceptance of the station.

to support Project Courier, a US Army Signal Corps satellite project.[40] Given the anti-militarization position of Zanzibaris, Mooring insisted in June 1960 that the Courier station be removed from the island. The US agreed and spent $5 million to move the facility to Southern Rhodesia »in order to give Mercury fairest winds possible in Zanzibar.«[41]

3. Building the Project Mercury Earth Station

Despite Zanzibari opposition to the Mercury station, the US and UK colluded to support its development. To build the Mercury station in Zanzibar, materials and equipment were transported via African Lightning, a ship operated by Farrell Lines, a subsidiary of U.S. Steel Corporation. The ship left Brooklyn on May 18, 1960 and arrived in Zanzibar Town on June 24, 1960.[42] The bill of lading reveals a list of Mercury-related equipment, 7 boxes of transformers, building materials, 2 trucks, 1 jeep, tires were brought into Zanzibar.[43] Though all of these materials entered Zanzibar duty free, per the agreement between the US and Britain, the British embassy in London advised the US not to call attention to the Mercury project in the marking of containers, as there were intensifying concerns about potential sabotage of the cargo. The

Fig. 5

40 Secret Telegram to Amembessy (sic) London Priority 51, July 2, 1960, Folder: Policy – Zanzibar – Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

41 Memo from London-Whitney to Secretary of State, June 30, 1960, Folder: Zanzibar Communications Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

42 Memo, May 18, 1960, Folder 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

43 Farrell Lines, Bill of Lading, African Lightning ship, undated, Folder 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

British embassy further recommended, »that US military aircraft not be used to bring material for station into Zanzibar or any territory in vicinity.«[44] When the three vehicles (trucks and jeep) were unloaded from African Lightning and driven onto the island, they were met with angry crowds. The vehicles had to be stored in a warehouse for several weeks and Mercury staff used rented cars and taxis.

The buildings and structures for the Mercury station, including »offices, storage, housing, sanitation, and other required purposes,« were to be »prefabricated, transportable, and removeable (sic),« signaling anticipated short-term use.[45] Most buildings were constructed of galvanized sheet metal supported by steel frames. Spare parts provisioning and local repair capability were other key considerations. Each industry partner in the project provided a 2-year supply of spare parts unique to its equipment and a list of recommended common item spares.[46] When I visited the Mercury site in 2018 (nearly sixty years after it was built), materials such as concrete foundations and fence posts, a water well, pump houses, and a still standing sheet metal structure, marked the ruins of the Tunguu receiving station. The building's interior was littered with debris. I spent two hours at the site and worked with a translator to talk with six people who now farm this land. They had no knowledge of the Mercury project. A taxi driver and I were only able to find the Tunguu site by pulling over and meeting a man named, Twaham Zane, who was born in 1966 and grew up nearby and remembered hearing about the site. Zane joined us and led us down a dirt road to the ruins.

To construct the Mercury facilities at Tunguu and Chwaka, US contractor Burns and Roe first considered hiring the Italian firm Stirling and Astaldi, as it had extensive »East African experience« and »a large labor force« with »a high proportion of Italian craftsmen and technicians.« However, British Resident Mooring insisted that Zanzibari workers be contracted, emphasizing what he called the »bread and butter« factor. As Mooring saw it, hiring Zanzibari workers was »necessary for the establishment of a cooperative atmosphere with local authorities

44 Memo from London-Whitney to Secretary of State, June 30, 1960, Folder: Zanzibar Communications Project Mercury, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. RG 59, General Records of the Department of State, National Archives.

45 Draft agreement for Zanzibar and Nigeria drafted by NASA and Sent to US State Department 1959, 14.D Satellite Tracking Stations UK Project Mercury Zanzibar 1959, National Archives accessed May 31, 2018. In theory employees.d rs as well, including, ntexts. al time computing. ol, at might be thought of as a prima.

46 In addition to the buildings housing electronic equipment, most stations contained power buildings, cooling towers, air handlers, water chillers, and hydropneumatic tanks. Diesel generators were installed to produce power as a commercial power backup. See Mercury Project Summary (NASA SP-45), 8. Worldwide Support Network, undated, available at https://history.nasa.gov/SP-45/ch8.htm, (23 December 2019).

and to prevent possible embarrassment and difficulties both in the construction and operation of the station.«[47] A US Embassy dispatch from London to the US State Department reinforced this position, noting: »[…] in the present conditions of economic depression and unemployment obtaining in Zanzibar it would cause considerable difficulties and embarrassment if the work were undertaken directly by an outside firm using imported craftsmen and labour.«[48] Ultimately, Burns and Roe contracted British civil engineering firm, W. & C. French, because the company already had a pool of Zanzibari workers. Approximately two hundred Zanzibaris built the Mercury structures at Tunguu and Chwaka between April and November 1960.[49] Employees of Western Electric, Burns and Roe, Bendix, and Space Technology, Inc. also contributed. Together these companies sent more than forty staff to Zanzibar for various phases of construction, installation, testing, and operation of the station.[50] Road, telecommunication, electrical, water and sanitation infrastructures also had to be built to support the fifty-acre Mercury station.

As the station was being built, the facilities had to be secured given ongoing political opposition to the project. On July 10, 1960, the day of a major ZNP demonstration, staff members were advised not to go to work, and Mooring deployed an extra two-hundred security workers, some coming from mainland Tanganikya, to patrol the Mercury station. Western Electric's, Paul Pedersen, recounted meetings with British Resident Mooring and the CIA about the station's security.[51] There were not only security concerns about the buildings and staff, but also about the connecting antenna fields, and overhead and buried cables that tethered the station to the worldwide network.[52] Mooring offered to protect Mercury station buildings, but explained: »[…] it would be impossible […] to promise physical

47 Memo to file from Zanzibar, May 9, 1959, Folder 1960, 14. Scientific Research & Development: 14D Satellite Tracking Stations: 23. UK Project Mercury-Zanzibar RG 59, General Records of the Department of State, National Archives.

48 Dispatch from US Embassy in London to US State Department, Dec 23, 1959, Folder 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

49 Construction schedule chart. Need cite for 200 Zanzibari employees. National Archives.

50 According to lists in the folder, 19 personnel were sent from Bendix Radio, 8 from Burns and Roe, Inc, 8 from Western Electric Co. and 2 from Bendix Pacific. Folder 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

51 Letter to Goethius from Pederson, Aug. 26, 1960, Folder 1960, National Archives. As a side note, the CIA had conducted covert operations in Zanzibar and Tanganyika during this period. In January 2017 the US released more than 12 million pages of declassified documents, which reveal its history of spying there. See: https://www.ippmedia.com/en/news/top-secret-cia-files-expose-us-covert-operations-tanzania.

52 Letter to Goethius from Pederson, Aug. 26, 1960, Folder 1960, 14. Scientific Research &

protection of widely spaced antenna fields […].«[53] The security of earth stations and other communication facilities around the world is an integral yet largely untold aspect of global network history.

Indeed, there is much more to be said about the labor of constructing the Mercury earth stations in Zanzibar and beyond.[54] The point I wish to emphasize is that the nodes of this »world wide tracking network« did not emerge unfettered; their development was embedded in particular material conditions and political struggles, which demand historical analysis. Zanzibar was just one of the Project Mercury sites, and the archaeologies of others remain to be excavated. Suffice it to say, this node of the world wide tracking network could only emerge because of a strategic, neocolonial partnership between the US and Britain that enabled the duty free shipment and import of US commercial materials and equipment into Zanzibar (even before an agreement was officially signed) and the hiring of a British firm with Zanzibari workers and visiting staff from US companies to build and secure the Mercury station and related infrastructure, all in spite of vociferous Zanzibari political opposition to hosting it. On May 5, 1961, several weeks after cosmonaut Yuri Gagarin's momentous orbital flight on April 12, 1961, the Zanzibar station tracked the Mercury capsule as it carried Alan Shepard into a sub-orbital flight. On February 20, 1962, the station helped to track Mercury astronaut John Glenn in the first manned satellite to orbit the earth. Undergirding and enabling these astronautic feats, was an extensive international network of earth stations much lesser known.

4. Conclusion

So what can be gained from this nodal study of an earth station in Zanzibar? By highlighting material conditions and political struggles that emerged during this earth station's development in Zanzibar, I hope to complicate the reductive iconographies of network cartographies, which, through their very production and circulation, imply that the visualized infrastructure had full authority to be

Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

53 Ibid.

54 On October 5, 1960, there was a traffic accident involving African Zanzibari men who worked for W. C. French and Co. (subcontractors to Burns & Roe). A local bus crashed into a truck that was carrying workers to the Mercury site and killed 3 men and injured 4. See Letter to Kerrigan from Campbell, Oct. 6, 1960, Folder 1960, 14. Scientific Research & Development: 14.D Satellite Tracking Stations: 25. Zanzibar Project Mercury RG 59, General Records of the Department of State, National Archives.

put in place. While the Mercury station in Zanzibar had the legal permission of the British colonial administration, the historical process of its installation was much more fraught and complicated. The situation of the Mercury station in Zanzibar prompts consideration of what it means to build and operationalize a network node that was built against peoples' will. Because I have examined only US archival records so far, my recounting of Zanzibari opposition to the Mercury station is filtered through the perspectives of US agencies and representatives. Further research could examine literature of the ZNP and press accounts of the station's development in Swahili and Arabic languages and could include oral histories in those languages as well. It would also be helpful to further examine Russian and Chinese commentaries about the Mercury station in Zanzibar to further modulate and contextualize US accounts of »bloc propaganda.«

While this additional research would certainly expand understandings of local and international perspectives on the project Mercury station in Zanzibar, a broader goal of this article is to make a case for experimental, multimodal methods that combine archaeological, archival, and phenomenological approaches. What kinds of network histories emerge if they are based on state, corporate, and/or regulatory records alone? If I were to use a strictly archival approach based on the US records that I gathered, my historical analysis of this station's development might be overdetermined by the perspectives of state officials and Cold War logics. Visiting the site and experiencing it as forgotten global network node, overtaken by Zanzibari farmers, compelled me to try and historicize it through a more open palimpsest, and to imagine a broader repertoire of agencies and positions for whom this node may have mattered. Being at the site's ruins, in other words, helped me to consider historical alterities in Tunguu and beyond, at other Project Mercury earth stations in Woomera, Kanton Island, Bermuda, the Canary Islands, and Kano, Nigeria, even if they remain inaccessible and unknown to me. A nodal approach not only involves complicating the intelligibility and efficiency of the network map and its agents; it is also about confronting the limits and paradox of the node: the moment one tries to »narrow the focus,« get »site-specific,« or »localize,« a jumble of vital questions and contradictions emerge to occlude and confound the view.

Given the forces of anti-militarization, neo- and anti-colonialism, and Cold War geopolitics that shaped the development of the Mercury station in Zanzibar, I conceptualize this site as a *contrapuntal node* rather than as a »global meets local« formation.[55] In his study of the French rocket launch complex in Hammaguir,

55 For a related discussion see N. Castree, D. Featherstone, & A. Herod: Contrapuntal geographies: the politics of organizing across sociospatial difference, in K. Cox, M. Low & J. Robinson (eds.): The SAGE Handbook of Political Geography, London 2008, pp. 305–321.

Algeria (1947–67), Asif Saddiqi uses heuristics of »site« and »scale« to challenge normative histories of the space age and reductive approaches to the »global« and »local« that often equate the global with Western science and the local with indigent populations. He insists that such »sites« of the space age were not only involved in establishing certain technologies, but also reorganized material conditions at different »scales,« from everyday social relations to the molecular chemistry of the atmosphere.[56] To challenge the normative history of the space age in another way, I have foregrounded Zanzibaris' role in Project Mercury, recognizing both their opposition and contributions to it. Such conditions, I argue, mark this site as *contrapuntal node* within Mercury's »worldwide tracking network,« as they signal the clashing forces and hybrid cultures that formed around the installation's construction as well as efforts to »undo« it. A contrapuntal node is one whose development is contested by those who live in its vicinity. Throughout all phases of the Mercury station's development, some Zanzibaris were ardently opposed and wanted it removed. Their political desire was gratified after Zanzibar's revolution. One of the first things the new President, Amani Abeid Karume, did after seizing power on January 12, 1964, was to demand Project Mercury staff leave the island. He also ordered the station be shut down by the end of April 1964.[57]

Even though the Zanzibar station was shut down, the role of this node in the first global real-time computing network provokes critical reflection about the continuities that exist between facilities such as satellite earth stations and data centers of the internet era. With the globalization of satellite- and internet-based communication, networked ground stations and data centers now abound across the planet. An interdisciplinary field of data center studies seems to have formed overnight. This new research area is essential and exciting. It is my hope that data center specialists will keep precursor facilities such as satellite earth stations and non-Western nodes in mind. Since much of the data center research so far has focused on energy efficient siting of facilities in Northern Europe, where temperatures are cooler, I wonder whether data centers and workers in the southern hemisphere, including in sub-Saharan Africa, will be eclipsed in new network histories and critical conceptualizations. Though the Mercury earth station was an entirely different technical entity, it (and its interlinked others) could be perceived as pit stops in data center archaeology since their function was to gather, store, and network telemetry and tracking data. An archaeological approach would entail querying and historicizing the very definition of »data center« and setting out to specify and analyze its diverse materializations across time/space rather than

56 Asif Saddiqi: Another Space: Global Science and the Cosmic Detritus of the Cold War, in: Pedro Ignacio Alonso (ed.): Space Race Archaeologies, Berlin 2016, pp. 34–35.

57 Smith: U.S. Will Remove Zanzibar Station (as note 3).

reify its figuration as »central« or »novel.« Will the historical narratives around the data center be dominated by familiar tropes of speed and efficiency, centers and peripheries? Or are there other rubrics through which to excavate and register its multiplicities and contrapuntal forces?

Whatever the case, a nodal approach to network history—whether an earth station or data center—is faced with the problematic of how to treat the one vs. the many. What do we gain from drilling down into one network node as opposed to exploring dynamic interconnections and relations between and across them? Which networks and nodes are worth investigating and historicizing, and why? What methods are most helpful in shaping the ways we conceptualize networks and their complex materialities? My interest has been to explore sites and socio-technical relations on the outskirts of industrial power, and, in the process, to unlearn and rethink how technologized communication, media cultures, and power relations take shape. This approach is not intended to relish in the obscure or the exotic; rather, it is an attempt to try to understand the heterogeneous sites and peoples that have innovated, built, and used technologies of communication and to contest the solidities and affordances that congeal in institutionalized and already recognized sites of power. At a minimum, Zanzibaris' opposition to the Mercury earth station encourages us to consider that countless nodes in the networks we have come to rely on each day possibly have been installed against peoples' will. Excavating the materialities of other contrapuntal nodes begins to complicate contemporary network histories that privilege visions of a »closed world« or »control society« by bringing to the fore people who sought something other.

Medienwissenschaft ohne Medien?

Claus Pias

»Mäuse vertreibe ich mit der Katze, aber womit soll ich die Katze vertreiben?«
(Franz Kafka an Felix Weltsch, 26.11.1917)

I.

In den zahllosen Digitalisierungs-›Initiativen‹, ›-Strategien‹ oder ›-Offensiven‹, die derzeit um politische Aufmerksamkeit, um Lufthoheit im Bereich ›Innovation‹ und um eine überzeugende ›*burn rate*‹ an Fördermitteln ringen, werden Geisteswissenschaften allenfalls in Gestalt homöopathischer ›Ethik‹ oder anwendbaren ›Reflexionswissens‹, als ›teilnehmende‹ Beobachter/innen oder als ›Begleitungsforschung‹ zu anwendungsbezogenen ›Innovationsprozessen‹ oder in ›Transferprojekten‹ angesprochen. Unter erheblichen Kosten hochgezogene Einrichtungen wie etwa das *Alexander von Humboldt Institut für Internet und Gesellschaft*, das *Einstein Center Digital Future*, das *Weizenbaum Institut* oder das *Center for Advanced Internet Studies* können auf Geisteswissenschaften ebenso gut verzichten wie improvisiert aufgelegte Förderprogramme zu ›Digitalisierungs-Professuren‹, von denen man sich eine rasche Linderung des ›Fachkräftemangels‹ erhofft.

Nicht zuletzt in den Medienwissenschaften zeichnet sich darüber Unmut ab, weil diese seit einem halben Jahrhundert ebenso umfangreiche wie – so scheint es zumindest – notorisch ignorierte Forschung zum Verständnis der Computerisierung leisten. Denn Verstehensanstrengungen für die Konkreta einer neuen kulturellen ›Lage‹, Beschreibungsversuche ihrer originären Phänomene oder die Vergewisserung über Reichweiten und Grenzen historischer Erfahrung verblassen regelmäßig vor dem Imperativ, sofortige ›Lösungen‹ und ›Anwendungen‹ für eine andauernd anbrechende Zukunft finden zu müssen.

Oder anders gesagt: Digitalitäts-Forschung ist zum blinden Fleck einer von Solutionismus und Innovationsglauben angetriebenen ›Digitalisierung‹ geraten. Als anekdotischer Beleg mag eine Szene aus Bayern dienen, dem Land mit der demnächst märchenhaften Zahl von 1000 neu geschaffenen Digitalisierungs-Professuren. Anlässlich der Auftakttagung des neu eingerichteten kunst- und medienwissenschaftlichen DFG-Schwerpunktprogramms »Das digitale Bild« (eine För-

derlinie, die von der DFG als »koordinierte, ortsverteilte Förderung wichtiger neuer Themen« verstanden wird) gab die Repräsentantin der LMU München in ihrem Grußwort der Freude darüber Ausdruck, heute einmal bei etwas ganz anderem dabei sein zu dürfen – weil sie ja ansonsten, in ihrem Alltag im Präsidium, mit den großen und drängenden Themen wie »Digitalisierung« beschäftigt sei. Dass diese so offensichtlich gar nichts mit dem Wort »digital« auf dem Plakat hinter ihr zu tun hat, konnte denjenigen, die sich damit längst abgefunden haben, nur ein müdes Kichern entlocken.

Angesichts dieser Situation wurde innerhalb der *Gesellschaft für Medienwissenschaft* das Forum »Digitalisierung« gegründet, das »quer zur thematischen Arbeit der AGs und Kommissionen« operieren und sich durch einen Katalog von Vorschlägen der forscherischen »Herausforderung« stellen will, dass »Digitale Medien […] längst unsere Lage« bestimmen.[1] Im Folgenden geht es mir nicht darum, in welchem Umfang, wie oder warum Medienwissenschaft bei der sogenannten ›Digitalisierung‹ mitmachen könnte oder sollte. Vielmehr möchte ich versuchen, aus der Perspektive dieser ›Herausforderung‹ zu fragen, was man über Medienwissenschaft erfahren kann, wenn man sie von einer gemeinsamen Geschichte von Medientheorie und Digitalisierung her betrachtet. Dies geht mit der These einher, dass Medientheorie die Bedeutung digitaler Medientechnologien so überaus erfolgreich propagiert hat, dass diese nun zu wichtig sind, um sie der Medienwissenschaft zu überlassen. Politische Entscheidungsträger haben (nicht nur, aber auch durch Medientheorie) über ein halbes Jahrhundert hinweg gelernt und sind davon überzeugt, dass digitale Medien die Zukunft schlechthin sind – und dass sie genau deshalb den ›relevanten‹ Fächern überantwortet werden müssen. Die scheinbare Ignoranz gegenüber der Medienwissenschaft wäre insofern nur ein ironischer Effekt ihres überragenden Erfolgs.

II.

Einen Ausgangspunkt für diese Argumentation bildet Lorenz Engells Beschreibung eines »doppelten Temporalisierungszwangs« der Medienwissenschaft. Sie »muss – Politik der Abwesenheit und der Historisierung: Was *waren* Medien – beständig ihre Objekte in die Vergangenheit verweisen. Und sie muss zugleich – Politik der Aktualität und des unmittelbar Bevorstehenden: Was *sind* Medien (gerade im Werden begriffen) – neue Objekte generieren.«[2] Es hat den Anschein, als

1 Unter: https://gfmedienwissenschaft.de/debatte/forum-digitalisierung (Januar 2020).

2 Lorenz Engell: Medien waren: möglich. Eine Polemik, in: Claus Pias (Hg.): *Was waren Medien?*, Zürich 2011, S. 103–128, hier S. 119–120.

sei durch dieses Tempo inzwischen auch der Medienbegriff selbst überholt worden. Dafür spricht zumindest eine (durch keinerlei quantitative Analyse verbürgte) Beobachtung aktueller Publikationen und Veranstaltungshinweise: Die Vermehrung der Gegenstände medienwissenschaftlicher Forschung scheint mit einem Verschwinden des Wortes ›Medien‹ selbst einherzugehen. Noch von ›Medien‹ zu sprechen wirkt gestrig oder bestenfalls naiv angesichts der unzähligen rezenten Begriffe, Konzepte und ›Studies‹, in denen eine Vorstellung von ›Medialität‹ wohl immer noch mitschwingt, ›Medien‹ aber nominell nur noch eine verschwindend geringe Rolle zu spielen scheinen. Oder anekdotischer: Galt vor 10 Jahren noch, dass die meisten Studierenden ›was mit Medien‹ machen wollten, so passiert es inzwischen, dass man auf die Frage nach einem möglichen Thema für eine *medienwissenschaftliche* MA-Arbeit zur Antwort bekommt: »Sehr grob umrissen, interessiert mich der Bereich Wissenschaftsgeschichte / Digitalität / Feminismus / Postkolonialismus / Nachhaltigkeit.« Anhand des Ausdrucks ›digitale Medien‹ lässt sich diese Vermutung in zweifacher Hinsicht präzisieren und bestärken:

Einerseits dadurch, dass rezente Beschreibungsversuche sich eher daran orientieren, dass digitale Medien allgegenwärtig und selbstverständlich geworden sind und darauf mit Konzepten wie ›digitale Kultur(en)‹ oder einer (im Kunstsektor seit etlichen Jahren diskutierten) ›Postmedialität‹ antworten, die einen hergebrachten Medienbegriff entbehrlich machen. Dazu hat nicht zuletzt die Forschung zu digitalen Medien selbst beigetragen – etwa durch die jahrzehntelang vorgetragene Prognose, dass alle Medien unter digitalen Bedingungen konvergieren, wodurch Einzelmedien unbeobachtbar und der Begriff des Mediums letztlich kassiert werden würde.

Andererseits (und vielleicht ebenso lange schon) wurde das Verschwinden der ›Medien‹ durch die Austreibung jenes ›medientechnischen a priori‹ aus der Medienwissenschaft befördert, das zuvor prominent an digitalen Medien entwickelt worden war. Vehement als deterministisch, technozentristisch, monokausal etc. kritisiert, wurde es durch verschiedenste Theorie-, Begriffs- und Methodenimporte bis zum Verschwinden hin relativiert und unermüdlich verabschiedet. Dass damit eskamotiert wurde, was zum eigenen Erfolg doch maßgeblich beigetragen hatte, entbehrt nicht einer gewissen Ironie. Denn wo und weil sich Medienwissenschaft zur »Plattform« ausgestaltet,[3] muss sie auf gewisse Weise hilflos einer ›Digitalisierung‹ gegenüberstehen, die sich zwar von ihr losgesagt hat, sie aber zugleich unentwegt mit den Resultaten ihrer abgelegt geglaubten Theoriegeschichte bedrängt und konfrontiert.

3 Patrick Vonderau: Methode als wissenschaftssoziales Problem, in: Zeitschrift für Medienwissenschaft 21 (2019), S. 165–168.

Statt des Rückzugs in den Schmollwinkel der Reklamation über die eigene Benachteiligung schlage ich eine (hier nur anzudeutende) Historisierung vor, die die präsentistische Dauerbelastung der ›Digitalisierung‹ auf die Zeitsemantik digitaler Kulturen und auf die historiographischen Formen bezieht, in denen Digitalisierung sich selbst verfasst.

III.

Eine entscheidende Szene »klassischer Medientheorie«[4] bildet Marshall McLuhans populäre Zuspitzung der These, dass die je historische Möglichkeitsbedingung unseres Denkens, Fühlens, Handelns und Wissens durch ein mediales *a priori* gebildet wird, das in Form von ›Leitmedien‹ die Kohärenz der Ausdrucksformen einer Epoche verbürgt. ›Medien‹ (und zwar ›digitale‹ oder wie man damals sagte: ›elektronische‹) waren somit als Subjekt des historischen Prozesses ausgemacht, der dadurch auf ein sichtbares Objekt in Form ›neuer Technologien‹ zurückgeführt werden konnte. Zugleich konnte die Gegenwart als eine identifiziert werden, die nach sofortiger Intervention im Hinblick darauf verlangt, dass diese neuen Technologien bereits unvermerkt mit einem fundamentalen und alle Lebensbereiche umfassenden Umbau der Welt begonnen haben.

Diese Kopplung von Epochalität an mediale Regime hatte eminente historiographische Konsequenzen. Weil Medien selbst nur durch Medien beobachtbar sind, können sie immer nur im ›Jetzt‹ des Medienumbruchs beschrieben werden. Es braucht einen letzten Beobachter aus der untergehenden Welt (hier eben McLuhan), der diesen Augenblick gerade noch mit stupender Gelehrsamkeit beobachten und Auskunft über den Epochenwandel erteilen kann. Die Macht des Medientheoretikers hängt insofern davon ab, dass dieser ›Umbruch‹ nicht aufhört, sondern immer ›jetzt‹, im Moment seiner Äußerung, stattfindet und durch diese Äußerung zugleich hervorgetrieben wird. Dies ist die Konsequenz der Behauptung der mentalitätsprägenden Kraft von Medientechnologien: Denn ebenso wenig wie man eine künftige, ›neue‹ Medienepoche verstehen kann, wenn man noch in der ›alten‹ lebt und denkt, wird man eine vergangene Medienepoche noch verstehen können, wenn die darauffolgende sich erst einmal verwirklicht hat. Außerhalb des ›Jetzt‹ ist *Understanding Media* eine Unmöglichkeit.

Solche Thesen fielen dort auf fruchtbaren Boden, wo es während der »Sattelzeit des modernen Computing« (Hans Dieter Hellige) zugleich auch um die Formulierung der Meistererzählung eines ›postindustriellen‹ Zeitalters unter amerikani-

[4] Erhard Schüttpelz: Medienrevolutionen und andere Revolutionen, in: Zeitschrift für Medienwissenschaft 17 (2017), S. 147–161.

scher Hegemonie ging. Nicht nur passten die Versprechen neuer Medien (Ende von Nationalismen, Pluralisierung von Weltbildern, lebenslanges Lernen, unentfremdete Arbeit, neue Ökonomien etc.) hervorragend zur westlichen Behauptung der eigenen Ideologiefreiheit. Das Argument eines durch Medien bereits eingeleiteten und prinzipiell kybernetisch ›prädiktiv‹ steuerbaren Epochenwechsels prophezeite einen Gewinn im ›Wettlauf der Systeme‹, indem man einfach das Spielfeld vom industriellen zum elektronischen Zeitalter wechselte. Als antikommunistische Strategie stellen Computerisierung, Digitalisierung und Vernetzung einen Systemgewinn über den Kommunismus in Aussicht, weil im sogenannten ›freien Westen‹ – das konnte man dank McLuhan behaupten – eine neue weltgeschichtliche Epoche bereits begonnen hatte.

Die Ausarbeitung dieser Agenda übernahm ab 1964 dann die ›Kommission für das Jahr 2000‹ an der *American Academy of Arts and Sciences*, der Soziologen, Historiker, Ingenieure, Naturwissenschaftler, Politikberater und Fördergeber angehörten.[5] Ausgehend von Szenarien darüber, wie der ›Westen‹ im Jahr 2000 diese neue Epoche dominieren würde, übersetzten die »Propheten des Postindustriellen« (Richard Barbrook) die medientheoretischen und geschichtsphilosophischen Thesen McLuhans in die Sprache von quantitativer Soziologie und Politikberatung und anschließend in konkrete Wirtschafts- und Innovationsförderung. In ihrem Selbstverständnis sahen sie sich dabei in keiner geringeren Rolle als die *philosophes* der Aufklärung, nämlich als Gestalter von Sozialität und Politik, Philosophie und Wirtschaft für eine grundlegend andere Welt.

Die These vom *a priori* der digitalen Medien war dafür ebenso zentral wie praktisch. Folgte man ihr, dann musste erst einmal nur in technologische Innovation investiert werden, damit sich der Rest dann wie von selbst einstellen würde. Denn mögen die Details des Epochenwandels auch verschlossen sein: durch Medientheorie wusste man zumindest, wie man ihn zielsicher würde herbeiführen können. Das erzeugte politischen Handlungsdruck, weil der Umbruch (und damit die Zukunft des Westens) ja bereits begonnen hat. Wie bei einem kybernetischen Flugabwehrgeschütz waren damit Ziel und Regelungsinstanz ausgemacht: Die postindustrielle Zukunft würde über digitale Medientechnologien erreicht werden, deren kulturprägende Mechanismen zwar eine *black box* bleiben, deren Entwicklung und Anwendung aber einer ununterbrochenen Regulation und Intervention in der Gegenwart bedarf.[6]

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5 Etwa Wassily Leontief, Ernst Mayr, Samuel Huntington, Karl Deutsch, John R. Pierce, Zbigniew Brzeziński, Daniel Ellsberg, David Riesman, Joseph Licklider oder Herman Kahn – und geleitet von Daniel Bell.

6 Die Kommission wurde von Lawrence K. Frank (dem Initiator der Macy-Konferenzen zur Kybernetik) ins Leben gerufen. Ihre Geschichte wird innerhalb des Projekts *Zukunft machen: Vergangene und gegenwärtige Zukünfte des Silicon Valley* (VolkswagenStiftung) re-

McLuhans Dringlichkeit des Medien*verstehens* im ›Jetzt‹ wurde gewissermaßen durch die Dringlichkeit von Medien*technologieförderung* im ›Jetzt‹ ersetzt, als deren entbehrliche Kritikerin sich Medientheorie dann bald schon zurückgestuft fand. Mehr noch: Medientheorie hatte geholfen, jenen *Präsentismus* geschichtsphilosophisch zu begründen, der seitdem die (unter wechselnden Begriffen) wiederkehrenden ›Digitalisierungs‹-Wellen kennzeichnet und innerhalb dessen die Geisteswissenschaften als *historische* Wissenschaften zunehmend ihren systematischen Ort verlieren.

IV.

Für die Risiken und Nebenwirkungen dieses Erfolgsmodells mögen zwei Beispiele genügen.

Erstens: Obwohl ihre Intentionen andere gewesen sein mögen, folgte auch die technikaffine *counter-culture* der McLuhan'schen Argumentation einem medialen *a priori* – und damit zugleich der wirtschaftspolitischen Beschlussfassung des Postindustrialismus. Wenn Computer nämlich ›Medien‹ sind, die unser Denken, Fühlen, Handeln und Wissen fundamental restrukturieren, dann läßt sich die eigene Entwicklungsarbeit in realen oder bloß imaginierten Garagen als Mentalitätsdesign eines neuen Zeitalters nobilitieren. PCs, Software und Datennetze für alle waren insofern gebaute, in Silikon inkarnierte Medientheorie und Geschichtsphilosophie.

Das ›Silicon Valley‹ konnte und kann sich seit den 1970er Jahren als Ausstatter einer neuen Epoche empfehlen, deren ökonomischen Motor präzise die Paradoxie einer *unvorgreiflichen* und zugleich bereits *eintretenden* (und daher unter Zeitdruck zu realisierenden) Zukunft bildet. Das aus dieser Zeitsemantik abgeleitete Unternehmertum ist daher als Modell zitierfähig – sei es nun als schwäbisches oder als niedersächsisches ›Silicon-Valley‹ – und veranschaulicht, »wie man Zukunft mit denselben Operationen erzeugen kann, mit denen sie antizipiert werden soll«[7]. Dabei verschlägt gut gemeinte medienwissenschaftliche Kritik am sogenannten ›Neoliberalismus‹ des Modells ›Silicon Valley‹ wenig an dem Umstand, dass die Begründung dieses Geschäftsmodells auf angewandter Medientheorie beruht.

Zweitens: Ein ähnliches Motiv ist auch in einer der Gründungsszenen der Medienwissenschaft auszumachen. Bei Friedrich Kittler wechselt in den 1980ern die

konstruiert, unter: http://portal.volkswagenstiftung.de/search/projectDetails.do?ref=96563 (Januar 2020).

7 Elena Esposito: Die Zukunft der Futures. Die Zeit des Geldes in Finanzwelt und Gesellschaft, Heidelberg 2010, S. 12.

gebaute Medien*theorie* des Personal Computers in eine *geschriebene* Medien*wissenschaft* des digitalen Zeitalters. Sie gerät damit von einem synthetischen in ein analytisches Register, innerhalb dessen nun genau jene Epochalität des ›Computing‹ nochmals entziffert werden sollte, die ihm globalstrategisch längst schon eingeschrieben war. Nur dass sich die Behauptung einer technologisch begründeten neuen Epoche nun mit der Provokation verschränkt, dass in dieser Epoche auch die Geisteswissenschaften zu ihrem Ende gekommen sein werden.

Denn danach, so hebt Kittler in *Grammophon Film Typewriter* 1986 (in einem ähnlichen ›Jetzt‹ wie McLuhan) an, kommen nur noch »Kästen, die als künstliche Intelligenzen von uns Abschied nehmen, zu namenlosen Oberkommandos unterwegs. […] Wie es dazu kam, was in keinem Buch mehr steht, ist für Bücher gerade noch aufzuschreiben.«[8] Das Gegenteil war selbstredend der Fall. Denn das Ziel der allfällig zitierten ›Austreibung des Geistes‹ war ja nicht die Abschaffung der Geisteswissenschaften, sondern deren Selbstaufklärung über ihre geist*versessenen* und zugleich technik- und materialitäts*vergessenen* Epistemologien. Dieses Verbesserungsprogramm war insofern ein enormer Erfolg, als die Beschäftigung mit Digitalität jahrzehntelang eine eminente Produktion und institutionelle Stärkung medien- und geisteswissenschaftlicher Forschung bewirkt hat.

Dabei ist jedoch eine ähnliche Ironie des Erfolgs zu beobachten wie zwischen McLuhan und dem ›Silicon Valley‹. Mit der zunehmenden Distanzierung der Medienwissenschaft vom Narrativ des medientechnischen *a priori* und der Entfaltung einer ihr eigenen Ästhetik der unwahrscheinlichen Themen, die auch ohne ›Medien‹ bearbeitbar sind, konnte deren Ort neu besetzt werden. Ansprüche auf diese Systemstelle ›Medien‹ stellen beispielsweise die sogenannten ›Digital Humanities‹. Denn eine starke Definition von DH könnte lauten, dass sie Antworten auf Fragen liefern, die keiner stellt und die keinen Bezug zu aktuellen Forschungsständen haben.[9] Vielmehr folgt das Erkenntnisversprechen der DH der aus dem Kalten Krieg stammenden Zeitsemantik einer digitalen *epoché*. Es legitimiert sie durch die Aussicht, dass sich *einerseits* grundlegend neue und vollkommen unerwartete Erkenntnisse einstellen werden – dass man *andererseits* bereits vorher weiß, dass der Grund dieser Wissens-›Revolution‹ digitale Medientechnologien sein werden. Diese Technologien einzusetzen gerät dadurch zu einer Forderung von größter Dringlichkeit, die unbedingt ›jetzt‹ entschieden werden muss, damit die Geisteswissenschaften ihre Zukunft nicht verpassen. Oder anders gesagt: Digital Humanities beerben die klassische Medientheorie um ihr verwaistes mediales *a priori* und legitimieren sich genau dadurch als ›Startup‹-Ausgründung aus den

8 Friedrich Kittler: Grammophon Film Typewriter, Berlin 1986, S. 4.

9 Claus Pias: Schätzen, Rechnen und die Medien des medialen Apriori, in: Zeitschrift für Medienwissenschaft 21 (2019), S. 155–160.

Geisteswissenschaften, die mit dem wirtschaftlich-politischen Begründungsnarrativ von ›Digitalisierung‹ aus den 1960ern völlig konform geht.

V.

Dies alles macht die ›Lage‹ nicht einfacher. Zwar kann man *einerseits* einer präsentistischen Epistemologie ihre Geschichte zurückgeben und (wie hier angedeutet) die zeithistorischen Bedingungen der allfälligen Behauptung einer ›Epoche des Digitalen‹ wieder sichtbar machen, statt sie immer nur nachzusprechen. Mit gleichem Recht läßt sich jedoch *andererseits* behaupten, dass sich die Zeitsemantiken und Epochennarrative des Kalten Krieges – schon weil sie endlos wiederholt, politisch vorangetrieben, finanziell gefördert, technisch implementiert und medientheoretisch legitimiert wurden – über mehr als ein halbes Jahrhundert hinweg zur *self-fulfilling prophecy* entwickelt haben. Digitale Kulturen stehen eben nicht erst durch ›Digitalisierung‹ noch bevor, sondern haben sich längst verwirklicht.

Diese Wirklichkeit und ihre Phänomene beanspruchen ein Vetorecht gegen das panische Starren in die Zukunft, denn sie besitzen eine andere Verlaufsdauer als jene Innovations- und Interventionszyklen, die mit Begriff und Imperativ der ›Digitalisierung‹ aufgerufen werden. Zugleich problematisieren sie jedoch auch die erkenntnistheoretische Begründung der Medientheorie des Kalten Krieges – d.h. eine Autorposition, die mit aller historischen Gelehrsamkeit den Untergang des »historischen Weltbilds« (Hans Ulrich Gumbrecht) selbst zu beschreiben und den Grund dafür in (digitalen) Medien zu bestimmen suchte. Denn diese Position ist nur so lange haltbar, wie der aus ihr heraus beschriebene Epochenumbruch nicht aufhört, sondern immer wieder ins ›Jetzt‹ gezogen und in ihm hervorgetrieben werden kann. Darüber hinaus erscheint die strategische Behauptung eines medialen *a priori* als korrumpiert – sei es durch das Modell ›Silicon Valley‹, durch die wirtschaftspolitischen Prämissen der ›Digitalisierung‹ oder durch ihr Recycling in den ›Digital Humanities‹.

Von der Wirklichkeit statt von der Zukunft digitaler Kulturen auszugehen könnte jedoch ebenso bedeuten, dass Digitalität als ein Zusammenhang entziffert werden kann, dessen Eigensinn sich auch in Phänomenen erschließt, bei denen technische Digitalisierung selbst gar nicht zum Tragen kommt, die sich aber – als Teil digitaler Kulturen – in und mit diesen gewandelt haben. Dies gilt gleichermaßen auf epistemologischer Ebene, insofern digitale Kulturen jene Wirklichkeit bilden, deren Teil auch ihre Beobachtungen sind und in denen sich veränderte Schematismen ausgebildet haben, die am Denken ihrer eigenen Gegenwart (und damit an Epochenbewusstsein und Epochenbegriffen) immer schon mitarbeiten.

Für solche Situationen des »Ordnungsschwunds« (Hans Blumenberg) gibt es Präzedenzfälle. Die ›Erste Kulturwissenschaft‹ etwa reagierte nicht nur mit einer *systematischen* Erschließung neuer Gegenstandsbereiche, sondern begleitete ihren Gegenstandsbezug durch die *epistemologische* Reflexion der eigenen Methodiken und disziplinären Register sowie durch eine gezielte und spekulative *Begriffspolitik und -poetik*. In diesem Sinne läßt sich die Wirklichkeit ›digitaler Kulturen‹ als eine Aufforderung zur Grundlagenforschung verstehen – und zwar in *allen* geisteswissenschaftlichen Disziplinen. Deren Notwendigkeit ist zugleich das stärkste Argument gegen eine Anstellung als Problemlösungsgehilfen von ›Digitalisierung‹.

Genau solche Grundlagenforschung wurde jedoch über Jahrzehnte hinweg durch den Begriff ›Medien‹ ermöglicht, der nun zur Disposition zu stehen scheint. Medienwissenschaft ist wesentlich am Export einer spezifisch medialen Epistemologie in andere Fächer gewachsen, deren Forschungen sie dadurch ›tieferlegte‹, dass sie ihnen ihre Medienvergessenheit aufzeigen und sie zur Selbstaufklärung über diese auffordern konnte. Sie »behauptete eine Kompetenz im Definieren von Problemen – und erhielt sie zugesprochen.«[10] Dass andere geisteswissenschaftliche Disziplinen (im Sinne besagter Begriffspolitik) höchst erfolgreich über ›Medien‹ belehrt wurden und die Medienthematik fachbezogen integriert haben, ist erfreulich – aber umgekehrt noch kein Anlass, die Rede von ›Medien‹ (aus welchen Gründen auch immer) nun selbst abzulegen. Denn wie würde medienwissenschaftliche Grundlagenforschung ohne ›Medien‹ aussehen? Schon weil die Frage nach ›(digitalen) Medien‹ über ein halbes Jahrhundert hinweg hoch problematisch geworden ist, wäre vielleicht der umgekehrte Weg ratsamer. Gerade die Bedingungen digitaler Kulturen könnten ein starker Grund sein, noch einmal auf die ›Medien‹ zurückzukommen – sei es im Sinne einer Vergewisserung der eigenen Grundlagen oder auch nur, um »das erreichte medienwissenschaftliche Reflexionsniveau kontinuierlich halten […] zu können«.[11]

10 Engell: Medien waren: möglich (wie Anm. 2), S. 115.

11 Wissenschaftsrat: Empfehlungen zur Weiterentwicklung der Kommunikations- und Medienwissenschaften in Deutschland (25. Mai 2007), S. 78, unter: https://www.wissenschaftsrat.de/download/archiv/7901–07.html (Januar 2020).

Postmedial

Kathrin Peters

Im Grunde kann ich Claus Pias nur beipflichten: Ja, es ist symptomatisch, dass die Forschungsinitiativen zu ›Digitalisierung‹ meinen, ohne Medienwissenschaft auskommen zu können – symptomatisch für eine wissenschaftspolitische Problemlösungsorientierung, die beschwörend auf Zukunft ausgerichtet ist. Und ja, die McLuhan-Kittler-Medienwissenschaft des medientechnischen *a priori* hat ihre hegemoniale Stellung eingebüßt, so sie eine solche je hatte. Aber wie hängen diese beide Befunde zusammen? Pias legt nahe, dass ein Erstarken der Medienwissenschaft in beschriebener Ausrichtung eine Antwort auf den Digitalisierungsdiskurs und seine Medienvergessenheit liefern könnte. Das möchte ich diskutieren und eine etwas andere Verknüpfung vorschlagen.

I.

Aus der Perspektive einer derjenigen Universitäten, die in Digitalisierungsoffensiven sehr aktiv verwickelt ist, der Universität der Künste Berlin, zeigt sich das Bild eines hektischen Aktivismus, mit dem in den letzten Jahren doppelt und dreifach das Gleiche aufgelegt worden ist. Die Abgeklärtheit, zu der Pias rät, ist mir angesichts dieser Lage nicht gegeben. Daher sei die Lage noch einmal kurz beschrieben: Das *Alexander-von-Humboldt-Institut für Internet und Gesellschaft* wird von Google kofinanziert und forscht u. a. zu Entrepreneurship und Innovation, Plattform-Governance oder zu Digital Rights. Das *Weizenbaum-Institut für die vernetzte Gesellschaft*, das aus einem Wettbewerb als sogenanntes Deutsches Internet-Institut hervorging, wurde vom BMBF ins Leben gerufen, durchaus als Korrektiv zum HIIG, aber unter Beteiligung der zum Teil selben Akteur*innen. Unter dem Thema »soziale Ungleichheit« wird dort außerdem zu Digitaler Bildung und Digitaler Souveränität geforscht. Am *Einstein Center Digital Future* arbeiten völlig neu eingerichtete Professuren, deren Finanzierung die beteiligten Universitäten bei Unternehmen einwerben mussten.

Die fehlende Repräsentation ›unseres‹ Faches ist hier weniger das Problem als vielmehr der Umstand, dass die Projekte und beteiligten Fächer – empirische Sozialforschung, Rechtswissenschaft, Wirtschaftswissenschaft, Betriebswirtschaft,

Informatik/Robotik, Designforschung – fast ausschließlich Anwendungsforschung betreiben und sich entlang von Fragen ausrichten, die wohl deswegen als drängend beschrieben werden, weil sie schon längst *common sense* sind. Dazu passt die Unternehmensfinanzierung. Sie ist nicht deswegen Anlass zu immer etwas uncooler Aufregung, weil zu befürchten wäre, dass Förderer sich in die Forschung direkt einmischen würden. Subtiler sind jene Verschiebungen, die sich erst allmählich einstellen: Bestimmte Themen gewinnen gegenüber anderen an Gewicht, Ausrichtungen von Professuren erscheinen naheliegender als andere. Sie lassen ein Feld thematisch verflachen und wirken zudem in die Universitäten hinein, das heißt in die Lehre und in das, was es dort sonst noch an Forschung geben mag.

Für eine Kunstuniversität kann das heißen, dass Apps (oder Prototypen von Apps) entwickelt werden, auch wenn jedes Unternehmen (oder meinetwegen Start-up) sie schneller umsetzen könnte. Besser beraten ist eine Kunstuniversität, wenn sie medienkünstlerische Projekte ermöglicht, die von Bedingungen der Nützlichkeit, der Problemlösung und der Instrumentalität unabhängig sind, um nach den Bedingungen zu fragen, unter denen überhaupt etwas als Problem identifiziert wird. Eine Universität könnte – und das ist ihr Privileg – die Zukunfts- und Dringlichkeitsrhetoriken, die Relevanz- und Standort-Anrufungen selbst zum Gegenstand der Untersuchung machen und ein retardierendes Moment einziehen. Es geht, anders gesagt, darum, den Technologien da, wo das überhaupt noch möglich ist, ihre nichtintendierten Potenziale abzutrotzen. Es geht um kritische und historische Reflexion oder, mit Donna Haraway gesprochen, um ausstreuende Diffraktion.

Medienwissenschaft hat hier einiges beizusteuern, ebenso die Kulturwissenschaft. Auch Ethnologie oder Soziologie sind für ein Verständnis von Digitalität, das sich über Vergangenheit, Gegenwart und Zukunft zugleich erstreckt, produktiv. Auch müsste die Informatik keineswegs eine »Erledigungswissenschaft«, wie Wolfgang Coy sie einmal genannt hat, sein und bleiben. Was auch für die anderen beteiligten Disziplinen gilt. In den Rechts- und Wirtschaftswissenschaften ist scheinbar noch wenig Notiz genommen worden von medialer Agency (Cornelia Vismann in Ehren). Man beschäftigt sich mit Datenschutz oder Partizipation und kommt dabei gut ohne Reflexion des Zusammenhangs von Urheberschaft und Buchdruck oder eine Diskursanalyse medialer Teilhabe aus.

Wenn ich Claus Pias richtig verstehe, geht es ihm darum, sich von der dominanten Anwendungsorientierung mit Grundlagenforschung abzugrenzen, ähnlich wie dies in den Technik- und Naturwissenschaften geschehen ist, als in den 1950er Jahren mit Grundlagenforschung Unabhängigkeit von politischen und wirtschaft-

lichen Zielen erlangt werden sollte.[1] Diese Grundlagenforschung soll die aus dem Digitalisierungsdiskurs verschwundenen Medien wieder einführen. Ob das innerhalb der – bei aller Zukunftsbeschwörung womöglich kurzlebigen – Digitalisierungsinstitute geschehen soll oder, sofern noch Geld übrig ist, in anderen Forschungszusammenhängen, ist wahrscheinlich unerheblich.

II.

So sehr ich Claus Pias' Gegenwartsbeschreibung folge, so wenig kann ich doch die Frage zurückstellen, warum es allein eine Medienwissenschaft des technischen *a priori* sein sollte, die zur Analyse digitaler Kultur taugt. Dass besagte Institute viel zu genau wissen, was ›Gesellschaft‹ ist, muss nicht dadurch gekontert werden, dass ›Technik / Technologie‹ an jeden Anfang gestellt wird. Anders und nah am Text gefragt: Warum sind »Wissensgeschichte / Digitalisierung / Feminismus / Postkolonialismus / Nachhaltigkeit« eigentlich keine medienwissenschaftlichen Themen? Mir fallen jedenfalls einige Lesarten und Analyserichtungen ein, die sich aus diesen Bereichen medienwissenschaftlich gewinnen lassen, zur Erhellung von Medienwissenschaft und Feminismus usw. gleichermaßen. Es geht keineswegs darum, Thema X oder Y ›im Film‹ zu untersuchen, sondern herauszuarbeiten, wie mediale Gefüge das Sicht- und Sagbare formen und formatieren. Ein paar Anregungen: Medienwissenschaftliche Analysen zu Kolonialität und Postkolonialität beziehen sich auf Kartografie, auf Dispositive der Vermessungen von Körpern und Territorien (Schüttpelz), auf Logiken von Sammlungen und Praktiken ethnografischer Aufzeichnung, die ihre Sujets weniger dokumentieren als konstituieren (Holl). Die Medienwissenschaft wird als Disziplin auf ihre post-/kolonialen Bedingungen hin befragbar; ihr impliziter und zuweilen auch expliziter Eurozentrismus wird lesbar, mitsamt der Abwehr, die diese Analyse begleitet (Bergermann). Zu sprechen ist über die medienphilosophische Figur der Alterität oder über Weißsein und Filmfarben (Dyer), über in Software eingebettete *race as technology* (Chun). Im Hinblick auf postkoloniale Digitalität sind Mobile Commons, der Diskurs des *digital divide*, Migration und *surveillance* bzw. *sousveillance* (Kuster, Tsianons) alles andere als überforschte Themen.

Dass technische Medien Genderkonnotationen mit sich führen – Muttersprache, Maschinenschrift, Doppelgänger –, hat auch Friedrich Kittler gewusst. Die feministische, gender- und queertheoretische Medienwissenschaft hat sich mit Blickanordnungen, Zuschauer*innenschaft und Genreerwartungen befasst (Bee,

[1] Wissenschaftsrat: Anwendungsorientierung in der Forschung. Positionspapier (Drs. 8289–20), 2020.

Deuber-Mankowsky, Seier) und das kunst- und bildwissenschaftliche Repräsentationsparadigma um Dispositiv- und Assemblagekonzepte erweitert. Sowohl mit der Affekt- als auch der Materialitätsdebatte ist einiges ins Rollen gekommen: Das Verhältnis von Materialität und Diskursivität ist insbesondere in der Wissenschaftsforschung neu diskutiert und Agency als relationaler Prozess gefasst worden (Haraway, Barad). Auch Medienwissenschaft *matters*, weil sie vor der Herausforderung steht, das Verhältnis von Technologien, Stoffen und Körpern nicht deterministisch, aber doch agentiell zu denken (Harrasser, Trinkaus). Eine medienwissenschaftlich informierte Affekttheorie, wie sie mit und gegen die Psychoanalyse erarbeitet wurde (Angerer, Berlant, Tuschling), hat wiederum viel zu sagen zu Male Nerd Cultures, Manosphere und Hate Speech im Internet (Strick). Überhaupt ist es vor allem Maskulinität, die gender- und medientheoretisch an der Zeit ist. Paul Preciados hat Maskulinität vom *Playboy Channel*, über Testosteron bis #MeToo als materiell-semiotische Praxis durchbuchstabiert. Und welche Sprache der Liebe erzeugen erratische Messages im Minutentakt, welche und wessen textuelle Lust / Macht wird zu *sexual harassment* – zum Beispiel bei Avital Ronnell? Welche und wessen nicht?

Ob das nun Medienwissenschaft mit oder ohne Medien ist, mögen andere beurteilen. Klar ist jedenfalls, dass die aufgeworfenen Fragen in den Digitalisierungsinstituten fehlen, aber Teil von digitaler Kultur sind. Wahrscheinlich hänge ich dem Konzept von Medienwissenschaft als Fragestellung an, demnach Medienwissenschaft ihre Gegenstände in den verschiedensten Bereichen hervorbringt, darin als Vermittlerin aber zugleich immer wieder unsichtbar wird. Die wiederholten Selbstreflexionsschleifen, in denen sich die Medienwissenschaft auf der Suche nach ihrer Genealogie, ihrer Bestimmung und ihren Methoden befindet, sind auch Maßnahmen der Selbstvergewisserung. Als Anwendung der eigenen Prämissen auf sich selbst ist das performativitätstheoretisch interessant – Medialität der Medienwissenschaft –, aber auch als Leerlauf beschreibbar. In der Kunsttheorie wird das Abrücken von der modernistischen Setzung der Medienspezifik – die Güte eines Werkes bemisst sich daran, wie es auf seine materiell-mediale Bedingung referiert – als postmedial beschrieben. Es umfasst die Anerkennung sowohl der Historizität und Heterogenität des Mediums, das sich nicht immer auf den gleichen Nenner bringen lässt, als auch der Überlagerung und Verflechtung verschiedener Medien. In diesem Sinne möchte ich durchaus für etwas mehr Postmedialität plädieren.

Max Bense

Axiomata

(für Erwin Bücken, Goswin P Gatti, H. Wamper)

1944

Faksimile und Transkription

Für Erwin Brücker, [illegible], H. Wenger.
1944.

Axiomata

?

1.

Wir sind der Ueberzeugung, dass es immer Dinge gibt, die entweder anerkannt oder ruiniert werden müssen. Es ist die Aufgabe der Kritiker anzuerkennen oder zu ruinieren.

2.

Wenn der Kritiker ein Zeitkritiker ist, dann ist er ein Aufklärer.

3.

Wir sind der Ueberzeugung, dass der Geistige sich dort offenbare, wo man von der Meinung ist, dass der wirkliche Mensch immer erst gebildet werden müsse. Diese Bildung des wirklichen Menschen ist ein Akt der ansichhaltenden Vernunft, die der Zeitkritiker nicht müde wird, auszuüben und einzuüben. In diesem Sinne ist der Zeitkritiker als Aufklärer sogar ein Lehrer des Philosophen.

4.

Wir sind der Ueberzeugung, dass über dem Erkennenden und Dichtenden sich erst der Geist wölbe. Dichtung ist ein Korrektiv der Wissenschaften, Wissenschaft ein Korrektiv der Dichtung in der Herausarbeitung des Geistigen.

5.

Nicht der Dichter, nicht der Wissenschaftler, nicht der Aesthetiker, nicht der Ethiker ist der Masstab. Der Geistige ist der Masstab.

6.

Der Geistige ist die Aufgabe. Des Lebens und des Denkens. Der Zeitkritiker steht im Dienste seiner Herausbildung und seiner Erhaltung, wo er der wesentliche Mensch ist, aber auch im Dienste seiner Zerstörung, wo er der Unwesentliche, der Falschspieler ist.

7.

Wir sind Axiomatiker, weil wir zurückführen, weil wir reduzieren. Wir sind Essayisten, weil wir versuchen, weil wir annähern.

8.

Wir sind zyklisch. Wir kehren wieder mit bestimmten Axiomen und bestimmten Versuchen. Das entspricht der Nachdrücklichkeit der ansichhaltenden Vernunft.

9.

Wir sind beschränkt, denn wir gedenken zu limitieren.

10.

Wir vertreten den Schriftsteller als eine Kategorie des Kritikers, der nur Art und Grad des Augenblicks, nicht Art und Grad der Ewigkeit kennt und vertritt.

11.

Wir vertreten den Philosophen als eine Kategorie des Geistigen, der nur Art und Grad der Universalität kennt und vertritt.

12.

Wir sind der Ueberzeugung, dass das, was der Wissenschaft angehört kanonisch der Mathematik verfällt. Aber was Sprache wird, gehorcht den Gesetzen der Literatur. Mathematik erzeugt Wahrheit. Literatur erzeugt Wirklichkeit, d.h. die Wirkung gehört zu ihrem Sein. Die Aufgabe der Philosophie besteht indessen in der Herausarbeitung der Vereinbarungen und Annäherungen. Daher

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kann ihre reine, echte Form nur das System sein. Der hohe, wenn auch relative Stil philosophischer Systeme bleibt uns kategorisch für die Vereinbarkeit von Wahrheit und Wirklichkeit, von Wissenschaft und Literatur, von abstraktem und konkretem Denken, von Erkenntnis und Erfahrung, von reiner Vernunft und unmittelbarer Existenz.

13.

Unserm Gedanke an das System erzeugt in uns eine enzyklopädistische Gesinnung. Wir vereinbaren, wir machen aufmerksam, wir halten fest, wir überliefern. Sofern wir dies wollen, haben wir eine Tendenz.

14.

Unser Begriff der Oeffentlichkeit ist eine Funktion unseres Begriffs von Tendenz. Wir anerkennen die Tendenz, denn wir anerkennen den Geist, der etwas vertritt, als den Geist, der ein Problem der Oeffentlichkeit besitzt.

15.

Oeffentlichkeit-d, h. nicht der Mann, sondern der Gedanke hat eine Oeffentlichkeit, d.h. nicht der Mann, die Gesellschaft hat einen Gedanken.

16.

Es ist nicht ausgeschlossen, dass die Anonymität des Mannes die Oeffentlichkeit des Gedankens begünstigt.

17.

Wir sind mit Leibniz der Ueberzeugung, dass Geist wesentlich Form ist. Daher ist Stil für uns stets eine Aeusserung des Geistes.

18.

Wir sind also Rationalisten. Die ansichhaltende Vernunft ist die Methode der schärferen, aber auch der begrenzenden Unterscheidung. Das Uferlose ist wider unsere Natur und unseren Geist.

19.

Die Methode der schärferen, aber begrenzenden Unterscheidung ist die Methode der reinen Phänomene, auf die alles reduziert werden kann und es ist die Methode der Wesen, die wissen, dass sie die Wesen der Täuschungen sind, aber versuchen, den Täuschungen zu entgehen.

20.

Nachlassender Rationalismus, also nachlassende limitierende Vernunft ist für uns ein Zeichen sinkender Geisteskraft.

21.

Nachlassender Ausdruck vollkommener Sinnlichkeit, also das Verschwinden des Aesthetikers im Verfall der vollkommenen sinnlichen Rede und im Verfall der vollkommenen sinnlichen Handlung ist ein Zeichen sinkender Lebenskraft.

22.

Die Welt, die heraufkommt, ist immer synthetischer als die Welt, die verlassen wird. Sie verlangt eine steigende Geisteskraft wie auch eine steigende Lebenskraft.

Max Bense

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»Anerkannt oder Ruiniert«

The Intellectual Politics of Max Bense's *Axiomata* (1944)

William Stewart

»Die Emanzipation der Intellektuellen,« writes Max Bense in *Technische Existenz* (1949), »von ihrer armen Einsamkeit zu einer reichen Öffentlichkeit des Ernstes und der Verantwortung ist der Fortschritt zur ethischen Perfektionierung dieser Welt, die in diesem Jahrhundert in der unmittelbaren Gefahr ist, an ihren eigenen Sündenfällen zugrunde zu gehen.«[1] With the omnipresent scars of the Second World War not half a decade old, Bense stakes a claim about the role of intellectuals in the betterment of a shattered world, addressing them with an ethical imperative: find their way to a public sphere and establish a discourse of sincerity and accountability. To be an intellectual in Bense's view means to have an audience; to have an audience is, for an intellectual, to be free.

No one embodied this devotion to an intellectual audience more earnestly than Bense himself, whose prolificity—in both academic and popular texts, from the 1930s to his death in 1990—betrays a deep-seated, constant compulsion to publish. The repeated emphasis on the intellectual's relationship to the public sphere in his *Axiomata* from 1944, itself an unpublished text, is thus not without some irony. *Sed exceptio probat regulam:* locating a work of Bense's that in one form or another did not ultimately see publication is indeed a feat.

True to Bense's form, the *Axiomata* present intellect, *Geist,* as an issue inevitably entangled with the public sphere. Bense depicts the intellectual in a constant process of synthesizing material and delivering it to a public: »Wir vereinbaren, wir machen aufmerksam, wir halten fest, wir überliefern«.[2] Notably, what the *Axiomata* do not specify are the criteria by which intellectuals choose their material. No stipulation is made for *what* the intellectual is to deliver, or that it intuitively reflect what the public sphere believes to be the contemporary moment. In part, this is due to Bense's conviction that the »contemporary« is always a bit more temporally tangled than the surface of any one instant might suggest: more often than not, *Geist* manifests through *unzeitgemäße Betrachtungen*. This alertness to the dis-

1 Max Bense: Technische Existenz. Essays, Stuttgart 1949, p. 74.

2 Max Bense: Axiomata [Unpublished typoscript], 1944, A: Bense, Max, Deutsches Literaturarchiv Marbach, Axiom 13. Subsequent citations to be given in text.

continuities in the historical development of thought helps account for Bense's tendency to ground his more forward-looking theses—the ontological priority of technology; the development of a universal logic; the transmutability of the qualitative and quantitative; the synthesis of material, intellect, mechanics, and aesthetics—in his study of 17th-, 18th-, and 19th-century figures like Denis Diderot, René Descartes, Pierre-Simon Laplace, Georg Cantor and, above all, Gottfried Wilhelm Leibniz. Bense's thinking is distinguished by the way it elevates the forces of deep conceptual latency operative in the technological avant-garde of his day.

In step with the asynchronous thought of his intellectual heroes, Bense's own pursuits, particularly those published during the Second World War, also reveal a distinct »untimeliness.« In this regard, the *Axiomata* are paradigmatic. For these twenty-two theses—dedicated to Erwin Bücken, Goswin Peter Gath, and Heinrich Wamper, friends from his days as a student in Cologne—capture how this untimeliness reflects not only Bense's topics of study, but also his method and form.

Judging strictly by his bibliography, Max Bense occupied something of a parallel dimension to the world around him in 1944. He published more than a dozen texts that year, with titles that betray nothing of the world-historical and military-catastrophic events simultaneously at play in Europe: a short book titled *Das Leben der Mathematiker. Bilder aus der Geistesgeschichte der Mathematik*, academic essays such as *Das Verhältnis von Literatur und Philosophie*, as well as feuilleton articles in the *Kölner Zeitung* under headlines like *Mathematik und Philosophie* or *Gedanken über ein Sanduhrspiel*.

In fact, this apparent disengagement reflects not an esoteric ignorance, but rather an idiosyncratic mental politics in which the fascist war machine embodied an anti-intellectual enemy that could be resisted only by doubling down on a vocation of the mind. »Critically aloof« might best capture Bense's position toward the conflict and its ideologies. He depicted the politics of this aloofness—which itself bears an a- or outright anti-synchronicity—in the memorable epigraph to *Technische Existenz:* »Mit List und Tücke ist es mir gelungen, die zwölfjährige Regenzeit zu überstehen. Ich hatte meine Laterne verhängt, damit ihr Licht nicht bemerkt werde und zu laut und auffällig denjenigen heimleuchte, die auf falschen Pfaden gingen.«[3]

Survival of the fascist »rainy season« in Bense's case involved an unsuccessful attempt to emigrate to the United States in 1939; a refusal to attend a Nazi *Ordensschule* following the completion of his dissertation, resulting in the forfeiture of a university career; compulsory service in the Luftwaffe as a meteorologist with no chance of promotion on account of his history of anti-Nazi statements; and, ulti-

3 Bense: Technische Existenz (as note 1), p. 11.

mately, placement from 1943 until the end of the war at the *Labor für Hochfrequenztechnik und Ultraschall* in Georgenthal.

Situated deep in Thüringen, Georgenthal paradoxically served both as a hub of military activity for the Nazis and as a shelter from the front lines for Bense. While there, he undertook a kind of inner immigration, devoting his free time to his own studies. During the day, however, he was at the disposal of the Luftwaffe's research efforts. As he chirps ironically in a letter to a friend from November 1943, »Ab 8 bis 17 Uhr bin ich als Physiker im Labor und mache gute elektronenoptische Versuche für die Luftwaffe.«[4] The American army, upon capturing Georgenthal in the spring of 1945, was less convinced about the importance of his experiments, deeming Bense little more than a bureaucratic assistant. Here, at least, Bense's strategy of critical aloofness as political resistance paid off: perhaps on account of this apparent lack of engagement with military projects, the American occupiers appointed Bense as Georgenthal's mayor almost immediately after their arrival, an office he held for some six months before taking a position at the university in Jena.[5]

The »criticality« of Bense's aloofness signals the importance of what this *Geistiger* chose and, more importantly, chose *not* to write about. The *Axiomata* open with precisely this point. When Axiom 1 claims the critic to be arbiter over the ontological dichotomy between recognition and ruination, acknowledgement and annihilation, Bense is articulating his intellectual politics outright. It is not just that written critique is here the ultimate source of creative (or destructive) power. Rather, the performance of Bense's aloofness, from a figure who published constantly throughout the Nazi regime, can never be understood as unintentional. Denial of recognition within Bense's written output is always deliberate, tantamount (following Axiom 1) to a purposeful ruination.[6] Refusing to elevate to the level of intellectual discourse of that which is inherently anti-intellectual constitutes an implicit criticism in Bense's aloofness, an ethos which would keep him focused solely (perhaps to a fault) on subjects that participated in what he deemed to be an *ansichhaltende Vernunft*.

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4 Max Bense: »Max Bense to Herbert Franke«, 26. November 1943, A: Bense, Max; Briefe an Herbert Franke, Deutsches Literaturarchiv Marbach.

5 A more detailed account of these events can be found in Michael Eckardt's contribution to Elke Uhl and Claus Zittel (eds.): Max Bense. Weltprogrammierung, Stuttgart 2018, pp. 11–26.

6 »Ruin«, too, is a loaded term in Bense's output during the war's end and its immediate aftermath. Surrounded by mountains of rubble, he confronts »ruin« as both a metaphorical and a material reality. The quote that opens this commentary, for instance, is taken from the essay in *Technische Existenz: Erinnerung und Voraussicht. Eine Rede vor der Ruinen und Särgen* (pp. 64–76). Even more pointed is an undated and unpublished essay from the mid-1940s, *Vom Wesen der Ruine*, which diagnoses a post-Reich Germany with the admonition that: »Jede Ruine birgt nur eine einzige Gefahr: das sie zum inneren Ruin wird« (n. p.).

The second axiom reiterates this politics while framing its inherent untimeliness and asynchronicity, aligning a critique and thus transcendence of the contemporary with a project of human enlightenment. (This enlightenment ideal Bense would never abandon, later openly challenging its now-canonical critics.[7]) But this asynchronicity reflects the form of the text itself, as its recourse to the axiom signals a key, early intellectual interest of Bense's. His self-description as »Axiomatiker« evokes the culminating developments of mathematics in the 19th and 20th centuries, specifically David Hilbert's call for the axiomatization—and thus logical systematization—of mathematical thought.[8]

Bense's intervention arrives in marrying together this mathematical tradition with one of a much clearer humanist genealogy, namely the essay, as Axiom 7 and 8 articulate. The marriage is encoded in his language, with the equivocality of *Versuche* simultaneously signaling both the laboratory's experiment and the writer's *essai*. This synthesis of mathematical and humanist aims—a constant refrain in Bense's writing throughout the 1930s and 40s, encapsulated in the titles of works like *Geist der Mathematik* (1939) and *Konturen einer Geistesgeschichte der Mathematik* (1946/49)—appears explicitly in Axiom 12. While Bense assigns mathematics to the realm of truth (in the sense of verifiability) and literature to the realm of reality (as generative of effect, an etymologically true notion of aesthetics), they, along with philosophy and science, are united in their adherence to laws, and thereby all subject to a reduction into systematic—and thus axiomatic—forms. That the axiomatic form employed to make this observation would itself be subject to that same observation is no accident. Such conceptual recursivity is invoked in the remarks on Leibniz in Axiom 17: style always expresses intellect. In the specific context of the *Axiomata*, however, the embeddedness of *Geist* and *Form* further indicates an inseparability of mathematics and aesthetics, as the axiom belongs equally to the realm of *Form* (method) and *Geist* (logic).

In a gesture to what will become a signal focus of Bense's postwar output, the *Axiomata* link systematicity to a so-called »encyclopedic« attunement. In the late 1940s, the historical *Encyclopédie* embodies Bense's ideal for knowledge production that is democratically distributed, liberally plural, and socialistically historicized.[9]

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7 See Bense's review of Theodor W. Adorno and Max Horkheimer's *Dialektik der Aufklärung*: Hegel und die kalifornische Emigration, in: Merkur 4/1 (January 1950), pp. 118–25.

8 As Bense remarks already in 1935, Hilbert »weiß um die geheime Mitte der Mathematik und stellt die gesamte mathematische Methodik und Axiomatik in den Dienst der Aufgabe, das Unendliche in seiner Transzendenz zu erfassen.« See Max Bense: Aufstand des Geistes. Eine Verteidigung der Erkenntnis [1935], in: Ausgewählte Schriften in vier Bänden: Bd. 1, Philosophie, ed. Elisabeth Walther, Stuttgart 1998, p. 100.

9 Max Bense: Über Rationalisten und Enzyklopädisten, in: Merkur 1/2 (February 1947), pp. 236–8: 238, § 16.

Diderot and d'Alembert are recurring and central figures in Bense's 1950 critique of Theodor W. Adorno and Max Horkheimer's *Dialektik der Aufklärung* as well as in his own *Konturen einer Geistesgeschichte der Mathematik*. Moreover, they set the tone for his entire pedagogic project upon re-entering the academy, serving as the topic of his 1946 *Antrittsvorlesung* in Jena, models of forward-looking intellectualism in the age of *Technik*.

The notable absence of »Technik« from the *Axiomata*, however, is all the more conspicuous given its status as watchword of the Bensean postwar program. While, in subsequent years, the concept both underpins Bense's synthesis of *Geist, Mathematik*, and *Material*, and serves as the axis around which his embrace of historical encyclopedism revolves, the shibboleth is only implied in the final axiom: »Die Welt, die heraufkommt, ist immer synthetischer als die Welt, die verlassen wird.« The synthetic world is nevertheless a fitting conclusion for the *Axiomata*, as it opens out to a sentiment that Bense's work invokes repeatedly in the postwar period.[10]

This postwar work has served as the focus for the recent resurgence of interest in Bense, which aims to move the thinker's writings to a more central place in techno- and media-theoretical discourse.[11] There is an understandable tendency in this revival to emphasize Bense's ready reception of cybernetics beginning in the 1950s, and his partly prophetic, partly esoteric prognosis of the convergence of the machinic and aesthetic worlds.[12] As insightful as these perspectives are, ex-

10 This axiom could plausibly serve as the mantra of Bense's *Technische Existenz*, as evinced by statements such as »Der Fortschritt der Welt besteht darin, daß sie synthetischer wird« (p. 90), or »Für den Einzelnen der Gesellschaft der Intellektuellen bedeutet diese Forderung nach der ethischen Verantwortung der Welt, die man mit hervorgebracht hat und die man bewohnt, nichts geringeres als der *Eintritt in die ethische Verantwortung dieser Welt*, die er hervorgebracht hat und die er bewohnt. Man wird nicht mehr Dichter, Gelehrter, Künstler, Erfinder und Schriftsteller im ausschließenden Sinne sein können, man wird ein synthetisches, ein enzyklopädisches Dasein führen müssen […].« (p. 73).

11 See here Elke Uhl and Claus Zittel (eds.): Max Bense. Weltprogrammierung, Stuttgart 2018; this volume largely reflects the proceedings of a 2010 conference held at the Internationales Zentrum für Kultur- und Technikforschung of the Universität Stuttgart on the occasion of Bense's 100th birthday. This collection is complemented by a second volume, Andrea Albrecht et al. (eds.): Max Bense. Werk – Kontext – Wirkung, Stuttgart 2019, based on a conference with the same title from early 2018 at the Deutsches Literaturarchiv in Marbach.

12 Such a tone is set by the editors' introduction to the recent volume *Max Bense. Weltprogrammierung*, positioning Bense as a woefully forgotten patriarch of digital humanities, the modern variant of which appears by comparison regrettably »hausbacken, apolitisch, anti-ästhetisch und in systematischer Hinsicht dramatisch unterkomplex« (p. 3). In his contribution to the same volume, Claus Pias presents Bense as an ur-media theorist, while Hans-Christian von Hermann traces Bense's anticipation of post-digital forms of art, and Sybille Krämer's essay categorizes Bense's literary theory as postmodern *avant le lettre*, perhaps even post-postmodern in its utter comfort with the artificiality of textual surface.

amining Bense's intellectual character at an earlier stage and on the cusp of his reception of information theory reveals the steadfastness of his dedication to the interdisciplinarity that, in his later oeuvre, appears under the signs of cybernetics and semiotics. In the *Axiomata*, this interdisciplinarity takes the form of a wide conceptual scope that seeks to unite mathematics, philosophy, aesthetics, and systematicity as all exhibiting a critical rationality, a rationality that claims its truest manifestation when it enters or even constructs a public space. Above all, the curation of this intellectual public space marks Bense's central political gesture, in which ideologies are always subject to a dynamic of *Anerkennung* or *Ruinierung*—preserved in the space of discourse or expelled from it.

Simultaneously embedded in Bense's key historical interests while anticipating the work that followed, the *Axiomata* illuminate the way that Bense's extensive and diverse intellectual trajectory betrays not ruptures of paradigm so much as periodic reorganization under new signs. The *Axiomata* remind us that there is a marked consistency over time in Bense's methods and ideas, one obscured only by the inherently provisional nature of his nomenclature and his constant search for a new vocabulary to name the phenomena he had all along been recognizing, all along been acknowledging.

Medien und Mathematik

Alexander R. Galloway

Was bedeutet es, von »Medien und Mathematik« zu sprechen? Die meisten werden zustimmen, dass *Technologie* ein Medium ist. Aber ist auch die *Mathematik* ein Medium? Wenn ja, um was für ein Medium handelt es sich? Man betrachte zunächst ein Zitat des Mathematikers Richard Dedekind aus seinem Göttinger Nachlass. Denn erst durch Dedekind, der am 24. November 1858 eine Tür schloss, die Zeno über 2000 Jahre zuvor erstmals geöffnet hatte, wurde die Mathematik vollständig linguistisch – vollständig literal und digital. Dies ist Dedekinds Hymne an die Arithmetik, seine Hymne an das Digitale:

»Von allen Hülfsmitteln, welche der menschliche Geist zur Erleichterung seines Lebens, d.h. der Arbeit, in welcher das Denken besteht, bis jetzt erschaffen hat, ist keines so folgenreich und so untrennbar mit seiner innersten Natur verbunden, wie der Begriff der Zahl. Die Arithmetik, deren einziger Gegenstand dieser Begriff ist, ist schon jetzt eine Wissenschaft von unermesslicher Ausdehnung und es ist keinem Zweifel unterworfen, dass ihrer ferneren Entwicklung gar keine Schranken gesetzt sind; ebenso unermesslich ist das Feld ihrer Anwendung, weil jeder denkende Mensch, auch wenn er dies nicht deutlich fühlt, ein Zahlenmensch, ein Arithmetiker ist.«[1]

Wer ist dieser »Zahlenmensch«, dieser Mensch, der von Schaltern und Befehlen besessen ist? Eine erste Antwort könnte in einer Strophe eines Gedichts von Hans Magnus Enzensberger zu finden sein, das Gottfried Wilhelm Leibniz gewidmet ist. Enzensberger gibt hier vor, dass die CIA Leibniz untersuche (der durch den Anfangsbuchstaben »L« gekennzeichnet wird) und ein psychologisches Profil des barocken Mathematikers erstellt habe:

»(Aus unsern Dossiers, sagt die CIA, ergibt sich folgendes Bild.
Privatleben: fehlt. Sexuelle Interessen: gleich null. Emotional
ist L. ein Kretin. Seine Beziehung zu andern ist der Diskurs
und sonst nichts. Was einen ferner schier rasend macht,

[1] Zit. nach William Ewald (Hg.): From Kant to Hilbert. A Source Book in the Foundations of Mathematics, Vol. 2, Oxord 1996, o.P.

ist dieser wahnwitzige Fleiß. Unter allen Umständen, überall,
jederzeit schreibt er, liest oder rechnet. Seine kleine Maschine,
die Wurzeln zieht, hat er stets zur Hand. Die Staffelwalze rotiert.
Wie ein Automat. Wie ein Automat, der einen Automaten gebaut hat.)«[2]

Was ist das Wesen der Arithmetik? Eine in der Medientheorie verbreitete Antwort lautet, dass die Frage nach dem »Wesen« schlicht nicht der richtige Ansatz ist, dass die Phänomene des Digitalen oder des Analogen aus spezifischen technischen Bedingungen *hervorgehen* und dass sie Effekte statt Wesen sind. Doch dies ist offenbar eine Auffassung, die bereits zugunsten des Analogen voreingenommen ist. Wie würde also eine *digitale* Theorie des Digitalen aussehen? Sie würde digitale Bedingungen vorziehen, Bedingungen wie Struktur, Rahmen, Abstraktion, Form, Sprache und Mathematik (insbesondere die Arithmetik). Sie wäre sowohl eine Aufgabe der Technologie als auch der Philosophie. Damit komme ich auf eine einfache, ja sogar naive Frage zurück, auf die Frage nach dem Digitalen und dem Analogen. Was ist das Digitale? Was ist das Analoge? Und wie hängen sie zusammen?

Der kurze und unvollendete Roman *Der Berg Analog* (*Le Mont Analogue*) des französischen Autors René Daumal präsentiert eine faszinierende, wenn auch schwer fassbare Auseinandersetzung mit dem Digitalen und dem Analogen. Bei der Beschäftigung mit dem Buch ist es schwer, einzuschätzen, was Daumal mit dem »analogen Berg« oder selbst mit der Verwendung des Begriffs »analog« meinte. Der Roman befasst sich mit mythologischen Beschreibungen von Bergen. Er thematisiert den Gegensatz von Proportion und Größe, insbesondere im Hinblick auf das Ausmaß und die Unzugänglichkeit des Berges. Er handelt davon, wie Berge als Schwellen zwischen dem Sichtbaren und dem Unsichtbaren fungieren. Der Text beklagt »ein unheilbares Bedürfnis zu verstehen«. Tatsächlich hat Daumal Spaß an dem Verhältnis der Sprache zum Wissen und Verstehen, denn es gibt eine Figur im Roman namens Sogol – eine umgekehrte Schreibweise des altgriechischen Wortes Logos – sowie eine Haushälterin, die schlicht Physik heißt.

(Wer neugierig ist, wie sich Daumal heute zu der digital/analog-Debatte verhalten würde, braucht nur den wort- und geistreichen Untertitel des Romans zu lesen: »Ein nicht-euklidischer, im symbolischen Verstand authentischer alpinistischer Abenteuerroman«)

»Alles Denken ist eine Fähigkeit, die Einteilungen eines Ganzen zu erfassen«, schrieb Daumal an einer der elegantesten Stellen des Romans, »*die Einteilungen*

2 Hans Magnus Enzensberger: G. W. L., in: ders.: Mausoleum. Siebenunddreißig Balladen aus der Geschichte des Fortschritts, Frankfurt am Main 1975, S. 24–27, hier S. 25.

eines Ganzen absolut jeder Art«[3] [Toute pensée est une capacité de saisir les divisions d'un tout… les divisions d'un tout absolument quelconque.]. Was soll der Leser von dieser Passage halten? Ist sie eine Hymne an die Leistungen des rationalen Denkens? Oder ist sie ein Eingeständnis, dass es, ungeachtet der Leistungen der Vernunft, immer einen Exzess der Ganzheit geben wird, einen Exzess von Totalitäten, die zwar vielleicht erfasst werden können, doch gerade in ihrer Fassbarkeit über eine grundlegende Trennung vom Denken hinwegtäuschen? In gewisser Weise kehrt Daumal zu einigen der ursprünglichen Fragen der griechischen Philosophie zurück: Was ist Vernunft, und was ist Analogie? Was ist *logos*, und was ist *analogos*?

Begriffe wie »Analogie« und »analog« teilen *logos* als gemeinsame Wurzel. Daher scheinen *logos* und *analogos* zumindest auf den ersten Blick etymologisch verbunden zu sein. Aber wie genau? Sind diese beiden Begriffe Gegensätze? Oder stehen sie in einer anderen Beziehung zueinander? Und wenn das vermeintliche Gegenteil des Analogen das Digitale ist, was folgt daraus für *»logos«*? Sind »digital« und »*logos*« Synonyme?

Logos bedeutet bekanntlich ›Sprache‹, ›Diskurs‹ und ›Wort‹. Doch es bedeutet auch ›Verhältnis‹ [*ratio*] und damit im weiteren Sinne Rationalität und Vernunft. Der Zusammenhang zwischen ›Wort‹ und ›Verhältnis‹ ist möglicherweise nicht ganz klar. Aber man muss bloß an die Kunst der Rhetorik denken und daran, wie ein erfahrener Rhetoriker die Rede komponiert und vorträgt. Zu sprechen – und gut zu sprechen – bedeutet, in einer Weise zu sprechen, die kohärent ist, in der Worte die passenden kompositorischen Arrangements bilden. Oder man denke an die Mathematik: Wie Friedrich Kittler einmal schrieb, nannten die Pythagoreer »Tonverhältnisse wie das 4:3 der Quarte, das 3:2 der Quinte und zuhöchst das 2:1 der Oktave wortwörtlich λόγοι«.[4] Mathematische Verhältnisse wie 4:3 oder 3:2 wurden als *»logoi«* verstanden, weil sie ebenso wie gut komponierte Sprache Beispiele für passende kompositorische Arrangements waren, die in der Musik gut hörbar und in der Geometrie sichtbar waren.

Analogos ist etwas anderes. Das *ana-* in *analogos* ist keine Negation von *logos* und bildet auch nicht dessen Gegenbegriff, sondern erzeugt vielmehr eine andere Beziehung, eine Art parallele oder implizite Beziehung. In seiner gebräuchlichsten Verwendung bedeutet *ana-* ›oben‹ oder ›aufwärts‹. *Ana-* ist das Gegenteil von *kata-*, d. h. ›unten‹ oder ›abwärts‹. Ein »katabatischer« Wind (*baino* [βαίνο], bedeutet ›laufen‹, ›treten‹ oder ›gehen‹) ist demnach der Wind, der von einem eisigen Gletscher

3 René Daumal: Le Mont Analogue. Roman d'aventures alpines, non euclidiennes et symboliquement authentiques (1952), Paris 1981.

4 Friedrich Kittler: Zahl und Ziffer, in: Sybille Krämer und Horst Bredekamp (Hg.): Bild – Schrift – Zahl, München 2003, S. 193–204, hier S. 199.

nach unten weht. Und »anabasis« bezieht sich auf die entgegengesetzte Art von Bewegung, einen Aufschwung oder Ansturm, etwa in einer Formulierung wie ›die Anabasis des Begehrens‹, die in den 1960er und 1970er Jahren populär wurde. Doch das ist nicht die hier verwendete Definition; *analogos* soll nicht als ›Aufwärts-Wort‹ oder ›Aufwärts-Rede‹ verstanden werden. Wie Pierre Chantraine in seinem Wörterbuch der griechischen Etymologie feststellte, kann *ana-* auch eine Art distributiven Wert haben, d. h. ›im Verhältnis von‹, ›aufgrund von‹ oder ›im Verhältnis zu‹.[5] Damit beginnt sich die eigentliche Bedeutung zu enthüllen. *Analogos* bedeutet wörtlich, »einem passenden Logos ›angemessen‹ oder ›gemäß‹« zu sein. Auf einen einzigen Begriff gebracht, bedeutet *analogos* auch einfach ›Proportion‹.

Doch wie wurde ein altgriechisches Wort mit der Bedeutung ›Proportion‹ schließlich zum Kurzbegriff für moderne Medientechnologien wie das Grammophon? Und warum wird der Begriff ›analog‹ als Bezeichnung für Theoretiker verwendet, die an Dingen wie Affekt, Intensität und Werden interessiert sind (z. B. habe ich Gilles Deleuze einmal einen ›analogen Philosophen‹ genannt)? Was verbindet all diese Dinge miteinander? Was verbindet Proportion mit Kontinuität und Kontinuität mit Intensität?

Der Mathematiker Euklid wird, wenn überhaupt, als Geometer erinnert. Aber Euklids *Elemente* waren ein Sammelwerk aller mathematischen Kenntnisse, die ihm damals bekannt waren, beginnend mit der ersten Mathematik und der Geometrie, gefolgt von der Behandlung von Größenverhältnis und Proportion – d. h. *logos* und *analogos* – bis hin zur Arithmetik, Irrationalität und anderen Themen. »Es gibt kaum etwas Schöneres in der Mathematik als Euklids wunderbares fünftes Buch«, schrieb der britische Mathematiker Arthur Cayley.[6] Tatsächlich stellen die Definitionen, mit denen das fünfte Buch der Abhandlung beginnt, eine Reihe wichtiger Konzepte zur Verfügung – zunächst das mathematische Verhältnis, dann die Proportion, verstanden als eine Gleichheit von Verhältnissen.

Konzentrieren wir uns auf die Definitionen 3 und 6:

Definition 3 lautet:

> »Ein Verhältnis ist die Beziehung zweier vergleichbarer Dinge der Größe nach.« [»*Λόγος ἐστὶ δύο μεγεθῶν ὁμογενῶν ἡ κατὰ πηλικότητα ποιὰ σχέσις*«].

Definition 6 lautet:

> »Stehen Größen in gleichen Verhältnissen, heißt ihre Beziehung eine Proportion.« [»*Τὰ δὲ τὸν αὐτὸν ἔχοντα λόγον μεγέθη ἀνάλογον καλείσθω*«].[7]

5 Vgl. Pierre Chantraine: Dictionnaire étymologique de la langue grecque: Histoire des mots, Paris 1968, S. 82.

6 »There is hardly anything in mathematics more beautiful than Euclid's wondrous fifth book«, zit. nach William Ewald (Hg.): From Kant to Hilbert: A Source Book in the Foundations of Mathematics, vol. 1, Oxford 1996, S. 559.

7 Euklid: Elemente. Übersetzung der 15 Bücher der Stoicheia mit Verknüpfung der grie-

Digital und Analog erscheinen hier – vielleicht zum ersten Mal – auf der gleichen Seite, zumindest unter dem Deckmantel von *logos* und *analogos*. Von unmittelbarem Interesse in Definition 3 ist der Ausdruck »zwei gleichartige Größen« (»δύο μεγεθῶν ὁμογενῶν«) oder, um die Terminologie von Euklid noch genauer nachzuahmen, zwei homogene Größen. Was braucht es, damit zwei Größen homogen, »gleichartig« sind? Sie müssen ein Bauelement oder ein Teilstück [μέρος] enthalten, durch das sie beide ohne Restbetrag gemessen werden können. Dementsprechend können die Ganzzahlen 4 und 3 das Verhältnis 4:3 bilden, da jede von ihnen durch ein gemeinsames, diskretes Teilstücks messbar ist: die einfache arithmetische Einheit, die gemeinhin als 1 bekannt ist.

Manche Dinge sind also vergleichbar, andere aber nicht. Im Englischen sagt man »you can't compare apples and oranges«. Äpfel und Orangen sind nicht vergleichbar und haben kein diskretes Verhältnis, weil sie kein Bauelement als gemeinsame Bemessungsgrundlage teilen. (Dies ist ein Indiz dafür, warum Ästhetik und Digitalität zu grundlegend unterschiedlichen Paradigmen gehören; die Wahrnehmung nimmt qualitative Unterschiede leicht auf, während die Digitalität sie gesetzmäßig verbietet.) Das *logos*-Verhältnis ist also ein seltsames Ding, es ist sowohl multipel als auch homogen. Das Digitale beginnt mit einem differentiellen Schnitt, dem Schnitt der Unterscheidung. Aber nach dem anfänglichen Schnitt gehört jede weitere Unterscheidung zur gleichen Gattung (dem Homogenen). Später in der Abhandlung erweitert Euklid diese grundlegende Einsicht, indem er feststellt, dass die *logos*-Verhältnisse symmetrisch [σύμμετρα], wörtlich »mit Maß«, oder durch einen geteilten, gemeinsamen Part vergleichbar sind.

Definition 6 verschiebt die Auseinandersetzung etwas. Während die vorherige Definition ein einziges Verhältnis betraf, das seinerseits als eine Beziehung zweier diskreter Zahlen definiert ist, dupliziert diese Definition das Verhältnis, indem sie zwei Verhältnisse in eine Gleichheitsbeziehung bringt. Wenn zwei Verhältnisse gleich sind, sind sie *analogos* oder proportional.

Euklid stellt diese spezifischen Definitionen bereit. Es ist aber auch möglich, sie zu verallgemeinern. Die allgemeine Formel für *logos* ist demnach a/b oder das Verhältnis zwischen zwei homogenen Elementen. Demgegenüber ist die allgemeine Formel für *analogos*: a/b = c/d oder die Gleichsetzung zweier bestehender Verhältnisse.

Diese beiden Formulierungen sind aufschlussreich. Zunächst bestätigen sie, dass *analogos* tatsächlich nicht die Negation oder Inversion von *logos* ist – und somit ist das Analoge durch Hochrechnung nicht das Gegenteil des Digitalen –, sondern vielmehr, in einem grundlegenden Sinn, sein Zwilling oder Echo. Doch selbst

chischen Textfassung von Rudolf Haller, Online-Fassung unter: http://www.operaplatonis.de/euklid/Euklid_Stoicheia.pdf, Buch V.

wenn sich Ersteres als eine Verdoppelung des Letzteren erweist, divergieren die beiden Begriffe in ihren Konnotationen und Wirkungen dramatisch. Die beiden Ausdrücke mögen ähnlich aussehen, und sie mögen sich gegenseitig enthalten, aber sie produzieren letztlich zwei sehr unterschiedliche Technologien.

Man müsste sich noch eingehender mit Euklid beschäftigen, um es zu demonstrieren, aber in der Wurzel beruht das Digitale (oder *logos*) auf einem *homogenen Substrat* von Elementen, die quantitativ voneinander abweichen. Dies nennt man Arithmetik. Diese berühmten ›Nullen und Einsen‹ erhalten die meiste Aufmerksamkeit, aber die restlichen Ganzzahlen sind ebenso digital wie die natürlichen Zahlen insgesamt und die rationale Zahlenreihe als Ganze. Und das Thema muss nicht auf die Zahl beschränkt werden, denn auch das Alphabet ist eine fortschrittliche digitale Technologie, die ebenso einflussreich, wenn nicht sogar noch einflussreicher ist als die Ganzzahlen. (Tatsächlich werden in Sprachen wie dem Hebräischen oder Griechischen Buchstaben des Alphabets als Zählzahlen eingesetzt.) Jedes andere System der Vermittlung, das durch eine quantitative Differenz konstruiert wird, verdient ebenfalls den Namen digital.

Wie sein digitaler Zwilling kann auch das Analoge zu einer Abfolge von Bewegungen oder Mechanismen verallgemeinert werden. Erstens beruht das Analoge auf einem Substrat, bei dem sich alle Elemente streng heterogen zueinander verhalten, d. h., sie beziehen sich primär durch eine nicht-quantitative Differenz aufeinander, ohne Rekurs auf eine abstrakte oder symbolische Infrastruktur. Für die beiden Verhältnisse ist letztlich nur wichtig, dass sie ›ähnlich‹ sind.

Es gibt somit weder ein analoges Alphabet noch eine analoge Sprache – oder wenn es eine solche Sprache gäbe, wäre sie, wie Deleuze schrieb, eine streng ästhetische Sprache der »Ausdrucksbewegungen, para-sprachlichen Zeichen, die Atemzüge und Schreie etc. umfasst«.[8] Das Digitale/*logos* wird aus einer Verbindung zwischen standardisierten Elementen gebildet. Das Analoge betrifft demgegenüber eine Gleichheit der Dinge, die in ihrer eigenen Rationalität besonders bleiben. In gewisser Weise beruht das Digitale auf einer internen, das Analoge dagegen auf einer externen Gleichheit. Oder zumindest liegt hier der Schwerpunkt der beiden Begriffe.

Dies führt zu einem etwas kontraintuitiven Szenario, in dem die allgemeine Formel für das Digitale (a/b) keine explizite Gleichheit der Begriffe ausdrückt, aber eine implizite Gleichheit des Typs enthält [ὁμογενής]; die allgemeine Formel für das Analoge (a/b = c/d) wiederum scheint ein Paar von Verhältnissen darzustellen, während sie deren jeweilige spezifische Rationalität zugunsten einer einzigen allgemeinen Gleichheit eliminiert. Letztendlich sind beide Begriffe paradox.

8 Gilles Deleuze: Francis Bacon. Logik der Sensation, übersetzt von Joseph Vogl, München 1995, S. 70.

Das Digitale ist intern homogen und doch irgendwie immer ›zweifach‹. Und das Analoge ist intern heterogen und bleibt dennoch ›eins‹. (Aus diesem Grund konnte Deleuze, dessen Werk ein ausgedehntes Liebeslied auf die Heterogenität und die Analogie ist, auch die Eindeutigkeit, das ›Sprechen mit einer Stimme‹, loben).

Mithilfe dieser Definitionen versuche ich, das Digitale und das Analoge als allgemeine Vermittlungsformen zu denken, und nicht – zumindest nicht nur – als Sachverhalte der Unterhaltungselektronik. Wenn man über die unterhaltungselektronische Theorie des Digitalen und des Analogen hinausgeht, wird eine ganz neue Ebene sichtbar. Was sind die größten digitalen Technologien? Das Logikgatter und der Computer sind lediglich die neuesten in einer langen Reihe digitaler Technologien, die man mit den Ganzzahlen, dem Alphabet oder sogar dem Atom, der Synapse, dem Gen und dem Punkt selbst (dem, was Euklid das »Semion« oder die Marke nannte) beginnen lassen würde. Sicherlich sind dies die großen Technologien des Digitalen.

Indem man über den Bereich der Unterhaltungselektronik hinausdenkt, wird zugleich das Analoge daraus befreit. Das Analoge ist nun nicht mehr bloß die Vinyl-Schallplatte oder das Magnetband, sondern Dauer, Intensität, Empfindung, Affekt sowie die Welle, der Gradient und die Kurve. Das Analoge existiert überall dort, wo es Ähnlichkeiten zwischen qualitativen Einzelfällen gibt (ohne den Gebrauch quantifizierter Atome). Tatsächlich ist das Analoge ganz einfach die *Schnittstelle einer Differenz im Realen*, aber eines Realen, das von seiner romantischen und nostalgischen Aura befreit wurde, eines Realen ohne jede Logik der An- oder Abwesenheit, ohne das Prinzip von Regel und Abweichung. Das Reale wird dabei als umfassender und kontinuierlicher Bereich verstanden, in dem die Repräsentation – falls Repräsentation immer noch ein relevanter Begriff des Analogen ist – mit der Realität völlig deckungsgleich ist. Das Analoge ist das Reale ohne Abstraktion, ohne Reduktion, ohne ›Sampling‹ oder ›Erfassung‹. Damit soll nicht bestritten werden, dass das Analoge eine Vermittlungsform ist. Es soll bloß konstatiert werden, dass das Analoge eine Vermittlungsform ist, der immer im Realen verbleibt.

Deshalb neigen analoge Denker dazu, Dinge wie Empirismus und Pragmatismus dem Strukturalismus oder Rationalismus vorzuziehen. Der eher britische als französische Empirismus und Pragmatismus sind grundsätzlich analoger Natur. Sie sind gegenüber verallgemeinerbaren digitalen Strukturen wie Name, Wort, Gesetz, Technik, Kategorie oder Art tendenziell skeptisch eingestellt. Sowohl Empirismus als auch Pragmatismus sind dadurch im Kern nominalistisch, d. h. ›nur dem Namen nach‹, und lehnen somit Eigennamen oder Gesetz ab. Digitalität ist dagegen kaum mehr als eine verallgemeinerte Theorie der Namen und der Benennung.

Dies ist auch der Grund dafür, dass das Analoge die Ästhetik gegenüber anderen Dingen (Vernunft, Urteil) favorisiert, dass seine Anhänger die Deterritoriali-

sierung der Territorialisierung vorziehen und dazu neigen, in Begriffen wie Assemblage, Multiplizität, Differenz und Heterogenität zu denken. Es handelt sich dabei um Bedingungen, unter denen die Identität der qualitativen Differenz Vorrang vor der regelmäßigen Struktur von Buchstaben, Zahlen oder Symbolen hat. »Am Anfang ist das Chaos«, schrieb Elizabeth Grosz, eine prominente Deleuzianerin, in ihren Wellek-Vorlesungen von 2007, »die wirbelnde, unvorhersehbare Bewegung der Kräfte, die vibrierenden Schwingungen, die das Universum ausmachen«.[9] (Man bedenke, wie beunruhigt ein digitaler Philosoph angesichts von Worten wie Chaos, Kräfte oder Schwingungen wäre.)

Die umgangssprachliche Bedeutung von ›analog‹ als Offline, als das Alte, das Reale, das Authentische, das reiche Ästhetische ist also nicht falsch, auch wenn solche Schlagworte ideologisch ablenken. Es geht nicht so sehr darum, dass das Analoge authentischer ist, sondern dass es synthetische Qualitäten gegenüber analytischen Atomen bevorzugt. Unbelastet durch Eigennamen oder Regeln findet sich das Analoge vornehmlich in jenen Methoden und Bereichen, die weitgehend ohne diskrete Größenverhältnisse arbeiten, vor allem in der Empirie, im Pragmatismus, in der Ästhetik und in der Ethik. Unbelastet durch diskrete Atome findet sich das Analoge vor allem in den Technologien der Kurven und Wellen, in einer Ästhetik der Glätte und der ungebrochenen Linien, Flächen oder Volumen. Der Spiegel, das Echo, der Geist, die Spur, der Umriss sind paradigmatische analoge Formen. Die Materialität des Analogen ist Wasser, Flüssigkeit, Fluss oder vielleicht Plastik mit seiner Formgebung und kontinuierlichen Variation – man denke an das Werk von Heather Davis oder Catherine Malabou –, aber auch Metall, mit metallurgischem Glühen als einer Art analoger Verflüssigung der Materie. Doch Wasser, Metall und Kunststoff sind lediglich Metonymien der analogen Materialität insgesamt, die – wie Elizabeth Grosz es formulierte – gleichsam zu wirbelnden »Chaosscherben« [*shards of chaos*] schmilzt und sich in sie verwandelt.[10]

Wir sind nun in der Lage, klarer zu bestimmen, was einen analogen Philosophen ausmacht. Der analoge Philosoph wird sich in erster Linie auf die reale Materialität als Assemblage, Multiplizität, Heterogenität und Differenz konzentrieren. Die *analoge Ontologie* wird also die Deterritorialisierung der Territorialisierung vorziehen, das Werden dem Sein, den Prozess dem Stillstand, das Offene dem Geschlossenen. Dies erzeugt eine *analoge Ethik*, die sich durch Tun, Aktion, Produktion, Kreativität, Experiment und Pragmatismus definiert. Und auch eine *analoge Ästhetik* des Zufalls, des Ereignisses und des Chaos.

9 »In the beginning is chaos«; »the whirling, unpredictable movement of forces, vibratory oscillations that constitute the universe.« Elizabeth Grosz: Chaos, Territory, Art: Deleuze and the Framing of the Earth, New York 2008, S. 5.

10 Ebd., S. 28.

Zugleich rückt die Identität des digitalen Philosophen in den Fokus. Der digitale Philosoph wird Strukturen bevorzugen, die durch Differenz erzeugt werden. Zu diesen Strukturen der Differenz gehören binäre Oppositionen, Hierarchien und Normen, aber auch Brüche, Unterscheidungen und Schnitte. Der digitale Philosoph wird die Analyse der Synthese vorziehen; er wird die Dinge in ihre Bestandteile zerlegen wollen. Seine bevorzugte Form der Analyse besteht darin, eine komplexe Welt in nur zwei Kategorien zu unterteilen. Der digitale Philosoph wird Abstraktion, Struktur, Sprache, Logik, Rationalität und Form bevorzugen. Er ist ein Strukturalist, ein Rationalist, ein Formalist, ein Kritiker, ein Mathematiker, ein Idealist, ein Metaphysiker.

Natürlich ist dies letztlich eine falsche oder doch eine etwas gezwungene Unterscheidung. (Das Digitale ist in diesem Sinne immer »falsch«.) Und ich schwäche den Umstand ab, dass das Digitale und das Analoge eng miteinander verwoben sind. Außerdem wissen wir, dass alle digitalen Phänomene analoge Effekte erzeugen und alle analogen Phänomene zur Digitalisierung neigen. Dennoch gibt es seit Euklid, über Leibniz und Dedekind bis heute eine streng digitale Theorie des Digitalen und des Analogen.

Aus dem Englischen von Erika Thomalla

Re-Collecting Microbes with Hans Blumenberg's Concept of »Reoccupation« (*Umbesetzung*)

From Isolating/Cultivating towards Digitizing/Synthesizing

Alexander Waszynski and Nicole C. Karafyllis

1. Introduction

Microbes are attracting widespread interest. In the following,[1] we explore how recent microbiology has been approaching its objects, reached out to others, and continues to do so. Preconditions are collecting, isolating, and cultivating. These practices have been recognized as initial steps of making biofacts.[2] We will not refer to biofacts as such, but to how they acquired technical and universal potentials—both in- and outside the biobank. Collecting implies interruptions of biological life-times,[3] which, as we will see, interrelate with the historical understanding of world-time. It is no coincidence that microbiology developed out of botany and its agricultural cultivation practices used in the lab, as the making of biofacts culturally started with collecting seeds for breeding. In tacit alliance, microbiologists still speak of ›harvesting‹ their objects. The agricultural background is veiled by popular narratives about men fighting diseases, e.g. the physician Robert Koch—inventor of the paradigm of ›pure culture‹. Infiltrating whole societies with hygienic discourses[4] paved the way for »bioterror«[5] and the microbial enemy.

1 This text resulted from subproject A of the research project »Contamination and Readability of the World: Articulating Microbes in Collections« (MIKROBIB, 2018–2021), supported by the *German Federal Ministry of Education and Research* (BMBF); support code 01UO1811A.

2 Nicole C. Karafyllis: Die Samenbank als Paradigma einer Theorie der modernen Lebendsammlung, in: Nicole C. Karafyllis (ed.): Theorien der Lebendsammlung. Pflanzen, Mikroben und Tiere als Biofakte in Genbanken, Freiburg 2018, pp. 39–136.

3 How the seed bank changes the relation of the *perdurance* of the object and its *persistence* in time and place was analyzed in Nicole C. Karafyllis: »Hey Plants, Let's Take a Walk on the Wild Side!« The Ethics of Seeds and Seed Banks, in: Angela Kallhoff, Marcello Di Paola and Maria Schörgenhumer (eds.): Plant Ethics: Concepts and Applications, London 2018, pp. 188–203.

4 Cf. Bruno Latour: The Pasteurization of France (1984), Cambridge, MA/London 1993.

5 Cf. Philip Sarasin: »Anthrax«. Bioterror als Phantasma, Frankfurt am Main 2004.

In contrast, we will sketch and deconstruct the microbe as existential substance, which, as instance of life, is even more powerful. Instead of handling this topic in styles of cultural anthropology or history of science, we drag it onto the stage where phenomenology interacts with philosophy of history, referring to Hans Blumenberg (1920–1996). Since cultivation affects the conceptualization of history and historiography, it changes the yardstick of what can account for life-time within (and historiographically: against) world-time.[6] This will become apparent by scrutinizing the idea of the allegedly first and last unit of life: the microbe. The microscope was an instrumental breakthrough for generating the microcosmos, no doubt. However, it should neither be overestimated as a mere tool of visualizing microbial life nor as an instrumental-ontological unifier of what a microbe is (not only a cell), can be (e. g. not only an infectious agent), and how it can generate worlds. That a microbe is a very small living entity is just the logical minimum of the concept. It does not allow for the imagination of its dimensional scope, i.e. the prefiguring of microbes in the light of totality, generality, and concreteness. The recent acquisition of microbiologists' power is not a matter of technical progress and instrumental discontinuities in making microbes *visible*; rather, of constructing the microbes' ›own‹ ontological-metaphysical continuity. We thus focus on the microbial *culture* and its preservation in the collection as references for ›operative ontologies‹. In the biobank, the microbe's continuity and discontinuity appear to be the same thing. Ultimately, this mode of appearance makes nothing less than history operative. New high-tech methods such as molecular sequencing and big data genomics veil the fact that the ongoing transformation of biology into engineering still requires cultivating techniques. The related dematerialization began in the 1970s, when script-metaphorics and the genealogical construction of a hypothetic microbial ancestor of life went hand in hand, as we will exemplify with the case of biophysicist Carl R. Woese (1928–2012) and his method of 16S rRNA-sequencing.

Our line of argument involves three hypotheses: (1.) techniques and technologies model the bio-ontology of what *is* a microbe. At the same time, this affects the modeling of what *we* humans are. (2.) It is microbial collections of pure cultures[7] that make microbes *operative*. Cultivating is pre-operative and, at the same time, an operation itself. Here, the complex technique that transforms enrichment

6 Therefore, the concept of biofact as a hermeneutical tool aims at reflecting on and deconstructing what seems to be *self-explanatory* in the life sciences and their interrelations with the lifeworld.

7 Robert Koch's »Reinkulturtechnik« not only established the causal relation between a specific microbe and a disease, but also »enabled microbiology to designate itself as a true science—one that could order the microbial world with rigorous experimental investigations.« Maureen A. O'Malley: Philosophy of Microbiology, Cambridge 2014, p. 70.

Fig. 1: Stored glass ampoules with lyophilized cells (*Bacillus coagulans*) at the DSMZ-*German Collection of Microorganisms and Cell Cultures*, Acc.no. DSM-1, Photo: A. Waszynski, January 2019.

culture to pure culture will be sketched. (3.) Since mid-20th century, microbe banks function as *world models* of a newly constructed ›microbial world‹, representing the whole biosphere and, in this planetary perspective, reaching out to the lifeworld (*Lebenswelt*). The resulting arguments reach far beyond biology and are in need of philosophical exploration.

Figure 1 shows a bacterial storage unit in the microbe bank. Even if the latter usually contains bacteria, it can host biological entities of different types and forms, ranging from human cell cultures to algae and plant viruses. Note that ›microbe‹ is a conceptual unifier working across biological kingdoms. In today's banks, microbial strains are usually stored as freeze-dried granulate in glass ampoules at around +10 degrees Celsius.

The strain results from one colony or cell that has been singled-out by various isolation and purification techniques. It is the final stage of a »glass and apparatus-bound immortality«.[8] As turning a culture into a distinctive storage unit requires

8 Hannah Landecker: Culturing Life. How Cells Became Technologies, Cambridge, MA/London 2007, pp. 16f.

several precursors, we reject two common answers to the question »What is a microbe?«: either the cell or the glass containment. The microbe should be seen as *process* rather than a thing. In the following, this difference is exemplified by a historical case study on the *German Collection of Microorganisms and Cell Cultures* (short: DSMZ). It was founded in 1970 as national collection of West Germany, at that time termed »DSM« and located in Göttingen.[9] One of its founders, microbiologist Norbert Pfennig (1925–2008), worked as a renowned expert for cultivating the fragile phototrophic sulfur bacteria, which became the DSM's founding objects. Today, the DSMZ is part of the Leibniz Research Cooperation based in Braunschweig, being one of the biggest Microbial Resource Centers worldwide.[10]

2. The Microbe as Meta-operative Vacancy for ›Operative Ontologies‹

Considering ›operative ontologies‹, we transform the question »What *is* a microbe?« into: »What *makes* a microbe? And how does it make worlds?«[11] Long before it was made visible, it occurred as *contagion* causing diseases by touch; or as *miasma* that we inhale as poisonous vapor while existing in the same milieu; or as transubstantiating power turning wine into vinegar.[12] The idea of the co-existence of microbes and humans *in* the world, sharing a common base of ›creativity‹ (i. e. the potential of becoming a creature), is much older than the scientific concepts *Infusorium*, *Protist*, *Bacterium* or *Prokaryote* that emerged during the last 250 years. The history of the microbe as media anthropology of allegedly toxic media still needs to be written. It would be a story of contamination and decontamination, helping to explain why, even at the end of the 19th century, elderly people were afraid of breathing ›night air‹ and kept their windows shut in the dark.[13] Already

9 For archival sources and more references see our article: Das ganze Spektrum: Die Frühgeschichte der *Deutschen Sammlung von Mikroorganismen* DSM (ca. 1960–1979) [in review].

10 Jörg Overmann: Konzeption, Relevanz und Zukunftsperspektiven moderner biologischer Ressourcenzentren am Beispiel des Leibniz-Instituts DSMZ-*Deutsche Sammlung von Mikroorganismen und Zellkulturen*, in: Karafyllis (ed.): Theorien der Lebendsammlung (as note 2), pp. 229–249.

11 Referring to the two ›sides‹ of ›operative ontologies‹: »Verfertigen« and »Medialität«. Cf. Lorenz Engell and Bernhard Siegert: Editorial, in: Zeitschrift für Medien- und Kulturforschung 8/2 (2017), pp. 5–9.

12 Cf. Marianna Karamanou, George Panayiotakopoulos, Gregory Tsoucalas et al.: From Miasmas to Germs: a Historical Approach to Theories of Infectious Disease Transmission, in: Le infezioni in medicina 20/1 (2012), pp. 52–56; Alain Corbin: Le miasme et la jonquille. L'odorat et l'imaginaire social XVIIIe-XIXe siècles, Paris 1982.

13 Peter C. Baldwin: How Night Air Became Good Air, 1776–1930, in: Environmental History 8/3 (2003), pp. 412–429.

here, we can envision how the microbe helps to structure the mediality and phenomenality of the lifeworld, e.g. as dangerous night and safe daylight.

The history of microbes can be told as a history of *vacancies and latencies* on the ontological and metaphysical level. Thus we look for meta-operations with the vacant and un-written, operating with Blumenberg's concept of »reoccupation«. For ontological reasons, we should keep in mind the Greek term μονάς, not only still prominent in quotes from Leibniz' *Monadology* (1714), but also persistent in the taxonomic names, e.g. in the alga *Chlamydomonas* and in the bacterium *Pseudomonas*, which literally means: a false *monas*.[14] Here, the border between plants (microalgae) and bacteria has been blurred. This is important for understanding what makes the single living unit an original *world producer* also in its material sense: by embodying photosynthesis as the process of primary production. However, water, the medium of life, and oxygen, the medium of *our* life, can be imagined as replaceable in bacterial photosynthesis. The microbial star of our story, the photosynthetic bacterium *Chromatium okenii*, was once termed *Monas okenii*,[15] owing taxonomic reference to philosopher Lorenz Oken (1779–1851). In the long philosophical history of the term *monas*, we highlight only the following:

– literally, it means both unity and singularity, and thus is comparable to ›atom‹, i.e. the smallest possible particle of the world; *monas* was also a unifier to make the world a whole in pre-Socratic natural ontology.
– Other than ›atom‹, *monas* was thought of as the metaphysical substance of what is ›number‹ since Pythagoras. In arithmetic, it had a direct relation to countability and measurability (figure), and writing and reading numbers in Greek numerals. Its mathematical-metaphysical opponent[16] was the point in geometry (which can be made visible by a dot).[17]

Thus, *monas* always was an ontological operator and related to digitizing. Within its operationality falls the transfer of numerals into script and vice versa. This will

14 Norberto J. Palleroni: The *Pseudomonas* Story, in: Environmental Microbiology 12/6 (2010), pp. 1377–1383.

15 Christian G. Ehrenberg: Die Infusionsthierchen als vollkommene Organismen. Ein Blick in das tiefere organische Leben der Natur, Leipzig 1838, p. 15.

16 Cf. the »dead point«. In his *Enzyklopädie* (1830), Hegel describes plankton as »light points«. Cf. Georg W. F. Hegel: Enzyklopädie der philosophischen Wissenschaften im Grundrisse (1830). Zweiter Teil: Die Naturphilosophie, A. Die geologische Natur, § 341, in: Werke, Vol. 9, Frankfurt am Main 1978, pp. 360f. (authors' translation).

17 Husserl identified the crisis of modern sciences in their technization, as a result of being based in an ultimate arithmetic that had gained supremacy over geometry. The latter had allowed visual access to the world as ›Anschauung‹ (appearance). Cf. Edmund Husserl: Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie, in: Husserliana VI, ed. by Walter Biemel, Den Haag 1954.

matter for the ›microbial world formula‹ (see section 4). At all times, the substantial world-making capacities needed background topologies, predominantly the ones of light and dark, fluidity and solidity. As in Leibniz' *Monadology*, the monad has substance but not matter. An immaterial medium was needed to ›activate‹ the monad: the »light fluidum«. Monads are then seen as infinite entities of world units with a soul. They have no extension[18] and act across the boundaries of inorganic and organic with *entelecheia* or *appetitus* as properties on the primary level of monadology.[19]

This is how microbiology approaches ›the world of life‹ today, reaching back to the so-called Early Earth three billion years ago. Separating the world of life from the lifeworld is all but new. Leibniz synthesized the material world bottom-up and in single units for the sake of universality. This allowed for the world's totality, countability, and completeness (as if it were a universal library). In his *Die Lesbarkeit der Welt* (1981), Blumenberg opposes Leibniz: the world can neither be grasped by a universal chronology nor a world formula.[20] Obviously, it matters how we read the world before we make it.

3. Ubiquity of Microbes: The World with/of Life versus the Lifeworld

In the last decades, microbes seem to be everywhere ›in the world‹: high up in the clouds, deep down in the sea, ubiquitous in the human body (from skin to gut) and, recently detected, also in the brain. The microbe lives like a fluidum across classic ontologies. Allegedly, it is also overcoming the divide of body and soul. Epistemologically, microbes do not have an own world anymore, the *microcosmos*. Instead, they dominate our world as »our planet's invisible rulers.«[21] The microbe has become a universal substance without implying the need to represent it in particulars. Kant would have registered this as »pure concept« (*reiner Begriff*), and Hegel as »concrete universal« (*konkrete Allgemeinheit*). In the collection, this changes because the vacancy of representation needs to be filled. For microbiology counting as a true science, collecting is a must: a microbe does not exist unless it has a deposit in a bank. The bank transforms the speculative concrete universal into a

18 The conflict between geometry and arithmetic is prefigured in Leibniz and involved the problem of the *prima materia*, relating back to Plato and Aristotle.

19 Cf. the prominent schema Leibniz added in his letter to Des Bosses (19 August 1715). For details see Hans Poser: Leibniz' Philosophie, ed. by Wenchao Li, Hamburg 2016, pp. 305 f.

20 Hans Blumenberg: Die Lesbarkeit der Welt (1981), Frankfurt am Main 2000, chapter X.

21 Gerhard Gottschalk: Welt der Bakterien. Die unsichtbaren Beherrscher unseres Planeten, Weinheim 2009.

concrete universe, a material world with imaginary plenitude (biodiversity). Speculation, however, remains crucial.

In microbiology's imagination, the microbe constitutes the limits of world as such, a world with life, both in its extension—the biosphere—and in its genealogy, i.e. the occurrence of the first organism (›progenote‹)[22] on Early Earth. Against Hegel's insight[23] that a »general-alive« entity (*Generell-Lebendiges*) which would fall and specify into different pieces or branches never existed (because nature essentially has intellect, which already implies specification), microbiologists infer from a general ancestor past and future potentials: how life can take place. Where the microbe cannot live, nothing can live, nothing has lived, and nothing will ever live—a reason why astrobiology is also very much into microbiology. Contrary to the idea of a world with life is the assumed presence of microbes in the lifeworld, i.e. a world of actual experience—even though microbes as such are invisible to the naked eye.[24] Cultivating is an operation of making them visible. Obviously, regarding microbes as present here and now, is a matter of knowledge—and belief, intrinsically linked to the hidden, substantial powers of what microbes might do with you or not. The potentials are existential.

Two current examples highlight this. A costly new trend is the »fecal microbiota transfer«.[25] Here, the microbe constitutes an own world in each of us, a microbiome. It supposedly guarantees health by means of a »prestabilized harmony« (Leibniz): you receive a portioned gut flora of a healthy, preferably indigenous and »pure« person, and are then held responsible for cultivating your new microbiome by dietary rules and omitting antibiotics. This touches the philosophical distinction of *being* and *having*: not having microbes; being microbes.[26] Indeed, there is ontological debate in microbiology who is the super-organism: we hosting the

22 Its inventor calls this »›genomic‹ organism« at the primary evolution stage of »nucleic acid life« a »theoretical construct«, admitting that it »may have been a kind of entity outside of our direct experience«. Carl R. Woese: Bacterial Evolution, in: Microbiological Reviews, 51/2 (1987), pp. 222–271: 262 ff.

23 Cf. Hegel: Enzyklopädie (as note 16), § 338, p. 349.

24 Actual experience here does not refer to a physical object, rather an atmosphere or »Erlebnis« mediated by microbes. For Blumenberg, ›Lebenswelt‹ is a sphere of self-evidence. It cannot be grasped as such and marks a hypothetical state before the emergence of ›theory‹. Cf. Hans Blumenberg: Theorie der Lebenswelt, ed. by Manfred Sommer, Frankfurt am Main 2010. In this perspective, the reduction of self-evidence, e.g. by isolating and cultivating bacteria previously perceived as a color phenomenon in nature, already *is* a theoretical operation, which requires further exploration.

25 Rebeca Cruz Aguilar, Anastasia Tsakmaklis and Maria J. G. T. Vehreschild: Fäkaler Mikrobiota-Transfer bei Clostridium-difficile-Infektionen, in: Pharmakon 5/6 (2017), pp. 451–455.

26 This implies an economic perspective for the quantification of human life that, as Simmel has pointed out, might well be analogized with microbial-physiological processes within

microbiome, or the microbiome hosting ›us‹.[27] This question goes beyond merological considerations. It demarcates the possibility of turning individual life-time into world-time by means of switching biological functions, as Blumenberg has figured out in his study on Karl E. von Baer's concept of entomology.[28]

The second example highlights the geological-planetary scope of an ›ecological‹ microbiology.[29] Characterizing microbial diversity nowadays aims at utilizing microbes »for the benefit of the planet and humankind«, e.g. by creating a »global Gene Atlas« of microbial communities.[30] Note the switch from the individual human with his/her intestines to the abstracting genus »humankind«. Günther Anders, among others, emphasized the contingencies that accompany the new dialectics of »World without Man« and »Man without World«, which emerged with Space Programs. Following also Anders' historiographic observation that the »epoch« of the human has been turned towards a »deadline« (*Frist*)—nowadays resembled in apocalyptic discourses on the Anthropocene—, we ask how this telescopic-planetary measure interrelated with the microscopic one. As the human body has been mapped along with the Earth, we might conclude that geodeterminism is allied with body determinism, including the brain. Over the last decades, the microbe thus gained power in intermediating the largest ontological scope known in philosophy: the relation between »I« and »World«.

Today's microbiologists regard both themselves and their organisms as saviors, e.g. in a recent »warning« to »humankind« regarding climate change solutions.[31] Referring to the »unseen majority« of microbes, microbiologists implicitly argue with the *law of large numbers* from probability theory. At the same time, they explicitly address microbes »yet to discover« and imagine a plenitude of the biotic world. This quantification paradigm triggers the idea of ubiquitous collecting, predominantly for human survival. In contrast to archives and libraries, the microbial collection makes it possible to present the ›microbial world‹ in its material and structural sense (a *project*), rather than representing merely a *prospect* (*Vorstellung*) of world. A mediator of this naturalistic meta-representation of world is taxonomy, based on a system of nature. The microbe has become not only the »measure of

the human body. Cf. Georg Simmel: Philosophie des Geldes (1900), Georg Simmel Gesamtausgabe, Vol. 6, Frankfurt am Main 2000, chapter 5.

27 Cf. Karafyllis: Samenbank als Paradigma (as note 2), p. 44.

28 Hans Blumenberg: Lebenszeit und Weltzeit (1986), Berlin [5]2016, pp. 267–294.

29 This perspective had its origin in late 19th century Russia. Cf. Lloyd Ackert: Sergei Vinogradskii and the Cycle of Life. From the Thermodynamics of Life to Ecological Microbiology, 1850–1950, Dordrecht 2013.

30 Cf. agenda *Earth Microbiome Project*: http://www.earthmicrobiome.org/ (6 January 2020).

31 Cf. Ricardo Cavicchioli, William J. Ripple, Kenneth N. Timmis et al.: Scientists' Warning to Humanity: Microorganisms and Climate Change, in: Nature Reviews Microbiology 17 (2019), pp. 569–586: 569.

all things« (the be-all and end-all), replacing the human in the famous phrase of Protagoras, but also the »measure of all times«, transforming how (if at all) to write history. This point will matter for understanding Blumenberg's concept of reoccupation.

4. Primary Production: Bacterial Photosynthesis and the World-Formula

The outreach for a ›microbial world‹ speeded up since the 1950s/60s.[32] Making the microbe a universal ›world unit‹ required a generalization strategy for a fragmented discipline that was ruled by medical doctors and infection paradigms.[33] The term ›general microbiology‹ methodologically mirrors this transformation. It was based on biochemistry, the chemical subdiscipline working at the edge of life and non-life, which later will operate the pair digitizing/synthesizing. Among its proponents were the chemist Cornelis B. van Niel (1897–1985) at *John Hopkins Marine Laboratory* and his scholar Roger Y. Stanier (1916–1982), and the Göttingen team at the DSM. Van Niel's strategy was based on *equalizing*, i.e. on a chemical equation that symbolizes productivity on Earth: photosynthesis. By studying sulfur bacteria, he found a generalized equation for *all* photoautotrophic— i.e. also anaerobic—processes. Anaerobes led back to the earliest metabolism on Earth, based on sulfur and hydrogen. The formula provides a strong example for Blumenberg's concept of reoccupation, even if it happens on the numerical level and is transferred into ordinary language afterwards. Van Niel constructed a chemical vacancy and made it operative by a symbol: the letter ›A‹ for the electron acceptor in a redox reaction. In the equation, ›A‹ allows to analogize sulfur with oxygen and to exchange the elements while keeping the equation balanced.

Equation of plant photosynthesis: $6\ H_2O + 6\ CO_2 + \text{Sunlight} \rightarrow C_6H_{12}O_6 + 6\ O_2$

Generalized equation: $2\ H_2A + CO_2 + \text{Sunlight} \rightarrow 2A + CH_2O + H_2O$

In consequence, the primary production of the world could be imagined to have started with microbes utilizing hydrogen sulfide (H_2S) rather than archaic plants splitting water. As within the concept of *monas*, letter, number, and digit operate together. Stoichiometrically, the photosynthetic generalization was possible as

32 *Locus classicus* is Roger Y. Stanier, Michael Doudoroff and Edward A. Adelberg: The Microbial World, Englewood Cliffs 1957.

33 Predecessor of this mid-20th century development was e.g. Marjory Stephenson: Bacterial Metabolism, London 1930.

both sulfur (no. 16) and oxygen (no. 8) are members of group 16 in the periodic table,[34] providing the background ontology for the switch. They are grouped together because of the six electrons in their valence shell, requiring two more according to the octet rule. Later it turned out that phototrophic bacteria even encompass five types of chlorophylls, while plants have only two (Chl. a+b). Bacteria (and microbiology) soon superseded the dominance of plants or, philosophically spoken, their *autarchy* in global primary production. As the formula worked for *all* autotrophic organisms, also chemoautotrophs, it served as ›world formula‹ in support of a ›general microbiology‹.

Whereas this strategy initially operated as a unifier inside of a then fragmented microbiology, the universalization strategy reached out to the world—by means of setting up collections. The microbial collection—like classical libraries aiming at universality—functioned as world model and model world, respectively. Its collecting, ordering and sorting structures prefigured what is relevant in the world, representative for the world, and worth keeping. Philosophically, the ›microbial world‹ manifested as ›assortment‹ (Heidegger: *Bestand*),[35] which allowed for semantically enframing and materially providing microbes as means for different ends—from basic research in taxonomy to biotechnology.

Therefore, it is no coincidence that in 1969, Göttingen based microbiologist Hans G. Schlegel (1924–2013), on the way of founding the *German Collection of Microorganisms*,[36] published the standard textbook *Allgemeine Mikrobiologie* (*General Microbiology*). In the preface, he stressed the quantity, flexibility, and »easy handling« of microbes. Figuring microbiology as vital contribution to »fundamental problems of biology« relied upon imperializing the »traditional disciplines« botany and zoology.[37] For doing so, he disguised the fact how difficult it is to *cultivate* microbes. Strategic narratives of easiness, unity, and simplicity accompany the new enframing of microbes as general units of life, which also helped to forget the subjective concept of life-time in general.[38]

For fundraising, Schlegel envisioned biotechnological usages of chemotrophic microbes for the nuclear age. In fact, the microbe bank was funded by the West-

34 According to IUPAC-nomenclature; old group VI A.

35 Cf. Karafyllis: Samenbank als Paradigma (as note 2), pp. 125–128.

36 See the blueprint of Hans G. Schlegel: Aufbau einer zentralen Kulturensammlung am Institut für Mikrobiologie der GSF in Göttingen (22 April 1968), in: Bundesarchiv Koblenz, folder B138/3340, pp. 16–29.

37 Hans G. Schlegel: Allgemeine Mikrobiologie, Stuttgart 1969, p. V.

38 For how cultivated organisms as research objects rule the life-time of research subjects, see Robert E. Kohler: Drosophila: A Life in the Laboratory, in: Journal of the History of Biology 26/2 (1993), pp. 281–310.

German *Society for Radiation Research* (GSF).[39] Nuclear power, assumed to be cheap, should help to fight world hunger. Schlegel was dreaming of low-cost nutrition by chemoautotrophic hydrogen bacteria kept in bioreactors, which only required energy for water electrolysis.[40] On the other side of the Atlantic, van Niel suggested on similar grounds a new perspective on life's origins, digging deep into world-time. Futurological, genealogical and territorial outreach went hand in hand. Early Earth with its simple geology, vague light conditions and the transition from hydrogen and sulfur atmosphere to oxygen atmosphere began to be scrutinized. After getting explanatory hold of the whole planet's autotrophy, the next steps needed for forming the world as concreteness were: making use of space and time, i.e. collecting ›everywhere‹ and thereby creating new genealogies.

What happened in the beginnings of life? Instead of assuming a first autocatalytic RNA-molecule, relying on the genetic information paradigm and its script-metaphorics (»RNA-world«),[41] van Niel and likewise the DSM-actors proclaimed: »Metabolism first!«, implying cellularization as a necessary precondition for life. This hypothesis was made operative by searching for an entity with a first metabolism, and, ultimately, for the »first microbe«, or philosophically: a primary substance. This speculative microbe is nowadays termed LUCA—last universal cellular ancestor. If it can account for being an organism is heavily debated. By extending the living ›*Bestand*‹ (Heidegger), the ›microbial world‹ in the bank approximated the extension of ›world‹ as planet's extent, i.e. spatially (*biosphere*). The ideal of collecting ›everywhere‹ not only required expeditions, sophisticated apparatus and instruments, but also knowledge of the modes for keeping the organisms in a purified state and alive long term.

5. Isolating and Cultivating at the DSM

This is where the operative ontology of isolating and cultivating as the crucial one sets in. It starts with making the East operative for the West of Germany. Already in 1958, just a few weeks after the GDR-bound Schlegel had become chair of the Microbiology Department at Göttingen University (FRG), he traveled back to his well-known pond near Halle (GDR), where he used to sample purple sulfur bacteria, particularly *Chromatium okenii*, during his PhD-time in botany. He har-

39 Cf. records GSF 7 and GSF 9 in Bayerisches Hauptstaatsarchiv, Munich.

40 Hans G. Schlegel and Robert M. Lafferty: Novel Energy and Carbon Sources. A: The Production of Biomass from Hydrogen and Carbon Dioxide, in: Advances in Biochemical Engineering 1 (1971), pp. 143–168.

41 Cf. Michael Yarus: Life from an RNA World: The Ancestor Within, Cambridge, MA 2010.

vested his epistemic object again and transferred it in a glass bottle through the Iron Curtain (the Wall was not built yet). Back in Göttingen, he handed it over to assistant professor Norbert Pfennig, pleading him to cultivate it. (At least we might imagine that it happened this way, the incident itself is documented). This was an almost impossible task. Nobody in the world so far had been successful in cultivating sulfur bacteria in pure, not even the group around van Niel. To avoid the cliffhanger: Pfennig was successful.

This happened with the help of a transatlantic cooperation and training on how to *cultivate* all the newly found and diversely adapted microbes. Most of them used to die within hours after sampling, unable to survive laboratory settings. Cultivating life forms from extreme habitats like the deep sea and from unknown biocoenoses became crucial for *really* generalizing microbiology on a planetary scope. In van Niel's programmatic view, the cultivator had to be as creative as nature itself. He proposed a quasi-natural variety of techniques and synthetic media. Opposing Koch's dogma of pure culture, he suggested enrichment culture.[42] Provokingly, we might say that microbiologists have had to imagine themselves as microbes, converting the famous paper title of philosopher Thomas Nagel (*What Is It Like to Be a Bat?*) into *What is it like to be a microbe?*—without taking into account that we neither can nor should attempt to leave the answer to the microbe, or the bat.[43]

In the early 1960s, Pfennig trained under van Niel's supervision in California. There, he also collected microbes later to be found in the DSM-catalogue. His colorful research objects should become the primary collection of the newly founded DSM, and they remain a core collection of today's DSMZ. Drawing on van Niel's enrichment cultures, Pfennig and Schlegel modified the media in the commonly used Winogradsky Column: a glass device with stratified media, especially suitable for enriching purple sulfur bacteria like *Chromatium*. Pfennig provided the crucial idea for intermediary cultivation, i.e. the operation in-between sampling/enriching and isolating.[44] While van Niel had failed by working with leaky glass-stoppered bottles, Pfennig used *air-tight* screw-cap bottles that prevented contamination. Up until that point, sulfur bacteria had resisted the dogma of pure culture predominantly because they require a metabolic partner (sulfur cycle). Instead, Pfennig became their partner as he manually fed them with hydrogen sulfide.

42 Cf. Cornelis B. van Niel: The »Delft School« and the Rise of General Microbiology, in: Bacteriological Review 13/3 (1949), pp. 161–174: 165.

43 Thomas Nagel: What Is It Like to Be a Bat?, in: The Philosophical Review 83/4 (1974), pp. 435–450.

44 These operations are shown in the scientific film PHOTOSYNTHESIS—PURPLE BACTERIA: VAN NIEL'S ISOLATION TECHNIQUE (ANAEROBIC PURE CULTURE), D: Norbert Pfennig, Eike Siefert and Bernd Lötsch, IWF Göttingen 1975.

Moreover, four sterile nutrient solutions were combined and Vitamin B_{12} was added, internationally known as »Pfennig's medium«.[45] The bacteria were pre-bred in the dark and underwent rhythmic shaking. Pfennig also experimented with monochromatic light for specifying light gaps in order to simulate natural habitats, like living 20 feet below water surface. *Chromatium okenii* transformed the DSM into an intensive care unit, and triggered the funding of the microbial bank. Its doctor on duty, Pfennig, was a confessed anthroposopher and admirer of Goethe and Rudolf Steiner.[46] He thought the world in self-sustaining rhythms, powers, and colors. Because of his highly unusual background ontology that successfully inspired his laboratory operations, the DSM soon counted as *the* institution for keeping difficult microbes alive.

This raised the question: *how*—not only: *what*—to cultivate in collections: which media, temperatures, and light conditions are to be considered and simulated? In Pfennig's view, the *operative* component in microbes is making use of media as *substrata*. He imagines microbes as activating *substances* in a world of light and water. Pfennig observes and interprets phenomena that the substance brings into appearance, not the substance itself. In his view, ontology consists of (lat.) *actus* and *potentia*, which resembles the Aristotelian pair (gr.) *energeia/dynamis*. An enlightened world is the overarching basic principle here. In Pfennig's words, the »power of sunlight« brings the »chemical potency« into appearance, »organic substances« then »bring in« (*einbringen*) this potency into microbes. Pfennig simulated the natural operation of bringing-to-appearance. Microbial life is »organically alive« (*organisch lebendig*), microbes are »process germs«. Hence, his background is a process ontology, not a thing ontology. By stressing »substance«, he purposely avoids the Latin dichotomy of matter and form, which makes the couple digitizing/synthesizing operative. Substance is necessarily object of change, i.e. continuously overcoming its form—*the* principle of life.

Pfennig deems his ability to ›read‹ in pure cultures »processual magnification«. For him, the glass bottles with nutrient solutions functioned as »physiological« optical instruments for visualizing each physiological type of microbial life. While the microscope visualizes entities, Pfennig visualizes the process of being ›itself‹. For doing so, the microbiologist has to consider »in detail« the preconditions that represent »specific constellations of environmental qualities, which we are able to experience [*erleben*] as mood or atmosphere«.[47]

45 For an overview see Hans G. Trüper: Sulfur and Light? History and »Thiology« of the Phototrophic Sulfur Bacteria, in: Christiane Dahl and Cornelius G. Friedrich (eds.): Microbial Sulfur Metabolism, Berlin et al. 2008, pp. 87–111.

46 Norbert Pfennig: Reflections of a Microbiologist, or How to Learn from the Microbes, in: Annual Review of Microbiology 47 (1993), pp. 1–29.

47 Norbert Pfennig and Jochen Bockemühl: Mikrobielle Prozesse und Pflanzenleben –

Pfennig himself did not seek out for microbial genealogies in the strict sense. However, making the sulfur bacteria »ready at hand« (Heidegger: *Zuhandensein*) enabled more research on the sulfur-cycle, and hence also the envisioning of its role on Early Earth. Relevant here is, among the options present around the 1960s, the later termed »Iron-Sulfur-World.«[48] Within this scenario, inorganic compounds had generated minerals like pyrite, supplying a first nutritional base for sulfur bacteria. It implies a background topology of liquidity and solidity, water and land, which—in the words of Hegel—enables the dead »crystal of life« to become »punctual and temporary vitality« in form of microorganisms.[49] The idea of a »pioneer organism« will settle on these ›grounds‹.[50]

6. Muddy Waters: Technologizing the Iron-Sulfur-World

The next practical step was *technologizing* the Iron-Sulfur-World for present problems of civilization. After all, collecting was a matter of funding. Thinking of industrial applications, the imagined Early Earth had affinities with the high-tech sewage plants of the 1970s. They newly included biological treatment of wastewater, especially the complex ones of chemical industry. Pfennig did several projects on degradation processes in sewage plants sustained by sulfur bacteria. For the researchers of the DSM, bacteria for biodegradation soon became research objects also in terms of bioinstrumentation and -production. Varying the purposes was possible by technically varying metabolic parameters and nutrition media. In consequence, microbes were framed as ›multipurpose‹ organisms, utilizing bio- and technosphere, but excluding medicine (also not to interfere with the Robert Koch-Institute's collections). The mud-loving sulfur bacteria were collected from liminal zones with low oxygen, e.g. the tidal coast zone or shallow ponds. These are also habitats of methanogens, likewise early epistemic objects of the DSM, difficult to cultivate, linked to Early Earth, and can be found in sewage plants.

Schlüssel zu einer Chemie des Lebendigen, in: Elemente der Naturwissenschaft 78/1 (2003), pp. 54–73; quotes pp. 54–57 (authors' translation).

48 Cf. Günter Wächtershäuser: Groundworks for an Evolutionary Biochemistry: The Iron-Sulphur World, in: Progress in Biophysics and Molecular Biology 58/2 (1992), pp. 85–201.

49 Hegel: Enzyklopädie (as note 16), § 341, pp. 360f. (authors' translation). See also the passage (p. 363), where he characterizes the marine Infusoria and their general property of being alive, stating that this »organism results immediately and does not continue to procreate«.

50 Günter Wächtershäuser: From Volcanic Origins of Chemoautotrophic Life to Bacteria, Archaea and Eukarya, in: Philosophical transactions of the Royal Society of London. Series B, Biological Sciences 361/1474 (2006), pp. 1787–1806: 1787f.

Until now, microbiology has suggested to combine ›clarifying‹ decontaminating applications with a ›microbial world ecology‹, e.g. in a 2010 article of Schlegel's scholar Gerhard Gottschalk: »Processes of this kind, especially sewage plants, are, so to say, the extended arm of microbes for closing metabolic cycles in nature.«[51] Ernst Kapp's understanding of techniques as *organ projection* (1877)[52] appears here in the light of philosophical geognostics.[53] The sewage plant is the extended metabolizing arm of the planetary microbe, which clears the whole world, so to say. Hence the functioning of the world is technomorphic, while appearing as natural or ecological. This technology-mediated ecologization of microbiology, happening from mid-20th century on,[54] goes along with the concept of contamination, as both are based on a concept of space (contrary to infection). Ecologization will turn out to be a pacemaker for systems biology, including synthetic biology.

7. From Sequencing to Digitizing/Synthetizing

As operator of metabolic cycles on the planetary scope, the microbe substantiates the whole biogeodynamics in chemical synthesis. In 1994, Carl Woese proclaimed: »Prokaryotes are the real chemists of this planet.«[55] And chemistry had already turned historical, striving for a molecular history. For the purpose of a molecular based, microbial-global history, the sewage plant and its super-metabolism were switched into nature again, which functioned as host for a developing script of life. Woese and his group in Urbana/IL intended to explore life's deep history by the revolutionary method of 16S rRNA-sequencing. Information was obtained only from the RNA in the small subunit (16S) of the ribosome, as this organelle is regarded conservative in the evolutionary sense. Several steps were mandatory: labeling microbes with phosphorus isotopes, extracting their rRNA, splitting it into fragments, running them through electrophoresis, ›burning‹ the

51 Gerhard Gottschalk: Mikrobiologie 2010. Entdeckungen und Entwicklungen in den zurückliegenden 25 Jahren, in: 25 Jahre VAAM (self-publication) 2010, pp. 4–19: 14 (authors' translation).

52 Ernst Kapp: Grundlinien einer Philosophie der Technik (1877), Hamburg 2015, pp. 40ff.

53 Cf. Ernst Kapp: Philosophische oder vergleichende allgemeine Erdkunde als wissenschaftliche Darstellung der Erdverhältnisse und des Menschenlebens in ihrem inneren Zusammenhange, Braunschweig 1845. For a critique on geognostics (in alliance with Blumenberg's critique on a ›world chronicle‹), see Hegel: Enzyklopädie (as note 16), § 338 (addendum), pp. 347–349.

54 For the medical side: Susan D. Jones: Population Cycles, Disease, and Networks of Ecological Knowledge, in: Journal of the History of Biology 50/2 (2017), pp. 357–391.

55 Carl R. Woese: There Must Be a Prokaryote Somewhere: Microbiology's Search for Itself, in: Microbiological Reviews 58/1 (1994), pp. 1–9: 7.

radioactive fragments on X-ray films, inferring and calculating sequences, indexing and comparative cataloguing. The comparison involved huge amounts of data processed by an IBM computer fed with punch cards.[56] The outcomes challenged microbiology's proclaimed nuclear cell difference: *prokaryotes* without and *eukaryotes* with a nucleus. Now another group and difference structures became evident: microbes like methanogens that have no nucleus, a unique cell wall structure and allegedly very old metabolic pathways connected to Early Earth. Together with Otto Kandler[57] and Ralph Wolfe, Woese later proposed a *three-domain* model of superphyla: Eubacteria, Eukaryota, and Archaea (replacing the preliminary term »archaebacteria«).[58] Important is: Woese's sequencing still demanded cultivation, which he delegated to specialists in collecting.

For present industrial biotechnology, the framework for an operative ontology is built by systems biology that also informs the German strategic agenda of »Bioeconomy 2030« and its counterparts in other countries.[59] In favor are model organisms that physiologically and genetically are able to contribute to all levels of biological organization (vertical) and of biochemical pathways (horizontal), ranging from infection to biodegradation. In short: of interest are multipurpose organisms like the fast growing soil bacterium *Pseudomonas putida*, showing a unique metabolic versatility and being acknowledged as the first-ever patented organism.[60] Genetic engineering optimizes its ability to degrade recalcitrant substances, e. g. crude oil, even under extreme conditions. »Tailoring« the microbe as a host for diverse genetic inserts (*P. putida* KT 2440) took place at the *Gesellschaft für Biotechnologische Forschung* (GBF) in Braunschweig, since 1980 temporary head organization of the DSM. The created organisms served both environmental and

56 For this reconstruction cf. David Quammen: The Tangled Tree: A Radical New History of Life, New York 2018, pp. 50 ff. and 196 f.; Jan Sapp and George E. Fox: The Singular Quest for a Universal Tree of Life, in: Microbiology and Molecular Biology Reviews 77/4 (2013), pp. 541–550.

57 Munich based botanist Otto Kandler, a specialist for *Lactobacilli*, also helped to establish the DSM. The bank had a decentral structure with a headquarter in Göttingen and branches in West-Germany, the most recent was established in Munich.

58 Cf. Carl R. Woese, Otto Kandler and Mark L. Wheelis: Towards a Natural System of Organisms: Proposal for the Domains Archaea, Bacteria, and Eucarya, in: Proceedings of the National Academy of Sciences (USA) 87/12 (1990), pp. 4576–4579.

59 Cf. https://www.bmbf.de/en/bioeconomy---new-concepts-for-the-utilization-of-natural-resources-4543.html (7 October 2019).

60 United States Supreme Court: 447 U.S. 303, 1980, Diamond vs. Chakrabarty. Cf. Bernhard Gill and Veit Braun: Lost in Translation: Biofakte auf dem Weg vom Labor ins Patentamt: in Bernhard Gill, Franziska Torma, and Karin Zachmann (eds.): Mit Biofakten leben. Sprache und Materialität von Pflanzen und Lebensmitteln, Bielefeld 2018, pp. 128–154.

biotechnical applications, functioning as »cell factories« for producing chemicals and compounds. Natural phenomena were turned into »operating conditions«.[61]

In the new millennium, the developments increased in pace by bioinformatics, enabling scientists to decipher a »genome repertoire«[62] and to establish pathway modeling[63] in silico, leading to genome-driven cell engineering. The microbe has become a customizable and mobile frame for diverse applications. This technical connotation of biodiversity demands a de-singularized, simplified and digitally endowed potential of reproduction, mediated at the expense of an organism concept and its ontological interdependence of form and content. Nonetheless, cultivated model organisms remain crucial as wetware. Again, the biotechnological projection allies with a phylogenetic re-projection. In 2018, *Escherichia coli* was technically converted into an archaeon.[64] The outcomes do not suggest a single common ancestor, »but a mixture of multiple life-forms,« maybe just a membraneless archaic »soup protected by clay particles«.[65] The vacant ›place‹ of life's beginnings has been filled with a perfect match of bio-, techno- and theological imaginations.

8. Reoccupations in Conceptualizing Living Beings: Conclusions with Hans Blumenberg

We have sketched three stages of microbe-related ›operative ontologies‹: isolating/cultivating, sequencing/technologizing, and digitizing/synthetizing. They address a material vacancy: how to create a genealogy without fossil records? Ultimately, this addresses philosophy: how to conceptualize history and differentiate it from the past? With regard to media anthropology: which media do we accept as instances and substrates of history in order to address an adequate concept of ›human‹?

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61 Victor de Lorenzo: Designing Microbial Systems for Gene Expression in the Field, in: Trends in Biotechnology 12/9 (1994), pp. 365–371: 365.

62 Pedro Soares-Castro and Pedro M. Santos: Deciphering the Genome Repertoire of *Pseudomonas* sp. M1 toward β-Myrcene Biotransformation, in: Genome Biology and Evolution 7/1 (2015), pp. 1–17.

63 Cf. Jacek Puchałka, Matthew A. Oberhardt, Miguel Godinho Ferreira et al.: Genome-Scale Reconstruction and Analysis of the *Pseudomonas putida* KT2440 Metabolic Network Facilitates Applications in Biotechnology, in: PLoS Computational Biology 4/10 (2008), doi: 10.1371/journal.pcbi.1000210.

64 Antonella Caforio, Melvin F. Siliakus, Marten Exterkate et al.: Converting *Escherichia coli* into an Archaebacterium with a Hybrid Heterochiral Membrane, in: PNAS 115/14 (2018), pp. 3704–3709, doi:10.1073/pnas.1721604115.

65 Arnold Driessen, quoted in Prachi Patel: Microbe Mistery, in: Scientific American 319 (July 2018), p. 18, doi:10.1038/scientificamerican0718–18a.

While Ian Hacking recommended a historical meta-epistemology for addressing continuities in the history of science, i.e. the »styles of thinking and doing« that should include the dynamic potential of instruments,[66] Blumenberg suggested to scrutinize our set of ›instruments‹ for making sense of history. In order to describe the dynamics involved at »epochal thresholds«, he coined the term »reoccupation« (*Umbesetzung*).[67] It rejects a substantialist intellectual historiography that would focus on changes in given ›substrates‹, as new theoretic approaches respond to questions that endure and persist. They persist in spite of answers already given. Blumenberg's concept implies that *vacant* places are being occupied anew.[68] With reference to modernity theory, these vacant places are often understood in terms of »metaphysical surpluses« which still remain after the proclaimed end of metaphysics.

The concept of »reoccupation« serves as an alternative to Thomas S. Kuhn's model of paradigm shifts in scientific revolutions. For Blumenberg, epoch formation needs to be discussed from its potential experience, crossing the threshold of the laboratory into the lifeworld. For applying this model to microbial life, we have to transform Blumenberg's overarching approach for explaining the threshold to modernity. On the other hand, we can thereby emphasize that modernity is characterized by *systematically* making use of life, or with Georg Simmel: by »Versachlichung des Lebens«,[69] i.e. the objectification of life also in the sphere of subjectivity. Regarding ›operative ontologies‹ it remains unclear, which relations between Man, World, and History could and should be considered. Fruitful seems the idea of systemic vacancies and their ongoing and competitive reoccupations; for the ›place‹ of the microbe has never fully been filled, neither that of ›world‹ nor ›man‹. The resulting vacancies are existential also in an anthropological sense. In this sense, Blumenberg's »reoccupations« have to be seen as necessities, by means of which the relation of humans to the world are continuously reshaped—in modernity, a world predominantly explained by science. Additionally, sciences make hermeneutical and conceptual offers for *understanding* the world. Microbiol-

66 Ian Hacking: »Style« for Historians and Philosophers (1992), in: Ian Hacking: Historical Ontologies, Cambridge, MA 2002, pp. 178–199.

67 Hans Blumenberg: The Legitimacy of the Modern Age (1966), transl. by Robert M. Wallace, Cambridge, MA 1991, p. 466.

68 »Der Begriff ›Umbesetzung‹ bezeichnet implikativ das Minimum an Identität, das noch in der bewegtesten Bewegung der Geschichte muß aufgefunden oder zumindest vorausgesetzt und gesucht werden können.« It implies, »daß differente Aussagen als Antworten auf identische Fragen verstanden werden können.« Hans Blumenberg: Aspekte der Epochenschwelle. Cusaner und Nolaner, exp. and rev. new ed. of *Legitimität der Neuzeit*, part IV, Frankfurt am Main 1985, p. 541. We use the translation »reoccupation« by Wallace as it alludes to violence and denotes that a transition might not be a ›smooth‹ shift.

69 Simmel: Philosophie des Geldes (as note 26), p. 723.

ogy seems to be able to answer the four Kantian questions, although shaping the answers requires technical procedures and living assortments. Intellectually, these assortments are reduced to an alliance of ›world formula‹ and ›world chronology‹. From Blumenberg's point of view, a natural history of microbes can never be understood as ›world history‹. Last but not least, »Umbesetzung« allows opposition against the idea of continuous progress, here: in microbiology.

The next decade will see a technological shift from DNAread to DNAwrite on the genomic and meta-genomic level.[70] Now that it seems clear how to *read* a whole genome, the challenge is to *write* or, as Hans Jonas said: to *rewrite* it.[71] We tried to show that this shift—and its acceptance—depends on the selected *mode* of ›reading‹ the world: in molecules, genomes, or cultures. Cultivating and sequencing imply not only two different concepts of reading, but also two divergent reading ›attitudes‹:[72] as parts of the 16S rRNA are regarded as evolutionary conservative, it functions as the minimal momentum of identity between life, history, and world—or: as an *operator of history*. Therefore, the 16S rRNA became both a substratum of microbial history (leading to ›us‹) and the supplementary material instance for a historiography of the Early Earth (leading to ›world‹). Ontologically, the microbe is a thing of ›condensed time‹ or even its monadic extreme: a point of time, understood literally. As such, it contrasts the liquid and organismic process of evolution it should help to explain.[73]

Reaching out for the whole planet's chemistry involved a large-scale biotechnological preview. Woese, the father of the 16S-rRNA-genealogy of life, was skeptical towards the »technological adventurism« of genetic engineering that speeded up in the 1980s.[74] His self-fashioning as a gate keeper of molecular genetics, restricting itself to basic research, appears doubtful. Alternatively, Woese's technique of constructing *hypothetic organisms* of the past—progenotes—can be regarded as door opener for constructing synthetic organisms in the future. In contrast, cultivators like Pfennig read in living processes presumably being birthed in world-water. It is the phenomenality of a substance in continuous transformation that is becoming readable, as if it were offering a gift to the gifted reader who

70 Cf. Jef Boeke, George Church, Andrew Hessel et al.: The Genome Project-Write, in: Science (2 June 2016) (online first), doi: 101126/science.aaf6850, pp. 1–3.

71 Hans Jonas: Philosophical Essays. From Ancient Creed to Technological Man, Englewood Cliffs 1974, p. 80.

72 On the ›attitude‹ (*Einstellung*) while reading see Hans Blumenberg: Phänomenologische Schriften 1981–1988, Frankfurt am Main 2018, pp. 401–404.

73 The microbe here is a living unit limited by its cell wall. At the same time, it resembles a historical unit indicating another time. The relevant process is not life itself, rather life situated in a geological past.

74 Carl R. Woese: Archaebacteria and Cellular Origins: An Overview, in: Otto Kandler (ed.): Archaebacteria, Stuttgart 1982, pp. 1–17: 2.

is practicing a naked-eye microbiology. Here, the minimum momentum of identity between life, history, and world is not a point or a punctual mutation. The momentum of identity appears as Gestalt (Pfennig: »Prozessgestalt«) within a subjective instance of time, which in German is termed ›*Augenblick*‹, a word which resists English translation in ›point of time‹.

In this visual regard of *how* and *what* to see with the naked eye, Blumenberg differentiated between clearness (*Anschaulichkeit*) and appearness (*Aussehen*) of scientific representations.[75] Traditionally, both relate to measures of spatial elements that ultimately rely upon the organic outfit of the human, including the sensory structure of perception. Pfennig's way of reading microbes by simulating their metabolic partners and mediating their vacant metabolisms through nutrition media relates to appearness, also in the light of temporality. This made it possible to relate the visual experience to subjective time, and yet comparable scientific procedures risk, as Blumenberg pointed out, that not the human remains »measure of all things«. Instead, all living beings would at last become the specific measure of all *their* things. This is just one part of a bigger and intrinsic problem of »Anschaulichkeit« in modern science: clearness tends to be a re-extraction (*Rückgewinnung*) from an already objectified world that has been given the form of ›nature‹ for the sake of the human and the discrete time of the subject. However, when the units of measure, being essentially related to human corporeality such as hand and eye, should grasp *cosmic* distances measured by means of large numbers (as in Woese's algorithmic-genealogical calculus), the measuring units lose power against the ›factor of its multiplication‹, and thus the clearness vanishes.

The need for harmonious processuality, embedded in what is metaphysically given, persists—despite of the next »reoccupations« in microbiology that will result from a new vacancy: skipping cultivation, a long wished-for and major flaw. To think in the binary code of ›collecting DNA‹ and directly ›sequencing DNA‹, without the time-consuming intermediary stages, is alluding in the light of efficiency. At the same time, rapid species extinction does not only recommend collecting, but also turning the organism into a genomic data set for assumingly eternal storage. In the case of vanishing microbes, most vacancies will not even appear as such in the lifeworld. The ›microbial world‹ together with its living representatives in the model world of collection might become virtual too: when the concept of history would be transformed into a processual past of digitalization, by which number, figure, and letter are fused together into one codical, meta-operative structure. But then the microbe would lose its feature of somehow sharing life with us.

75 Blumenberg: Lebenszeit und Weltzeit (as note 28), pp. 268 f.

For theoretical purposes, biobanks need to be analyzed as instances of both ordering worlds and, still neglected,[76] producing worlds. Finally, we address two insights from collection research: a collection collects what is regarded *similar*, and all collections are guided by the ideal of *representativity*.[77] In consequence, microbe banks allow to think both options: either assimilating the microbe to our understanding of world or assimilating us to their representations of world. The shown »reoccupations« have led to a technomorphic world view. It is a world the microbe was collected for—and now, even as a semi-synthesized object, fits in almost naturally. The question persists, how we want to fit into this world.

76 Cf. Bruno J. Strasser: Collecting Experiments: Making Big Data Biology, Chicago 2019.
77 Boris Groys: Logik der Sammlung. Am Ende des musealen Zeitalters, Wien 1997, p. 39.

Predicting and Shaping or How to Close the Future

Christina Vagt

Numerous apps on my smart phone tell me what to do: drink more water, exercise more, sleep more, spend less money, get your mammogram done. All of these encouragements and reminders are good for me and my physical, mental, or financial health. I chose to use them (and to frequently disobey them) willingly because life is complicated and I tend to forget about these things. Nobody coerces me into it.

My decisions to rely on behavioral technologies is the result of good behavioral design of user-oriented technology, so called »persuasive computer technologies«.[1] Behavioral design works so well because it is human-centered, has a low entry threshold, and promises its user/consumer to achieve »personal« goals in productivity, diet, physical fitness, or personal finance. One of its oldest and most prominent fields of application is education, and as a result the interaction between me and my students in large undergraduate classes takes place mostly via digital technology that aims at producing certain behaviors and preventing others:

I take their attendance by making them use a little handheld device called »iClicker«. iClicker hardware is owned and distributed by a private company, which does not have a contract with my university but nevertheless has a monopoly on »radio frequency classroom respond systems« on our campus. Students have to pay around $ 60 for their device while the teacher's package is free (lowering the threshold to use it). IClicker is fully integrated in our open access online learning platform based on the open source software »moodle«. Moodle allows me to track course-related online activities of my students and iClicker enables me to measure their in-classroom activities: are they paying attention to the lecture, did they do the reading, etc.? The students don't have a choice when it comes to digital learning environments, whereas I still do. And I chose to, because the administration of modern college education is complicated and I am neither a good book keeper nor a good warden by nature.

1 BJ Fogg defines persuasive technology as »any interactive computing system designed to change people's attitudes or behaviors. For example Amazon doesn't just process orders, it attempts to persuade people to purchase more products«. BJ Fogg: Persuasive Technology. Using Computers to Change What We Think and Do, Amsterdam et al. 2003, p. 2.

Whether digital learning platforms as well as health, productivity, and accounting apps are actually useful for the users/consumers is an open question, but I am quite certain that the monetary cost-benefit ratio of their operational economy fails to grasp the full extent of the effects of these technologies, which are not just monetary or educational but also political, social, psychological. I chose »behavioral design« as a generic term to describe this synthesis of corporate, governmental, academic theory and practice incorporated in the development or application of behavioral technologies that have—over the course of only a few years—become a ubiquitous phenomenon that permeates almost every aspect of my professional and private life. »Persuasive technologies« is a euphemism because persuasion can only occur where there is free choice. Behavioral design allows for individual deviation to a certain degree that will not affect the statistical median of the superordinate system.

Historically, behavioral design is the result of a merger between psychology, economics, and computer engineering, a strategic response of military, governmental, and academic players to the general problem that the behavior of complex systems such as humans, societies, or markets is difficult to predict, and that controlling these complex systems means shaping them by designing their technological and social environments. *Predicting* and *shaping* could be called the *ontological operating switch* at the center of this phenomenon, but dating its beginning has its obstacles because of its various story lines and the simultaneity of the non-simultaneous: while behavioral psychology and social engineering emerged as scientific discourses in the 1920s, and cybernetics with its own take on behavior was coined in the 1940s, economics did not experience its behavioral turn until the 1980s and behavioral design only reached its full fletched digital and global dimension in the 21st Century. The term »behavior design« appeared on the course catalogue of US universities like Stanford around 2011, and the first Wikipedia entry on »behavioural design« was written in 2019. The recent institutionalizing of behavioral design indicates that it not only belongs to what Wolfgang Schäffner has called the »design turn«[2] of science but furthermore, that higher academia is in the midst of a significant shift of power structures from natural and social sciences to computer engineering and behavioral economics that it fosters. In its aesthetics and its imaginary, behavioral design is closely related to behaviorist utopias like B.F. Skinner's *Walden Two* that once were discarded as totalitarian,

2 Cf. Wolfgang Schäffner: The Design Turn. Eine wissenschaftliche Revolution im Geiste der Gestaltung, in: Claudia Mareis, Gesche Joost, and Kora Kimpel (eds.): Entwerfen – Wissen – Produzieren. Designforschung im Anwendungskontext, Bielefeld 2010, pp. 33–45.

while its techniques, its ontological operations, are grounded in computer technology and the reprogramming of choice architectures.[34]

1. Operant Behaviorism

Behavioral design of user-oriented technologies is attempting to narrow the gap between future and present behavior by creating environments that are based on positive reinforcement or »nudges«, incentives for desired behavior. It influences the decision making of individuals as well as of very large systems like economic markets and populations. Business models, soft- and hardware design, as well as policy making are based on it. Basically, it is an actualization of B.F. Skinner's »operant behaviorism«, a scientific method that technologically influences environments to generate a desired behavior. Skinner's »operationism«, embodied in the boxes he designed to modify the behavior of rats or pigeons, allows the experimenter to neglect all inner states that might motivate an animal or a person such as affects, desires, feelings, motives, expectations, values, attitudes, or personality traits.[5] At the height of psychological behaviorism during the 1940s and 50s, these inner states were considered to be »hidden factors.« Since they could not be measured with scientific methods, they had to be defined »operationally.« Operant behaviorism allows to completely disregard any qualitative explanation of behavior and to shift the focus towards the shaping of environments—laboratories in this case—that can generate the desired behavior in individuals interacting with these environments.[6] The disregard of any analysis of inner states or hidden factors distinguishes behaviorism from previous attempts to explain human behavior like psychoanalysis, Gestalt psychology, or moral philosophy.[7]

It also distinguishes Skinner's behaviorism from 21st century behavioral design which does not define hidden psychological factors operationally but aims at *eliminating* them by closing the gap between present and future behavior within certain »choice architectures« of consumer decision making.[8] The operationality of be-

3 Burrhus F. Skinner: Walden Two (1948), Indianapolis 2005.

4 Cf. Christina Vagt: Design as Aesthetic Education. On Politics and Aesthetics of Learning Environments, in: History of the Human Sciences, forthcoming.

5 A detailed study on Skinner boxes and teaching machines can be found in: Alexandra Rutherford: Beyond the Box: B.F. Skinner's Technology of Behavior from Laboratory to Life, 1950s–1970s, Toronto 2009.

6 For a historical overview of the concept of environment see Florian Sprenger: Epistemologien des Umgebens, Bielefeld 2019.

7 Cf. John A. Mills: Control: A History of Behavioral Psychology, New York 1998, p. 87.

8 The term »choice architecture« was introduced by Richard H. Thaler and Cass R. Sun-

havioral design has its roots in operant psychology but the technological means to »unhide« hidden factors by forcing the system into a desired behavior belong to a new type of economics that did not exist before the take-off of digital user technologies.

2. The Computational Aspect of Behavioral Economics

Behavioral economics became a focal point of economic theory during the 1980s but its arrival or *event* in the sense of Hannah Arendt who distinguishes between technological events and ideas, were computer simulations.[9] Behavioral economics can be traced back to a new type of economic mathematics or econometrics that John von Neumann and Oskar Morgenstern started with their *Theory of Games and Economic Behavior* (1944). This book is generally recognized as the beginning of modern game theory and in its wake digital market simulations. Von Neumann's and Morgenstern's mathematical take on behavioral axioms played a key role for the merger of psychology and economics which would later be coined »behavioral economics.«[10] While behaviorism made it possible to disregard any hidden factors of the human psyche or mind, mathematical game theory made it possible to disregard any inner rules or laws for economic decision making or behavior, e.g. the idea of a rational *homo oeconomicus* that had dominated classic liberalism and its model of rationality for so long. Instead, it follows the Cold War maxim that modeling and predicting of human behavior works best when the game rules are environmentally shaped. Mathematical ideas according to von Neumann, even if grounded in experiences, have a life of their own, governed by almost entirely aesthetic motivations, before their derivations and proofs have to be related once more to characterizations of the empirical world.[11] Modeled and simulated within the mathematic framework of game theory, economic behavior becomes »empirically« observable. Instead of building economic models on assumed characterizations of rational behavior like classic liberal economics assumed, they now were subjected to experimental verification.

Mathematical game theory and in its wake computer simulations of consumer decision making became the key technique for corporate institutions like the Ford Foundation and the RAND corporation, or military agencies such as the Office

stein: Nudge: Improving Decisions about Health, Wealth, and Happiness, New Haven 2008, pp. 81–93.

9 Cf. Hannah Arendt: The Human Condition (1958), Chicago/London 1998, p. 156.

10 Cf. Floris Heukelom: Behavioral Economics: A History, New York 2014, pp. 20–21.

11 Cf. ibid., p. 24.

of Naval Research.[12] Not only did game theory flourish within the context of Cold War behavioral science, it also survived the downfall of the latter.[13] In 2002, Philip Mirowski famously coined the term »cyborg economics« in his history of economics but only dedicated a footnote to the role of computers for the post-1970 success of experimental decision theories both in economics and psychology.[14] Today, it seems safe to say that not just economics but also policy making irrevocably changed through game theory and computer modeling and in their wake behavioral tech-economics.

3. Open Future, Closed Future

The idea of an open future is rather young: sometimes between the Protestant Reformation and the French Revolution did people actually start talking about the future, either in terms of revolution or reaction.[15] If time is understood as being socially and culturally constructed, ›future‹ is not just a historical but also an ontological concept because it affects all scales of human beings, from the atomic scale of the individual to the macro perspective of entire states. As historic concept, the future itself is subject to change. Medieval Christian societies apparently had no use for the term because the fate of a Christian subject was predetermined by a divine order. It was born into a certain socio-economic role and generally stayed put. Life and death were not considered to be contingent or to be dependent on personal decisions, but predetermined by a higher power. The idea of an open, undetermined future emerged in the 17th and 18th century and in close connection with the ideal of political freedom and economic equality. Not coincidentally did game theory and statistics emerge at the same time and in close correspondence with the concept of future.

Social systems theory is itself heir of the rise of game theory and statistics over the course of the 20th century but Luhmann's distinction between a *present future* and *future present* can still be helpful to understand the dimension of the social effects of today's behavioral design.[16] The concept of an open future implies that future functions in the present as a mere time horizon of many diverse possible

12 Cf. ibid, p. 60.
13 Cf. Paul Erickson: The World the Game Theorists Made, Chicago 2015.
14 Cf. Philip Mirowski: Machine Dreams – Economics Becomes a Cyborg Science, New York 2002, p. 545.
15 Cf. Niklas Luhmann: The Future Cannot Begin: Temporal Structures in Modern Society, in: Social Research 43, no. 1 (Spring 1976), pp. 130–52: 132.
16 Cf. Niklas Luhmann and William Whobrey: Observations of Modernity, Stanford 1998, p. 70.

future presents, all of which will disappear but one. Because of this continuous potentiality, the present future is highly complex and requires social systems to decrease the number of possibilities—to »defuturize« the future.[17] From the standpoint of social systems theory, techniques that are based on statistics and game theory are means to deal with the fact that a social system does not know what the other players will do. In order to make reasonable decisions towards an environment which can only be partially known, social systems develop fictional or simulation strategies, strategies that allow to simulate future presents.[18] Shaping and predicting are operators within literary utopian fiction as well as in game theoretical simulations.

Global capitalism of the 21st century confronts us with new technological means to defuturize the future, fostering higher and higher degrees of calculability and predictability of economic decisions and markets. Social systems are easily manipulated on the affective and aesthetic level through the design of their environments the operative basis for the growing sector of behavioral economics that focuses on ›nudging‹ consumers via chains of incentives. ›Persuasive‹ technology design like digital learning systems or behavioral smart phone apps trigger desired behavior through incentives without evoking the feeling of coercion but whether the user experiences it as compulsion or play does not matter systematically because the bottom line is still the operant behavioral principle of positive reinforcement. The operandum might not look like the lever in a rat dispenser, but the design of online teaching platforms is nevertheless that of a Skinner box.

4. Surveillance Capitalism

Behavioral technology design in coordination with nudging economics creates quasi-closed systems of user/consumer markets in which the possible and probable behavior of each actor is already factored into the product design because they represent de facto social environments for micro-decisions. Informed by the »digital exhaust« of surplus behavioral data that users/consumers leave behind using these technologies, »surveillance capitalism« as Shoshanna Zuboff coined it, is able to not only *predict* but to actively *shape* consumer/user behavior, which means de facto closing up the future. When technologies fold behavioral and cognitive science into corresponding economics, aiming at undermining both senses and sense of individual decision-making processes, the future can no longer be understood

17 Luhmann: The Future Cannot Begin (as note 15), p. 141.

18 For fictional strategies as defuturization, cf. Elena Esposito: Die Fiktion der wahrscheinlichen Realität, Frankfurt am Main 2007.

as an open horizon for individual or democratic decision-making. This behavioral machine affects every inner and outer aspect of life, science, culture, markets, and politics.

The prominent role of a few global actors like Google, Facebook, Amazon, WeChat, etc. in this most recent chapter of global capitalism requires special attention, because it resembles a technological condition of possibility for this shutdown of an open future. Even though psychology, economics, political, and social sciences all have had their behavioral turn, they still employ divergent, even contradictory models of behavior.[19] While the different academic disciplines do not agree on their behavioral axioms, behavioral design creates facts by merging them into the same digital environments, creating behavior that is game theoretically modeled before it occurs. It disregards analytical differences and focuses instead on the production of a certain behavior. In order to understand the implications and effects this behavioral design machine creates and its inner operations, it is important to observe not only the actions of the behemoths in the field but also the underlying behavioral design discourse. Retrospectively, Google's eureka moment was the idea to turn the behavioral surplus data of its search engine, the »digitial exhaust« of its users, into a commodity that can be traded with extremely high profit margin.[20] Only with this new type of data can Skinner's dream of a technology that effectively predicts and shapes human behavior be realized. Skinner's vision of a totalitarian world based on the scientific method and the principles of behaviorism is being reified in the form of user technologies that create their own markets, in which the decision making of user groups can be predicted with a very high certainty, and the system can adapt accordingly, creating markets of total certainty.

Google, Amazon, Facebook, et al. deal in prediction products that are aimed at reducing the risk for customers: »Prediction products are sold into a new kind of market that trades exclusively in future behavior—behavioral future markets in which any player with an interest in purchasing probabilistic information about behavior and/or influencing future behavior can pay to play in markets where the behavioral fortunes of individuals, groups, bodies and things are told and sold.«[21]

Furthermore, as representatives of the field of »computers as persuasive technologies« aka »captology« already predicted in 2003, persuasive technology design operates beyond the Web: »With the emergence of embedded computing, the forms of persuasive technology will likely become more diverse, ›invisible‹, and

19 Herbert Gintis: The Bounds of Reason: Game Theory and the Unification of the Behavioral Sciences, Princeton 2009, p. 221.

20 Cf. Shoshana Zuboff: The Age of Surveillance Capitalism: The Fight for the Future at the New Frontier of Power, London 2018, p. 87.

21 Ibid., p. 96.

better integrated into everyday life. The Web, which is so prominent today, will be just one of many forms of persuasive technology within another 10 years.«[22]

The difference between computer-based behavioral design and older ›persuasive‹ media such as print or television marketing, is interactivity and adjustability: computer systems are feedback systems, they are persistent, they can learn and they can scale. Software-based experiences can easily replicate one successful persuasive experience to millions.[23] In the current summer of AI and machine learning systems, behavioral design promises to reach previously hard to be imagined dimensions. *Capital One,* one of the prominent culprits who not only disrespect their customer's data but also fail to secure them, carries out its own behavioral design research to create methods for applying behavioral economics in products and services and to deploy machine learning. Personality traits in form of big data are no longer hidden factors because within controlled environments that were created by behavioral design in the first place, they form very precise prediction patterns, and machine learning promises to take the predictability of behavior to a new level:

»Practitioners and behavioral scientist have decades of research on how people behave and make decisions, but we're only now figuring out how to practically apply this knowledge on products and services at scale in order to positively influence people. Behavioral practitioners aren't just intervening any more – people are self-selecting to be nudged. With machine learning, we can skirt a debate in psychology about weather personality (fixed, stable traits in people) or situation (context, environments in which people find themselves) best predicts behavior. Nudging at scale with machine learning models helps detect some patterns that are person-specific and some patterns that are situation-specific so that the right balance can be struck.«[24]

There seems to be neither a lack of self-confidence nor relevant scruples in the field of behavioral design, and any critique today seems to come too late. The economic discourse on nudging fully anticipated at its very beginning the coming of critique against this new economic theory and practice. Any risk to nudge theory is being assessed and taken into account for possible future scenarios. This essay probably is already factored in and part of the equation.

22 BJ Fogg: Persuasive Technology (as note 1), p. 3.

23 Ibid., p. 10.

24 Chris Risdon: Scaling Nudges with Machine Learning – Behavioral Scientist, Behavioral Scientist (blog), 2017, under: https://behavioralscientist.org/scaling-nudges-machine-learning/ (1 January 2020).

Martin Heidegger

Force, Violence and the Administration of Thinking

Adam Knowles

The German philosophical tradition, perhaps more than any other tradition in Western philosophy, is a peculiar product of the university system. David Hume, Jeremy Bentham, Jean-Jacques Rousseau, Voltaire, Baruch Spinoza—to name but a few—produced their works outside of the university system. Yet from Immanuel Kant in the 18th century to Peter Sloterdijk in the 21st, the history of German philosophy is a history of a thinking that has had its home within the German university—with Friedrich Nietzsche as a partial exception. This fact is central to the development of German philosophy.

In his book *German Philosophy 1831–1933* Herbert Schnädelbach puts it succinctly: »German university scholarship is ›bureaucratic scholarship‹ [›*Beamtenwissenschaft*‹].«[1] Put differently, one can say that Germany university scholarship, including philosophy, has always stood in relation to a particular form of administration—namely the administrative structure of the professor as a civil servant. German philosophy is *administrative philosophy*, philosophy administered under particular rules of operation, a philosophy that has flourished under the particular conjuncture of a set of administrative practices.[2] Given the centrality of administration to the history of German philosophy, this paper pursues one central question: What can we learn about the work of Martin Heidegger by examining it through the lens of administration [*Verwaltung*]?[3] Just as our own thinking and scholarly production (especially for representatives of universities in the United States) is the peculiar product of the productive operational imperative of the

1 Herbert Schnädelbach: Philosophy in Germany 1831–1933, Cambridge 1984, p. 23; Philosophie in Deutschland 1831–1933, Frankfurt am Main 1984, p. 38.

2 For a portrait of the figure of the German Professor on the eve of National Socialism see Fritz K. Ringer: The Decline of the German Mandarins. The German Academic Community, 1890–1933, Middletown 1980.

3 A systematic publication of documents from Heidegger's Rectorate in Freiburg is still lacking. The most extensive collection fails to take into consideration the Aryanization files from the Freiburg University Archive: Alfred Denker and Holger Zaborowski (eds.): Heidegger-Jahrbuch 4. Heidegger und der Nationalsozialismus, vol. 1: Dokumente, Freiburg 2009.

neoliberal university, analyzing the conditions of production of any philosophical thinking is itself a philosophical task, and not merely a historical concern.[4] While Heidegger, like many professors of his time, had ambitious plans for reforming the German university, he nonetheless remained a steadfast product of the German university system.

Moreover, Martin Heidegger was a philosopher whose university career spanned three distinct phases of the bureaucratic history of the German university. Heidegger began his academic career in the Weimar era and experienced a productive period of teaching and writing in Marburg, resulting in the publication of his magnum opus *Being and Time* in 1927 and a professorship in Freiburg in 1928.[5] He then began the Nazi era as an established full professor with a significant international reputation. In early 1933 in the midst of the *Gleichschaltung* of the German university system, he made serious efforts to shape the administrative structure of the German university, while maintaining his teaching obligations and producing a large body of philosophical manuscripts.[6] Finally, Heidegger entered a third phase of his career in the post-war German university after denazification. This was a period in which his reputation suffered under a teaching ban levied by the denazification commission, before reinstatement and public rehabilitation as a figure of immense international reputation.[7]

In this essay I would like to focus on the transition between two of these periods, specifically on the time from approximately 1930 to 1936. These were particularly fecund years of philosophical productivity for Heidegger, resulting in

4 For the most extensive analysis of Heidegger's administrative activity see Bernd Grün: Der Rektor als Führer. Die Universität Freiburg i. Br. von 1933 bis 1945, Freiburg 2010; on the complicity of the American university system see Piya Chatterjee (ed.): The Imperial University. Academic Repression and Scholarly Dissent, Minneapolis 2014.

5 The most extensive biographies of Heidegger is Rüdiger Safranski: Martin Heidegger. Between Good and Evil, Cambridge 1998. On Heidegger's time as an instructor in Marbach see John van Buren: The Young Heidegger. Rumor of the Hidden King, Bloomington 1994; Hans-Georg Gadamer: Philosophische Lehrjahre. Eine Rückschau, Frankfurt am Main 1997, pp. 210–221.

6 The first extended treatment of Heidegger's political activities under National Socialism appeared in nearly contemporaneous publications by Victor Farías: Heidegger and Nazism, Philadelphia 1991; Hugo Ott: Martin Heidegger. A Political Life, London 1993; Peter Trawny: Heidegger and the Myth of the Jewish World Conspiracy, Chicago 2014.

7 For the most extensive analysis of Heidegger's denazification process see Silke Seemann: Die politischen Säuberungen des Lehrkörpers der Freiburger Universität nach dem Ende des Zweiten Weltkrieges (1945–1957), Freiburg 2002; Reinhard Mehring: Heideggers Überlieferungsgeschick. Eine dionysische Selbstinszenierung, Würzburg 1992; Holger Zaborowski: Eine Frage von Irre und Schuld? Martin Heidegger und der Nationalsozialismus, Frankfurt am Main 2010.

fundamental shifts in his thinking.[8] These were also the years of *Gleichschaltung* and of Heidegger's most intense bureaucratic activity. Heidegger was one of many philosophers who sought influential administrative positions in higher education in the Nazi era. Indeed, during the entire Nazi period the discipline of philosophy was conspicuous for its intense participation in the administrative remaking of the German university system.[9] Three German universities went through *Gleichschaltung* with a philosopher as Rector—Heidegger in Freiburg, Ernst Krieck in both Frankfurt (and Heidelberg), and Hans Heyse in Königsberg. Later, Erich Jaensch would become Rector in Marburg.[10] In Berlin multiple philosophers participated in administering higher education, most prominently Alfred Baeumler, who played a critical role in overseeing academic surveillance in Alfred Rosenberg's Office of intellectual surveillance.[11] Baeumler, Krieck, Jaensch, and Heidegger constitute a partial list of the philosophers who sought proximity to Nazi centers of power. Many of these thinkers—for the most part mediocre philosophers at best—have conveniently been excluded from the memory of the discipline, with the exception of Heidegger. Of all the ambitious professors seeking to influence the administration of higher education in Nazi Germany, Heidegger is perhaps the one with the strongest post-war reputation—with Carl Schmitt only experiencing a later rehabilitation.[12] This underscores the question central to this article: did Heidegger have a philosophy of administration [*Verwaltung*]? Was administration a philosophical practice for him? The first four volumes of Heidegger's philosophical diaries known as the *Black Notebooks* provide a clear answer to this question, especially in the entries from the periods of the Rectorate and denazificaion, i.e. in the very moments when Heidegger was most thoroughly entangled in administrative practices. Heidegger regarded the administration of the university as a philosophical task, one linked to the exercise of power and associated with

8 This period has been associated with Heidegger's so-called turn (*Kehre*) since at least the 1969 publication of William J. Richardson's influential book: Heidegger. Through Phenomenology to Thought, New York 2009.

9 Frank-Rutger Hausmann: Die Geisteswissenschaften im »Dritten Reich,« Frankfurt am Main 2011; Helmut Heiber: Universität unterm Hakenkreuz, München 1991.

10 George Leaman: Heidegger im Kontext. Gesamtüberblick zum NS-Engagement der Universitätsphilosophen, Hamburg 1993; Ilse Korotin (ed.): Philosophie und Nationalsozialismus, Wien 1994; Thomas Laugstein: Philosophieverhältnisse im deutschen Faschismus, Hamburg 1990; W. F. Haug (ed.): Deutsche Philosophen 1933, Hamburg 1989; Monika Leske: Philosophen im »Dritten Reich«. Studie zu Hochschul- und Philosophiebetrieb im faschistischen Deutschland, Berlin 1990.

11 Reinhard Bollmus: Das Amt Rosenberg und seine Gegner. Studien zum Machtkampf im nationalsozialistischen Herrschaftssystem, Berlin 2006.

12 Dirk van Laak: Gespräche in der Sicherheit des Schweigens. Carl Schmitt in der politischen Geistesgeschichte der frühen Bundesrepublik, Berlin 2002.

a fundamental term which became central Heidegger's work in the late 1920s: *Walten*.[13] To understand the nature of that task, we must first understand something about the role of *Walten* in Heidegger's thinking.

Before beginning the ontological analysis of *Walten*, it is important to remember a critical fact about Heidegger: from April 1933 to April 1934 Heidegger served in a significant bureaucratic function holding the office of the *Rektor-Führer* of Freiburg University.[14] The archival record of the Rectorate shows Heidegger to be a conscientious, detail-oriented and highly functioning civil servant who deftly negotiated competing factions within the regime before, both during and after the Rectorate.[15] Moreover, Heidegger never failed to be attentive to his concrete position within the cultural politics of National Socialism and he pursued a research agenda that was deeply aligned with the Nazi promotion of regional homeland studies (*Heimatkunde*) and with Nazi Philhellenism.[16] After the war, Heidegger sought to occlude his administrative function more than any other aspect of his political past, even more than the anti-Semitism that he preserved for publication in the *Black Notebooks*.[17]

From the time of his testimony to the Denazification Commission in 1945, Heidegger began to carefully control the narrative about his relation to National Socialism and he remained largely consistent in his various portrayals of his Rectorate. In these accounts Heidegger, adopting a common set of post-war tropes about »inner emigration,« admits to a form of ideological complicity, distances himself from Nazi racial politics, and describes himself as being disappointed by what he called the increasing radicalization of the movement, while supposedly

13 I deal with the ontology of *Walten* in Adam Knowles: Towards a Critique of *Walten*. Heidegger, Derrida and Henological Difference, in: Journal of Speculative Philosophy 27/3 (2013), pp. 265–276; for the most extended analysis of the term Jacques Derrida: The Beast and the Sovereign, vol. II, Chicago 2011.

14 On the role of the Rector at universities under National Socialism see Helmut Seier: Der Rektor als Führer. Zur Hochschulpolitik des Reichserziehungsministeriums 1934–1945, in: Vierteljahreshefte für Zeitgeschichte 12/2 (1964), pp. 105–46.

15 Portions of this research can be found in Adam Knowles: Heidegger's Fascist Affinities: A Politics of Silence, Stanford 2019; Adam Knowles: Martin Heidegger's Nazi Conscience, in: Christina Morina and Krijn Thijs (eds.): Probing the Limits of Categorization: The Bystander in Holocaust History, New York 2018, pp. 168–186.

16 On *Heimatkunde* see Knowles: Martin Heidegger's Nazi Conscience (as note 15). On philhellenism see Suzanne Marchand: Down from Olympus. Archaeology and Philhellenism in Germany, 1750–1970, Princeton 2003.

17 On antisemitism in the context of the *Black Notebooks* see Trawny: Heidegger and the Myth (as note 6); Donatella di Cesare: Heidegger, die Juden, die Shoah, Frankfurt am Main 2015; Walter Homolka and Arnulf Heidegger (eds.): Heidegger und der Antisemitismus. Positionen im Widerstreit, mit Briefen von Martin und Fritz Heidegger, Freiburg 2017.

adhering to a form of »private National Socialism.«[18] Nowhere does Heidegger discuss the precise nature of his administrative practices as Rector, even though he was involved in the production of thousands of files and deftly negotiated the material practices of party politics at the university, municipal, state and federal levels. Even in the sole text dedicated exclusively to the Rectorate, Heidegger does not specifically discuss his administrative work, except to say that he was »not interested in the formal execution of such empty bureaucratic business, but was also inexperienced.«[19] By controlling the narrative about his relationship with the regime, Heidegger has successfully distracted us from investigating his role in the university *Verwaltung*, from what he called the "violence of administration."[20]

Yet in the *Black Notebooks* Heidegger offers a few important hints about what we might call his »philosophy« of administration. Although he mentions his administrative activities as Rector only a handful of times in cryptic passages, if one interprets these scattered references to the role of administration in the National Socialist remaking of the German university in the light of his ontological analyses of *Walten*, then an ontological complexity begins to accrue around a term that might otherwise be easily dismissed from philosophical analysis. This is the task I undertake in this paper. After analyzing the term *Walten* in Heidegger's ontology, I will then seek to interpret Heidegger's cryptic references to administration in the *Black Notebooks*. In the final section I will reflect on Heidegger's place in the operation of our own »administered« academic practice.

1. Heidegger's *Walten*

In Heidegger's 1929–30 lecture course *The Fundamental Concepts of Metaphysics* Heidegger introduced *Walten* as a new ontological term.[21] He initially introduces the term as a novel way of translating of Aristotle's concept of *phusis*, yet *Walten* soon accrues a complexity imbedded with manifold meanings that defy any at-

18 Martin Heidegger: Das Rektorat 1933/34. Tatsachen und Gedanken, in Reden und andere Zeugnisse eines Lebensweges (1910–1976), vol. 16 of Gesamtausgabe, Frankfurt am Main 2000, pp. 372–394: 381. Daniel Morat: No Inner Remigration: Martin Heidegger, Ernst Jünger, and the Early Federal Republic of Germany, in: Modern Intellectual History 9/3 (2012), pp. 661–79.

19 Heidegger: Das Rektorat 1933/34. Tatsachen und Gedanken (as note 18), p. 384.

20 Martin Heidegger: Überlegungen II-VI (Schwarze Hefte 1931–1938), vol. 94 of Gesamtausgabe, Frankfurt am Main 2014, p. 211; Martin Heidegger: Ponderings II-VI, Black Notebooks 1931–1938, Bloomington 2016, p. 155.

21 Martin Heidegger: Die Grundbegriffe der Metaphysik: Welt, Endlichkeit, Einsamkeit [GA 29/30], vols. 29/30 of Gesamtausgabe, Frankfurt am Main 1983, pp. 4off.; Martin Heidegger: The Fundamental Concepts of Metaphysics: World, Finitude, Solitude,

tempt to reduce the term to its initial origins in Aristotle. In his typical style, Heidegger begins to associate *Walten* with a list of cognate terms such as *durchwalten*, *obwalten*, *umwalten*, *verwalten*, *überwältigen*, *vorwalten*, *Gewalt*, *Vergewaltigung*, and the neologism *erwalten*. These terms often tax Heidegger's translators, but if *Walten* is commonly translated as to sway, reign, govern, or prevail, then the set of cognate terms encompasses a broad range of meanings such as prevailing through, prevailing over, prevailing around, overpowering, administrating, governing, violence, rape and violation. The complexity of translation is intensified because Heidegger tends to utilize the substantivized infinitive *das Walten* in ways that do not lead to an elegant English rendering comparable to the verbal words. In this article, I will focus primarily on two of these terms *verwalten* and *Gewalt* in the light of the meanings they assume in the *Black Notebooks*.[22] In the process I forego any attempt at a consistent translation of the term, for doing so imposes a rigidity upon a term which operates within a landscape of fluidity in Heidegger's German. By analyzing the role that the violence of *Walten* plays in Heidegger's work, both at an ontic and ontological level, we can better understand Heidegger's *philosophical* alliance with National Socialism.

Heidegger introduces *Walten* in *The Fundamental Concepts of Metaphysics* in the context of an explication of Aristotle's ontology in a section entitled »The Two Meanings of *phusis*.« Though commonly translated as »nature,« Heidegger intentionally avoided the Latinate term and offered the unorthodox alternative translation of *phusis* as *Walten*. *Phusis* in this unique rendering is not simply a set of things which exist in the world, but it is more precisely the power that allows those things to be things, and even the power that allows the world to be a world. Through his interpretation prevailing bears this twofold meaning as both that through which the prevailing prevails and the very force of that prevailing. Heidegger distinguishes these distinct yet closely intertwined meanings of prevailing as »that which prevails in its prevailing« and »prevailing as such as the essence of the inner law of matter« (GA29/30, pp. 44–46/30–31).

Heidegger associates the first meaning, that which prevails in its prevailing, with more traditional conceptions of *phusis* as nature. This prevailing denotes the

Bloomington 1995. Volumes of Heidegger's Gesamtausgabe cited as GA number with German/English pagination.

22 Heidegger: GA 94 (as note 20); Martin Heidegger: Überlegungen VII-XI (Schwarze Hefte 1938/9), vol. 95 of Gesamtausgabe, Frankfurt am Main 2014; Martin Heidegger: Ponderings VII-XI, Black Notebooks 1938–1939, Bloomington 2017; Martin Heidegger: Überlegungen XII-XV (Schwarze Hefte 1939–41), vol. 96 of Gesamtausgabe, Frankfurt am Main: 2014; Martin Heidegger: Ponderings XII-XV, Black Notebooks 1939–1941, Bloomington 2017; Martin Heidegger: Anmerkungen I-V (Schwarze Hefte 1942–48), vol. 97 of Gesamtausgabe, Frankfurt am Main 2015.

elements associated with nature »in a narrower sense,« as »the vault of the heavens, the stars, the ocean, the earth« (Ibid., p. 46/30). Given that this productive natural force embodied in the earth, sky and other natural entities comes to be of its own accord, it is distinct from the objects created through human skill or craft (*technē*), things which come to be and perish through human intervention. In his 1937 lecture course Heidegger would describe the difference between *phusis* and technē in more detail:

»For that is what *technē* means: to grasp beings as emerging out of themselves in the way they show themselves […] to order oneself [*sich einzurichten*] within beings as a whole through productions and institutions. *Technē* is a mode of proceeding *against phusis*, though not yet in order to prevail over [*überwältigen*] it or exploit it […] but, on the contrary, to retain the holding prevailing [*Walten*] of *phusis* in unconcealedness.«[23]

Technē, understood in its most fundamental sense as the human power for creation and bringing forth, operates through a capacity for intervention and a capacity for renunciation, both of which are enabled by prevailing. However, *technē* becomes a destructive force when it sets its own goals by attempting to overpower (*überwältigen*) the prevailing, when it becomes—in Heidegger's words—»arbitrary« and ceases to be the »occurrence and letting-prevail of the unconcealedness of beings« which is »required by *phusis* itself.«[24] *Phusis* in this sense ought to be understood as a »regional concept« denoting the realm of self-movement that occurs without human intervention (GA 29/30, p. 46/30). This power of prevailing is »that which is determined and governed from out of itself.«[25]

As »the essence of the inner law of the matter,« prevailing in the second definition does not designate a particular region or domain, but instead refers to the enlivening force which moves matter in an Aristotelian sense of motion. *Phusis* conceptualized in this way »does not mean that which prevails itself, but its *prevailing* as such, the essence, the inner law of a matter« (GA 29/30, p. 47/31). This essence or inner law is not a power granted to or bestowed upon humans, but is instead that towards which human beings, guided by the capacity for philosophical listening and attunement, orient themselves within the emerging forth of being. This

23 Martin Heidegger: Basic Questions of Philosophy Selected »Problems« of »Logic«, Bloomington 1994, p. 155; Martin Heidegger: Grundfragen der Philosophie. Ausgewählte »Probleme« der »Logik«, Frankfurt am Main 1992, p. 179.

24 Heidegger: GA 45, p. 180/155.

25 Martin Heidegger: Aristoteles, »Metaphysik« Theta 1–3. Von Wesen und Wirklichkeit der Kraft, vol. 33 of Gesamtausgabe, Frankfurt am Main 1981, p. 46; Martin Heidegger: Aristotle's »Metaphysics« Theta 1–3. On the Essence and Actuality of Force, Bloomington 1995, p. 38.

power is not entirely unrelated to more conventional conceptions of human power, for the very fact that human beings can at all have power—be it over themselves, one another, or nature—is enabled by the prevailing. Hence Heidegger writes: »I emphasize once more that *phusis* as beings as a whole is not meant in the modern, late sense of nature, as the conceptual counterpart to history for instance. Rather it is intended more originally than both of these concepts, in an original meaning which, prior to nature and history, encompasses both, and even in a certain sense includes divine beings« (GA 29/30, p. 39/26). In his initial introduction to and most detailed discussion of prevailing, Heidegger summarizes the confluence of the two aforementioned meanings, linking them further to language and understanding: »*Phusis* means this whole prevailing that prevails through man himself, a prevailing that he does not have power over, but which precisely prevails through and around him—him, man, who has always already spoken out about this« (GA 29/30: 39/26). Here Heidegger points to the primordial intertwining of human existence with the capacity for language. Many of his later treatments of *Walten* are devoted to fleshing out the link between the power of prevailing and the human capacity for language.

The human capacity for language is, by virtue of the prevailing that prevails, enlivened by the power which prevails through human beings. To speak authentically, or, in the language that Heidegger adopts in the 1930s, to speak poetically (*dichtend*), means to speak through and of the prevailing in accordance with its prevailing. Hence in *On the Way to Language* Heidegger defines language as »what prevails in and bears up the relation of human nature to the twofold [*Zwiefalt*].«[26] In this context, the twofold can be understood as referring to the ontological difference between being and beings. Accordingly for Heidegger, understanding the link between prevailing and language does not require grappling with how to speak *about* the prevailing, but instead it involves how to grasp the manner in which all language already speaks of and through the prevailing. Prior to all speech, the prevailing enables the very capacity for speech.

In short, being speaks through the prevailing, yet necessarily also diverges from the prevailing. Language, if employed authentically and poetically, speaks in accordance with the prevailing by attuning language to the prevailing. Given that that which prevails speaks in its prevailing as the elemental force of being, the role of the poet is to translate this speech while leaving, to the greatest extent possible, the prevailing untouched, that is to say, by leaving it in its unconcealment: »The poet experiences a prevailing, a dignity of the word, vaster and loftier than which

26 Martin Heidegger: Unterwegs zur Sprache (1950–1959), vol. 12 of Gesamtausgabe, Frankfurt am Main 2018, p. 116; Martin Heidegger: On the Way to Language, San Francisco 1982, p. 30.

nothing can be thought.«[27] Importantly for Heidegger's philosophy of language, the poet renders this experience in poetry through the cultivation of silence, i.e. through the cultivation of the art of withdrawing language at the appropriate moment. »By learning that renunciation,« Heidegger writes, »the poet undergoes his experience with the world's lofty prevailing.«[28] The unencumbered prevailing of the prevailing relies upon a certain degree of knowing renunciation on the part of the poet in order to leave the prevailing in its unconcealment. Heidegger regards this act of renunciation as the proper care for language.

Prevailing is the primordial force of being. It is a violence or force which we must attune ourselves to, even as the contrary force of technology seeks to overpower this primordial force. In the *Black Notebooks* Heidegger takes up a similar set of themes, while overlaying them with a language of struggle, describing the task of thinking as »the release through struggle of the incomprehensible [*kämpferische Freigabe des Unbegreifbaren*]« (GA 94, p. 29/23). Later, on the cusp of taking up the Rectorate, Heidegger links this preservation of the poetic space of prevailing to an administrative task: »*The philosopher* is never someone who grounds—he leaps ahead and stands there to the side and instigates the clarity of questioning and tends to the hardness of the concept and thereby administers the space-time of free poetizing in the empowerment of the essence toward the grounding of humans in soil—work—struggle and descent« (Ibid., 82/63).

While one might be tempted to interpret this quote in a merely metaphorical fashion, this would overlook the fact that Heidegger was already negotiating for a position of power in the administration of the new regime and was only days away from assuming the Rectorate.[29] I suggest, therefore, that we dwell more closely with the term's philosophical import. Heidegger's fantasy was that the National Socialist revolution would transform the German university into the »space-time of free poetizing [*Raum-Zeit des freien Dichtens*].« As the guardians of the »reigning world of the German element [*die waltende Welt des Deutschen*]« (GA94, p. 110/81), National Socialism would restore the gap between our speaking to and with the power of the prevailing by reinstating what he calls the »force of simplicity [*Gewalt der Einfachheit*]« (Ibid., p. 211/155), thus preserving »the quiet essential force of things [*die stille Wesensgewalt der Dinge*]« (Ibid., p. 419/304). This preservation was not merely a task of thinking, but also a task of administration.

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27 Heidegger: GA 12, p. 158/66.

28 The masculine pronoun is Heidegger's own. Ibid., p. 159/67.

29 On Heidegger's political affiliations with local Nazi and *völkisch* organizations see Reinhard Mehring: Martin Heidegger und die »konservative Revolution,« Freiburg 2018; Charles R. Bambach: Heidegger's Roots. Nietzsche, National Socialism, and the Greeks, Ithaca 2003.

2. Administration as Philosophical Practice

In his account of the Rectorate in the first volume of the *Black Notebooks*, Heidegger associates two terms with the moment of his administrative alliance with National Socialism: *Gewalttat* and *Verwaltung*. National Socialism, Heidegger theorizes, will assert itself as »an act of violence.« As the »second beginning,« it will be the »origin of the act of violence« (Ibid., p. 209/153). Heidegger regards this act of violence as justified since it is directed against the technological machinations of an age that has forgotten being and is not only doing violence against itself, but also against the earth. As Heidegger puts it, this act of violence of the second beginning is thus responding to a prior act of violence, which he calls the »the violent cowardice in the face of being [*gewalttätige Feigheit vor dem Seyn*]« (Ibid., p. 168/123). Concretely speaking, Heidegger is alluding to removing the »inessential« influence of the elements of the deadly pincer movement that he believed was trapping Germany: Americanism, Bolschevism and »world Jewry.« In *The Myth of the Jewish World Conspiracy* Peter Trawny attempts to describe this type of violence in strictly ontological terms as a form of what Trawny calls being-historical anti-Semitism.[30] However, I argue that closer attention to the language of *Walten* in the *Black Notebooks* reveals how Heidegger translated this ontological structure into the concrete political concerns of university administration as an act of very deep ontic violence.

As a man who was in his own brother's words—a »celebrity« and a »hot stock on the world market of public opinions,« Martin Heidegger's eager devotion to the movement lent early intellectual credibility to the Nazi revolution.[31] As is well known, Heidegger joined the Nazi party on May 1st, 1933 and remained a member until the end of WWII.[32] Already in March 1933 Heidegger served as a founding member of the Cultural-Political Working Community of German University Professors (*Kulturpolitische Arbeitsgemeinschaft deutscher Hochschullehrer*), a »community of conviction, work and struggle.«[33] The founding document of this group is informative because it constitutes the most extensive political statement that he

30 Trawny: Heidegger and the Myth (as note 6), pp. 18–37.

31 Letter from Fritz Heidegger to Martin Heidegger, March 30, 1930, in: Homolka and Heidegger (eds.): Heidegger und der Antisemitismus (as note 18), p. 16; Claudia Koonz discusses the revolutionary remaking of Germany sought by National Socialism in: The Nazi Conscience, Cambridge 2003; see also Saul Friedländer's discussion of Heidegger in the context of Nazi higher education policy in: Nazi Germany and the Jews. The Years of Persecution, 1933–1939, New York 1998, pp. 41–7

32 See Heidegger's membership card from the Zentralkartei der NSDAP, printed in Alfred Denker and Holger Zaborowski (eds.): Heidegger-Jahrbuch 4 (as note 3), p. 245.

33 Bundesarchiv Berlin-Lichterfelde, BArch R8088/1155.

endorsed and participated in drafting. It ultimately tells us a great deal about the importance of *Verwaltung* in Heidegger's vision of reshaping German universities. In a somewhat disingenuous gesture, the group disavowed affiliation with any particular party, yet called for »German universities to wear a German face,« »for the renewal of an ethnic [*völkischen*] consciousness,« and for the leading role of the university as a »site of national-political education.« The group limited its numbers to »ethnically German university professors« and declared that those who do not recognize the »ethnic bounds of all genuine culture […] have no place among us.«[34]

Although Heidegger would claim to the Denazification Commission that he assumed the Rectorate because he was »persuaded to accept by friends and admirers,« the same report from the Cultural-Political Community notes that Heidegger was already in contact with the Ministry of Culture in Berlin weeks before assuming the Rectorate.[35] With the passage of the »Law for the Restoration of the Professional Civil Service« on April 7th, 1933, the full *Gleichschaltung* of German Universities began and as Rector it would be Heidegger's task to remove all Jewish and so-called politically undesirable professors from universities.[36] Heidegger adapted with incredible alacrity to his role as a bureaucrat and documents signed by Heidegger on April 19th, 1933, one day prior even to the election, show that at first he eagerly worked to implement the anti-Jewish measures at the level of his own *Lehrstuhl*, or professorial chair.[37] By April 28th, the day on which Heidegger issued a decree »requesting a complete and clear implementation of measures from Apr. 7th« to all deans, almost all Jewish professors had been purged from the university.[38]

In the section of the *Black Notebooks* dedicated to the Rectorate Heidegger describes the dawning of this moment in quiet ontic terms: »A day is dawning in which all authorities and institutions, all endeavors and standards will be *fused together* [*Eine Zeit bricht an, in der alle Gewalten und Einrichtungen, alle Strebungen und Maßstäbe eingeschmolzen werden*]« (GA94, p. 178/130). The key terms here are forces and institutions—*Einrichtungen*—the institutions, which of course must be managed correctly. Heidegger writes a »motto for the Rectorate« to himself in 1933

34 Bundesarchiv Berlin-Lichterfelde, BArch R8088/1155.

35 Quoted in Ott: Heidegger. A Political Life (as note 6), p. 325.

36 Michael Grüttner and Sven Kinas: Die Vertreibung von Wissenschaftlern aus den deutschen Universitäten 1933–1945, in: Vierteljahrshefte für Zeitgeschichte 55/1 (2007), pp. 123–186

37 Heidegger augmented in his own handwriting a list of »non-Aryan« civil servants dated and stamped 19th April 1033, Universitätsarchiv Freiburg, file B1/3986; the German university system lacks the kind of departmental structure familiar in the Anglo-American system and the *Lehrstuhl* (chair) is the decisive administrative and financial unit.

38 For a discussion of the source see Knowles: Martin Heidegger's Nazi Conscience (as note 13).

and ruminates about the term *Führerwille* (the will to lead), contrasting it with what he calls »the drive to dominate« (*Geltungstrieb*). While the leader who drives to dominate seeks to have their successes »be noticed and extolled,« the leader with the will to lead quietly gains satisfaction from his task. The drive to dominate, Heidegger opines, would require the following traits: »Necessary for him are soundness of administration, dexterity in negotiation, lightheartedness throughout *great* questions and tasks, pleasure in undertakings and a certain ability to run with the wolves« (GA94, p. 139/102). While it may be tempting to interpret Heidegger as saying that he rejects the will to dominate in favor solely of the *Führerwille*, as if that were some kind of defense, I would instead suggest that he is describing his administrative-political position as requiring a combination of both the will to lead and the drive to dominate.

This is confirmed by those who witnessed Heidegger's Rectorate. In the words of the Freiburg economist Adolf Lampe, who later served on Heidegger's denazification commission after imprisonment in Auschwitz, as Rector Heidegger »defended his positions with fanatical and terroristic intolerance and summoned the political force of the party to his defense.«[39] Heidegger recognized clearly that any movement seeking to remake institutions and authorities through the type of revolution he calls for in his infamous Rectoral Address »Self-Assertion of the German University« would require good administrators. This interpretation is corroborated by a passage, written after stepping down from the Rectorate, in which Heidegger adds philosophical depth to his use of administration: »The worlding of the world happens in the world-producing, opening, ordaining violence of administration—care [*Welt-weltung geschieht in der erweltenden, eröffnenden fügenden Gewalt der Verwaltung—Sorge*]« (GA94, 211/155). By linking administration to care, one of the most important concepts of *Being and Time*, Heidegger introduces a new ontological complexity to the place of administration in his work. Administration opens up the space for the prevailing to prevail by violently removing whatever keeps it from prevailing. In other words, for the prevailing to prevail, space must be cleared for it and obstacles must be removed through a force that requires the administrative will to dominate.

Though the Rectorate may have failed to administrate properly, we should be wary of any attempt to say that Heidegger's assumption of the Rectorate is not philosophically important. In the fourth volume of the *Black Notebooks*, Heidegger reflects on the failure of the Rectorate and speaks once again about his administrative capacity. Running throughout this volume rings the constant refrain »the genuine error [*der eigentliche Fehler*]« of the Rectorate. Here Heidegger offers a

39 Letter to the Rector of Freiburg University, 6th Oct. 1945, Universitätsarchiv Freiburg, file C67/2817.

variation on that refrain: »›They‹ will therefore not immediately grasp what the genuinely decisive factor was in my step in 1933, which nonetheless turned into an *error.* Not for the reasons I just mentioned, rather with regard to the possibility within National Socialism and with regard to the moment and the aptitude of a thinker for *administrative* activity in an institution of public education.«[40]

Heidegger regrets the timing and the fact that he as a thinker may not have adjusted to this task—although this is not at all corroborated by the archival record. But Heidegger does look back on the Rectorate as an administrative failure. If anything, National Socialism failed Heidegger. What, then, might he sought to have achieved?

3. Conclusion

Even if *verwalten* never ascends to the status of a fundamental term in Heidegger's thinking, *walten* certainly does. Such terminological constellations and play with homophony are typical for Heidegger's philosophical practice. Reading administration into Heidegger's ontology of *Walten* is itself justified by Heidegger's own philosophical practice, which brings cognate terms into tenuous alliances, associations, and conjunctures. Readers of Heidegger's work in the 1930s, especially his manuscripts on the event (*Ereignis*), have long been familiar with this practice. This practice involves a mode of attunement which demands that the reader adjust to the repetitive motifs in Heidegger's thinking, following the variations on themes which course through his cyclical style of writing in the 1930s. Heidegger invites us readers to bring administration and violence together, along with the long series of terms mentioned in the introduction. This invitation is only reinforced when one attends to Heidegger's actual administrative practices not only during his Rectorate, but also during his entire career. This career was enabled by the administrative structure of what Schnädelbach calls »bureaucratic scholarship.« Heidegger was highly attentive to his own reputation and was a master at self-representation, yet we should not allow ourselves to be distracted by Heidegger's own sleight of hand.

One fact about Heidegger is ineluctable: he was a thinker who flourished under fascism. This fact need not determine all readings of Heidegger, but it should certainly inform them, especially when dealing with texts produced under condi-

40 Heidegger, GA 97, p. 127: »›Man‹ wird daher auch nicht sobald begreifen, was das eigentlich Bestimmende war in meinem Schritt 1933, der gleichwohl ein *Irrtum* wurde; nicht in dem eben Gesagten, sondern hinsichtlich der Möglichkeit im National-Sozialismus und des Augenblicks und der Eignung eines Denkenden zum *verwaltungs*mäßigen Handeln in einer Anstalt des öffentlichen Unterrichts.«

tions of fascism. What is extraordinary about the Heidegger case is the immense energy which has been devoted to rehabilitating Heidegger. Heidegger himself set this into motion as early as 1945 and was soon aided by a global cadre of scholars—most importantly, perhaps—Hannah Arendt. If this rehabilitation was successful, it was because something about Heidegger's thinking has satisfied and perhaps still satisfies the needs of the operation of university philosophy—the sort of institutional philosophy that finds its home in various forms in very different university systems. This stands in contrast to thinkers such as Krieck, Baeumler and Jaensch, all of whom have been excluded from the discipline. Surely there is a question of greatness and mediocrity here, but those too are problematic terms rooted in gendered biases. Moreover, standards of and decisions about greatness are always the result of institutional practices. What has made Heidegger useful to the post-war universities? Why is it that Heidegger has proven so useful to our own administered thinking?

Something that Disturbs

Encounters between Animals and Optical Machines

Pauline Chasseray-Peraldi

»The speed of a movie is 25 frames per second. God knows how many frames per second flicker past in our daily perceptions. But it is as if, at the brief moments I'm talking about, suddenly and disconcertingly we see *between* two frames. We come upon a part of the visible which wasn't destined for us. Perhaps it was destined for night-birds, reindeer, ferrets, eels, whales… Our customary visible order is not the only one: it coexists with other orders. Stories of fairies, sprites, ogres were a human attempt to come to terms with this coexistence. Hunters are continually aware of it and so can read signs that we do not see. Children feel it intuitively, because they have the habit of hiding behind things. There they discover the interstices between different sets of the visible.«[1]

In this passage of the book *The Shape of a Pocket*, John Berger opens the possibility of considering another space of the visible that is mostly beyond the reach of humans. A space between the images that would potentially be destined for other species, thus posing the hypothesis of a fundamental coexistence with other sensitive orders. When considering his proposal, it would be a question of trying to appreciate interstices, behind, intermediate states of the sensitive world. Since the ninteen-thirties, theories in natural and human sciences have insisted on the idea of coexistence between humans and other orders of the sensitive. Images of encounters between animals and optical technologies are often seen and described as unusual, yet they could be seen from the perspective of otherness and strangeness, in a manner dissimilar to normative practice. In doing so, one could try to think of an inclusive ecology of optical technological artifacts.

The last decade has witnessed what researchers in visual studies have deemed a ›sensory turn‹, going hand in hand with a general movement in the human sciences consisting of rethinking the visual through the prism of multi-sensoriality and intertextuality. As Uricchio summarizes in his article *The algorithmic turn: photosynth, augmented reality and the changing implications of the image*,[2] researchers like

1 John Berger: The Shape of a Pocket, New York 2001, p. 5.

2 William Uricchio: The Algorithmic Turn: Photosynth, Augmented Reality and the Changing Implications of the Image, in: Visual Studies 26/1 (2011), pp. 25–35: 28.

Tim Ingold and Sarah Pink are concerned about taking multisensory parameters into account – the movement and the position –maintaining the idea that there is something which overflows from the meeting of the image with the eye. Thus, according to Sarah Pink,[3] a theory of multisensoriality challenges the supposed dominance of the visual in culture. But it also implies taking into account the contexts in which images make sense in the continuity of everyday life and the culture from which they emerge. Contrary to a fixed vision of the image, Pink considers photographic images as produced and consumed in a dynamic environment, which implies to understand the sensoriality of images as »something that is generated through their interrelatedness with both the persons they move with and the environments they move through and are part of.«[4]

In this article I will focus on the different regimes of animacy and conflicts of affects in two types of media: Google Street View images and drone videos on YouTube. These cases enlighten specific relations between natural things and optical technologies, between the observer and their environment, and challenge us to explore the interwoven processes between the act of recording and its surroundings. Therefore, I am questioning web-based optical devices in the presence of animals as a way to experience the presence and materiality of the machine, and I am observing animal presence throughout media configurations and media discourses representing encounters with technical artifacts. How to identify and interpret moments of otherness that would manifest in images or sequences of images? What does animal presence in Google Street View images or drone videos on YouTube tell us about contemporary optical technologies?

1. Fortuitous Encounters

Capturing images in Northern Ostrobothnia in Finland in October 2009, a vehicle of the Google Street View fleet met a horse and rider on its way. As he approached, the animal suddenly became frightened and fled across the fields. During the wild dash, the rider was thrown to the ground. He appears a few shots later, lying in the meadow, his mount far off. It seems that the driver of the persuing vehicle stopped.

The images of the available sequence in succession show a shot of the rider lying on the floor and another one of him reunited with his horse, far away. On the ground, wheel tracks on the muddy road also indicate a precipitous stop of the

3 Sarah Pink: Sensory Digital Photography: Re-Thinking Moving and the Image, in: Visual Studies 26/1 (2011) pp. 4–13: 4.

4 Ibid., p.4.

Fig. 1: Screenshots of the sequence of the encounter between a horse and a Google Street View car in Finland, 2009

vehicle at the edge of the field, thus assuming assistance to the unhorsed rider by the driver before he hit the road again. Between that, there are missing shots. Something important took place and we only see the ends of it. What happens in these missing images is a stop, a breach, in the protocol of recording. The event bursts and diverts the spectator from his hypnotic navigation through images, but above all, it diverts the protagonists from their initial situation: the horse from its supposed serenity, the rider from his accustomed ballad, the driver from his programmed mission.

This case was first reported to Imgur[5] on April 19, 2016, then to Reddit[6] the next day, finding its way onto other websites such as the British tabloid press, and finally on French websites. The various media reporting the case alternate between hyperbolic figures and euphemistic judgments: »the incredible moment«,[7]

5 Ttra: When Google Street View car meets a horse, under: https://imgur.com/gallery/xNk16 (18 December 2019).

6 Abaosle: When Google Street View car Meets a Horse, under: https://www.reddit.com/r/google/comments/4fn9vy/when_google_street_view_car_meets_a_horse/ (18 December 2019).

7 Lila Randall: The incredible moment Google Street View cameras capture rider being

»a SHOCKING accident«,[8] »a very akward encounter«,[9] »hilarious moment.«[10] Only one of the articles normalizes the animal's attitude, calling it »perfectly natural.«[11] Another article even named the horse as »the horse that didn't want to be on Google.«[12] If we consider the few extracts mentioned, the emphasis is placed on the extraordinary aspect of the encounter, with emotions sometimes positive, sometimes negative, sometimes humorous, sometimes frightening: an encounter, an accident. This shows differences in the understanding of the event. The Sun's report emphasizes the cowardliness of the horse which reduces the animal's attitude to a behaviour that is easily evaluable and interpretable for humans, describing the horse as »an easily frightened pony.«[13] The animal's emotions are suddenly revealed and evaluated under an anthropomorphic prism, which is in line with Jennie Coy's observation that humans generally tend to underestimate the complexity of animal behaviour.[14]

Conversely, others normalize the attitude adopted by the creature, others concede »but to be fair to this frightened horse, the Google Street View car is a little strange.«[15] For the majority, strangeness would be on the animal's side, normality on machine's side.

On the Reddit thread from 2016, users wonder about the reaction of the horse:

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thrown off a horse, under: https://www.thesun.co.uk/archives/news/1138973/the-incredible-moment-google-street-view-cameras-capture-rider-being-thrown-off-a-horse/ (18 December 2019).

8 Aaron Brown: Google's Street View van just caused a SHOCKING accident for this unlucky horse rider, under: https://www.express.co.uk/life-style/science-technology/663114/Google-Street-View-Accident-Horse-Finland, (18 December 2019).

9 Brian Koerber, Google Street View had a very awkward encounter with a horse, under: https://mashable.com/2016/04/20/google-street-view-horse/?europe=true#ZTqQoFr3yEqG (18 December 2019).

10 Corey Charlton: And she's off!, under: https://www.dailymail.co.uk/news/article-3558028/And-s-Hilarious-moment-rider-thrown-saddle-Google-Street-View-car-causes-animal-bolt-Finland.html (18 December 2019).

11 Jay Hathaway: Horse has perfectly natural response to Google Street View camera car, under: https://www.dailydot.com/unclick/horse-runs-from-google-street-view-car/ (17 January 2020).

12 Nicolas: Le cheval qui ne voulait pas être sur Google, under: https://www.echeval.com/news/14-cheval-google-street-view (17 January 2020).

13 Randall: The incredible moment Google Street View cameras capture rider being thrown off a horse (as note 7).

14 Jennie Coy: Animals' Attitude to People, in Tim Ingold (ed.): What Is an Animal?, London 1994, pp. 77–83: 83.

15 Koerber: Google Street View had a very awkward encounter with a horse (as note 9).

»*Realtrain*: I wonder if the horse was specifically scared of the street view cameras? It can't be like this with all cars.
Calicoan: Horses think differently – for them, an alteration of a familiar thing turns it into a completely different thing, instead of a familiar thing that's a little different. This is pretty adaptive when the creatures that want to eat are prone to sneaking up on you all camouflaged!
Neebat: 20 years ago, I would have freaked out if I saw a streetview car. That horse has less experience with cars than I did then, so I can sympathize.
NeoZero: What kind of horse are you?
Neebat: Apparently a really, really old workhorse.
[deleted]: One who can write.« [16]

This conversation emphasizes both the specific aesthetic of the Google Street View car as a possible stressor for the horse and the progressive irruption and integration of these devices in the common and shared environment. Sign of a problematic presence, of an accidental encounter, the frightened horse gradually becomes an allegory on privacy rights and data policies in the context of algorithmic rulling by such tech companies.

According to Anna Tsing, disturbance is a key concept for ecologists, which emerged at the same time scholars in the humanities and social sciences began to worry about instability and change.[17] Humanists connect disturbance with damage, but as used by ecologists, disturbance is not always bad nore only caused by humans. The question of disturbance opens the discussion to what follows: »the reformation of assemblages.«[18] Used as an analytical tool, disturbance

»requires awareness of the observer's perspective—just as with the best tools in social theory. Deciding what counts as disturbance is always a matter of point of view. From a human's vantage, the disturbance that destroys an anthill is vastly different from that obliterating a human city. From an ant's perspective, the stakes are different. Points of view also vary *within* species. […] No single standard for assessing disturbance is possible; disturbance matters in relation to how we live. This means we need to pay attention to the assessments through which we know disturbance.«[19]

16 Abaosle: When Google Street View car Meets a Horse (as note 6).
17 Anna Lowenhaupt Tsing: The Mushroom at the End of the World. On the Possibility of Life in Capitalist Ruins, Princeton 2015, p. 160.
18 Ibid., p. 160.
19 Ibid., p. 161.

Disturbance opens the terrain for transformative encounters and brings us into the heterogeneity of situations.

This presence of another kind questions the relationship we have with those technologies. The recorded scene is generated by the vehicle passing, they are ontologically related, making visible the mediation operated by the device in the spaces it travels through.[20] These encounters visualise two ghostly or minored figures of global archiving infrastructures: the animal and the Google Street View car (and its recording machine). In the end, looking at these pictures, we face the moment when the protocol goes off the rails, affects its environment and is affected by it.

2. The Machine in Hot Pursuit

On April 3rd, 2017, a YouTube user, Nate Holman, published on his account a video named »Drone Chasing Pronghorn Antelope.«[21] In this video, we can see a herd of antelope, a drone in pursuit, scrambling through steppes, staying on the lookout and without respite, resuming their course each time the flying vehicle approaches. Accompanying these images, the lyrics of a Creedence Clearwater Revival's song, *Bad Moon Rising*, hover like a bad omen:

I hope you got your things together
I hope you are quite prepared to die
Look's like we're in for nasty weather
One eye is taken for an eye
Oh don't go 'round tonight
It's bound to take your life
There's a bad moon on the rise
There's a bad moon on the rise[22]

In the description section on the YouTube page, the producer and owner of the video expressed his eagerness to launch his drone from his Jeep when he saw the herd from the top of a hill in the Nebraska forest. »Well done, man, you're disturbing the wildlife«[23] comments the user Miguel Silva, while the author of the video assumes his jeep, his drone, and his rifle in another comment. Silva's comment was

20 Pauline Chasseray-Peraldi: Processing the Territory: From Taking a Picture to Online Archiving, in: Questions de communication 37/1 (2020).

21 DRONE CHASING PRONGHORN ANTELOPE (USA 2017, Nate Holman).

22 BAD MOON RISING (USA 1969, John Cameron Fogerty).

23 Miguel Silva, under: https://youtu.be/0p-Y2VtYrPM (18 December 2019).

published in November 2018, as were most of the comments found below this video, blaming the producer's irresponsible behavior towards wildlife.

This peak in video activity is related to the online publication of an article by The National Geographic, November 7th 2018, entitled *Viral bear video shows dark side of filming animals with drones*[24] in which the antelope video is mentioned as one of the examples where the presence of machines actually influenced animal behaviour in a negative way. This article, which is not the first published by National Geographic on this subject (one was already published in 2015),[25] echoes a viral video from the fall of 2018 on ViralHog YouTube channel entitled *Fallen Bear Cub Climbs Back To Mama*.[26] In this video, we can see a bear and her cub trying to climb a snowy cliff with dramatic bounces, the cub not being able to reach the top. Hands are sweaty, heart is tight, until the happy ending when the cub reaches their mother and then both flee from their pursuer.

The media coverage of this video often describes the event from a dramatic and moral perspective. This is how National Geographic's article begins, by reminding us that most media coverage has decided to retain the angle of the British proverb »If at first you don't succeed, Try, try, try, try again«, attributed to William Edward Hickson, a british educational writer and editor of the Westminster Review[27] during the nineteenth century. Human moral qualities are attributed to the cub — which becomes the symbol of the deserving child—to the bear—described as a devoted and desperate mother—ultimately making this wild scene an allegory of tenacity and individual responsibility for completion and success. The article reminds us that bad uses of technology are mostly due to a misunderstanding of a possible different perception, to the necessity to adapt to different animals as they don't react the same way to the same signs, and to the lack of knowledge about the artifacts we use in the environments we inhabit.

Animals do react in various ways to technical artifacts and human presence, depending on their proximity to humans and their own sensitivity. For some animals, what will matter will be the angle of approach, for others it will be the speed, the colour, or the noise.[28] For others, these elements do not matter, they are

24 Jason Bittel: Viral Bear Video Shows Dark Side of Filming Animals with Drones, under: https://www.nationalgeographic.com/animals/2018/11/drone-brown-bear-video-russia-wildlife-harrassment-news/ (15 December 2019).

25 Jennifer S. Holland: How Drones Are Affecting Widlife in Suprising Ways, under: https://www.nationalgeographic.com/news/2015/08/150825-drones-animals-wildlife-bears-science-technology/(15 December 2019).

26 *Спасение медвежонка на скальном обрыве.* FALLEN BEAR CUB CLIMBS BACK TO MAMA (RU 2018, MrDKedrov).

27 British liberal journal founded by Jeremy Bentham in 1823, official organ of the Philosophical Radicals.

28 Jarrod Hodgson and Lian Pin Koh: A Guide to Using Drones to Study Wildlife: First,

used to drones, as they can be to cars, airplanes, city noises or any other human manifestation. Some animals will have a visible reaction (agitation, unusual behavior in a common situation), for others, there will be an indiscernible change for the observer like a rise of the heart rate. Drones can act as stressors, arousing awareness and anxiety if not used with proper regard to wildlife. The technical name of a drone is UAV for Unmanned Aerial Vehicle. For the mother bear, and according to the ecological wildlife biologist Sophie Gilbert, the UAV becomes an UFO (Unidentified Flying Object). As drones are still pretty unusual, most people do not know what it is like to be in their presence, which is what Gilbert underlines: »I don't know how much time you've spent around drones being flown, but they're really loud.«[29]

Many videos recorded with drones have no sound or have a post production soundtrack (peaceful or emotionnal) that's stereotypical for wildlife documentaries. Drones are actually very loud and disturbing, with a range of tones depending on their rotors and propellers. The drone's noise generally ranges from 75dB to 80dB,[30] and this aspect is usually not the main concerns of the drone test online which focuses mostly on flight range, flight time or image quality. Considering the videos captured by drones, the machine appears to be silent most of the time, and even though they are noisy in reality, they often do not record themselves, and we rarely do hear the sound they make in the videos published online. According to Grégoire Chamayou, the distance of the crew piloting the drones contributes to a disempowerment of the pilots and tends to charge the object as an entity separated from human choices which is why it is considered as ethical by its supporters and nonethical by its detractors.[31]

In 1983 Holmes Rolston III pointed out the fact that »animals take an interest in affairs which affects them. They hunt and flee, grow tired, thirsty, and hot. They seek shelter, play, wag tails, scratch, suffer injury, and lick their wounds.«[32] The mistake would be to think that animals feel as we do, or to think there can be no such qualities as those of human beings in nature, qualities which we are used to value. For Edward S. Reed, we live in a lively environment shared with other beings: objects, events and places have potentialities and meanings both for

do no Harm, under: https://theconversation.com/a-guide-to-using-drones-to-study-wildlife-first-do-no-harm-57069 (18 December 2019).

29 Ibid.

30 Tim Levin: How Loud Is Your Drone? The Drone Noise Test Of P2, P3P, P4P, I2…, under: https://www.wetalkuav.com/dji-drone-noise-test/ (19 December 2019).

31 Grégoire Chamayou: Théorie du drone, Paris 2013, p. 30.

32 Holmes Rolston III: Terre objective, essais d'éthique environnementale (1983), Bellevaux 2017, p.100.

others and for us.[33] Sometimes it's the same, sometimes it's different. The reaction of the animals unfolds a form of mediation from the technical object, a form of animation of the optical machine which eludes us.

3. Zone to Defend

In 1988, in *The affordances of the animate environment: social science from the ecological point of view,* Edward S. Reed precised animals relationship to their environment:

»Because animals are aware of their environment (including us) and because they *act* in those surroundings (including us), we perceive them and act with regard to them in ways very different from our perceptions of and actions towards inanimate objects: When touched [animals] touch back, when they are struck they strike back; in short, they *interact with the* observer and each other.«[34]

In this excerpt, the author insists on the ontological dimension of animal behavior. The idea of the subjective animal already appears in Jakob von Uexküll's theories in 1934: »We no longer regard animals as mere objects, but as subjects whose essential activity consists of perceiving and acting. We thus unlock the gates that lead to other realms, for all that a subject perceives becomes his perceptual world [*Merkwelt*] and all that he does, his active world [*Wirkwelt*]. Perceptual and active worlds together form a closed unit, the *Umwelt*.«[35] For Uexküll, as explained by Bret Buchanan in *Onto-Ethologies*: »The being of animals—how they reveal themselves as intertwined with the environments they in turn create—is expressed through their behavior. To understand what it means to be an animal therefore requires that we understand its relation to an environment.«[36]

If animals are aware of their surroundings, they also express their ways of being through their reactions, and reveal specific kinds of relations and affects towards their environment and to an extent to what constitutes their territory.[37]

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33 Edward S. Reed: The Affordances of the Animate Environment: Social Science from the Ecological Point of View, in: Tim Ingold (ed.): What Is an Animal?, London 1994, p. 116.

34 Ibid., p. 116.

35 Jacob von Uexküll: A Stroll Through the Worlds of Animals and Men. Instinctive Behavior: The Development of a Modern Concept (1934), edited by Claire Schiller, New York 1957, p.5.

36 Bret Buchanan: Onto-Ethologies. The animal Environment of Uexküll, Heidegger, Merleau-Ponty, and Deleuze, Albany, New York 2008, p. 188.

37 On affect and encounter see Maan Barua: Encounter, in: Environmental Humanities 7/1 (2016), pp. 265–270 .

Fig. 2: Screenshots from Google Street View of a Shiba Inu Chasing a Car in Japan, 2014

There are many revenge stories of animals fighting back undesired machines in their surrounding that circulate on the internet. Images of a Shiba Inu chasing a Google Street View Car in Japan, district of Kumage, in Kagoshima Prefecture, went viral in April 2018. In this sequence from Google Street View, we first see the pup beside his owner repairing a boat, then attacking and pursuing joyously the unwelcomed visitor until the car reaches a dead-end. There is an intruder in his territory, he won't let that go unoticed. Wether it is a game or a defensive act, the dog's reactions signal the passage of the car, and the act of recording. It also reveals his *Umwelt*, his own territory shared with his human that »he has« to defend.

In 1987, Donna Haraway analysed National Geographic covers about primates.[38] This work questionned modern culture and the part of its ideology that resides in the stories we tell about gorillas in mass media: »What has to count as nature, for whom and when? And how much it costs to produce nature, at a particular moment of history, for a particular group of people?«[39] The Royal Burger's Zoo in Arnhem, the Netherlands, published a video on their YouTube account on April 10th 2015 in which a chimpanzee defeats a drone using a branch to observe it with curiosity.[40] This case has been reported on National Geographic, April 13th, 2015

38 DONNA HARAWAY READS THE NATIONAL GEOGRAPHIC ON PRIMATES (USA 1987, Donna Haraway).

39 Ibid.

40 CHIMPANSEES HALEN DRONE NAAR BENEDEN EN FILMEN ELKAAR! (NL 2015, Burger's Zoo).

Fig. 3: Screenshot of the video *Chimpanzee Takes Down Drone*, 2015

by Ralph Martins. Once again the sound of the video is probably a post production: we can hear animals (as a choir of animals from the zoo), and drone manipulation (we can hear the crash, and the chimp breathing while manipulating the object, but not the drone flying) mixed with the opening of *Also Sprach Zarathustra* from Richard Strauss. The opening piece called *Sunrise* is supposed to depict the mountaintop sunrise that opens Nietzsche's book. The motif of the trumpets has been called the ›nature‹ or ›world riddle‹ motif, as a symbol of nature's mystery.[41] The music related to the gesture of the chimp, glorify the use of the tool by the animal as a symbol of the genesis and meaning of life. This video functions as a mirror where two forms of curiosity—human and animal—confront each other through the use of tools—the drone and the branch.

41 Houston Symphony: That Existential Feeling: Strauss' Thus Spake Zarathustra, under: https://houstonsymphony.org/strauss-zarathustra/ (19 December 2019).

On YouTube, videos of ›drone vs. something‹ are very popular, and after planes, cops, hornets, animals are found in the 4th line of the search bar, shortly after: birds, eagles. Many videos show the efficiency of birds' claws, taking down drones. Most of the time, the fight takes place in the air, a space that we colonized and which we experience in different ways, from goose collisions with airplanes in North America, airport bird control methods, to other bird attacks.

In 2016, Dutch police started to train eagles to defeat dangerous drones. »A low-tech solution to high-tech problem«[42] that they abandonned one year after for two reasons: firstly, the cost; and seconfly, because the birds would not always do what they were trained for, and might be a trouble outside the controlled training due to frustration if they don't catch the drone prey.[43] Falconers of the French army also started to train golden eagles for combat against drones in 2016, but on April 17th 2018 an eagle of the French army attacked a five year old girl in the Atlantic Pyrenees. The justification the army gave was that the eagle might have confused the girl with a rabbit, or confused the colour of her white tee-shirt with the drone they use to train it.[44]

In his film *Aquila non capit muscas* the artist Mircea Cantor depicts the eagle's victorious battle with the drone fly. His series of drawings, exposed in the exhibition *Vânătorul de imagini*,[45] insist on the interaction between the machine and the animal, and the process and steps throughout which he progressively perceives the drone as a prey. This series emphasizes the plasticity and the sensitivity engaged in such encounters. The difference between animated and inanimate objects lies in the fundamental difference of the ability to move autonomously, which can sometimes be simulated by optical objects. These same simulations can be perceived as being alive.[46] Some animals perceive them as threats, others as a discomfort, others ignore them. Whatever the nature of the reaction is, it exists and it can mean and act on other beings, other contexts. Some drones are equiped with sensors to detect the presence of a lifeform, which blurs some of these distinctions. But these sensors can be activated or deactivated by the pilot and are still ruled by

42 Eagles vs. drones: Dutch police to take on rogue aircraft with flying squad, under: https://www.theguardian.com/world/2016/sep/12/eagles-v-drones-dutch-police-take-on-rogue-aircraft-flying-squad (19 December 2019).

43 Janene Pieters: Dutch Police Drops Drone Hunting Eagles Project, under: https://nltimes.nl/2017/12/07/dutch-police-drops-drone-hunting-eagles-project (19 December 2019).

44 Bixente Vrignon and Iban Etxezaharreta: Un Aigle de l'Armée Attaque une Fillette de 5 ans au Pays Basque, under: https://www.francebleu.fr/infos/faits-divers-justice/un-aigle-de-l-armee-attaque-une-fillette-de-5-ans-1528352617 (19 December 2019).

45 Vânătorul de imagini, Mircea Cantor, Musée de la chasse et de la nature, Paris, 15 January 2019 to 31 March 2019.

46 Reed: The Affordances of the Animate Environment (as note 33), p. 116.

calculation. Drones represent danger for many reasons: accidents, intentional violent attack, infringing on privacy and freedom rights, environmental disturbances, security concerns.

Drone use is subject to legal restrictions. In French legislation[47] on personal drones, three kinds of spaces are considered as unauthorized by the law: public space in urban areas, airports, and sensitive areas or protected areas (nuclear sites, military zones, natural reserves in that order). This typology excludes other spaces, less determined or regulated, which have their own fragility. Since June 2019, media outlets have reported cases of seagulls and other birds threatening French police surveillance drones, especially during protests. The first spectacular case occured during the *Act 32* of the ›Gilets Jaunes‹ protest in Paris on June 22nd 2019, the second one during the strike in Paris on December 10th 2019. For Frédéric Malher, regional delegate for the Bird Protection League in Île-de-France, birds attack to protect their territory and clutch of eggs.[48] Considering the political context, they are often acclaimed on the web as fighters for freedom and privacy rights. The press has reported the blury regulation of drone use by the French police. In fact, drones are not supposed to fly over crowds which is not respected in these cases, and bird attacks underline the potential risk of accident. Their encounters suggest that a danger is coming from the sky. Birds and drones stories intertwine around discourses on disturbance and the variability of its perception.

For Rolston III, we need to re-think the system of values we live by:

»This sort of experience moves value outside of ourselves. It forces a redistribution and redefinition of value. Value is not just a human product. We realize this by learning how we humans, including much that we value in ourselves, are natural products, and are thereby alerted to look for other natural productions of value. Such nonhuman values, as we track them here, are first discovered in these roots, but the path does not end there. It leads secondly to wild neighbors and on beyond to paths more foreign and difficultly explored.«[49]

As for disturbance, our systems of value require a change of point of view on the way we look at nature and otherness to try to experience what exceeds us.

47 Ministère de la Transition écologique et solidaire: Modèles réduites et drones de loisir, under: https://www.ecologique-solidaire.gouv.fr/modeles-reduits-et-drones-loisir (19 December 2019).

48 Jean-Michel Décugis: Paris: les goélands attaquent les drones de la police, under: http://www.leparisien.fr/faits-divers/les-goelands-attaquent-les-drones-de-la-prefecture-de-police-de-paris-25–06–2019–8102361.php (19 December 2019).

49 Rolston III: Terre objective, essais d'éthique environnementale (as note 32), p.99.

4. When Bugs Meet Bugs

For me, the numerous pictures of herds of sheep blocking the roads on Google Street View have a certain poetic, aesthetic, and political value. Forced wait, occupation of the territory, the masses formed by sheep, are ›slow down‹ operations forcing the Street View Car to wait. These herds reveal a time frame during which the protocol of recording has been disrupted. These moments are often considered as rare and unusual on compilations on the web. The way these encounters are qualified to keep a distance between these encounters and the technology we use, as if these reactions couldn't be considered anything else but funny.

Another thing that also occures on Google Street View are accidents, even if they are rare, or simply unseen or untold. One has been reported and acknowledged by the company on January 29th, 2009, leading an online testimonial untitled »Oh, deer: Street View and road safety reminders.«[50] This text brings back the part of banality of this huge archive project lead by the Silicon Valley player in which drivers are involved and face the same situations as local drivers. Sometimes a driver hits a deer, has to call the police, and follow common instructions for safety reasons. This collision reveals the embodied side of the process of recording. In that testimonial, the driver remains anonymous, Google Street View drivers are one of these ghostly figures of optical machine and enginery, and it is pretty

Fig. 4: Screenshot of a herd of sheep from Google Street View, 2010

50 Wendy Wang: Oh, deer: Street View and road safety reminders, under: https://maps.googleblog.com/2009/01/oh-deer-street-view-and-road-safety.html (19 December 2019).

Fig. 5: Screenshot of a Google Street View driver cleaning the camera, 2017

rare to meet them, because they are behind the lense for confidential reason. But insects allow to encounter some of them.

When the bug hits the lense, the drivers are forced to stop and to clean the camera, or the next series of pictures would be compromised. An amateur footage of a Google Street View Car and its driver is available on YouTube[51] in which we can meet the driver and discover the inside of the vehicle. In this rare footage, the driver is hiding her face for confidentiality reasons. She explains that she had to stop to clean a bug from one of the lenses of the camera. Most of the pictures we can find of Google Street View Cars are due to bugs on lenses. Sometimes they forget to switch off the cameras while cleaning them, which gives partial alien portraits of these invisible workers of the web.

These situations underline the necessity to think new media and technical devices as interrelated to biological and environmental concerns. The multiplication and democratization of optical technologies requires not only technical knowledge, economical, political and ethical considerations, but also an ecological reflection on coexisting with others. This is a meeting point where we confront otherness, which requires thinking about how we use the device and its system of sensoriality. What do we delegate to the machine when we face what we do not understand?

51 GOOGLE STREET VIEW CAR (USA 2012, SteamUP).

The legacy of positivism and Cartesianism have constituted a subordinate place for animals, perceived as machines and then with the rise of capitalism as resources. If there is an *animal turn* today in science and in society, there are still many concerns about how we negotiate territory occupation with this radical otherness, and by extension how we could develop a new approach of the unknown. What has to count as insignificant, for whom and when? And how much does it cost to value progress at a particular moment of history for a particular group of beings?

What I notice when observing these images, is that nature and territory are seen and treated as resources in such devices, from the ideal of commensurability to processes of archival valorisation. In that context, the animal helps us to see in a spontaneous affective way that optical technologies are artifacts that operate mediations, they are therefore not neutral and do not guarantee objectivity. They shape the spaces in which they circulate and are ontologically related to the recorded phenomenon. They guide the images and scenes of nature of which we become spectators. But the environment also shapes what we do see in this online service of imagery, showing breaches in the protocol.

The same presence of animals makes us realize that the way in which we generally consider what optical technologies do is very limited because it is only considered from our own environment. When we build and use our artifacts, we could start to think about how to open optical technologies and ways to co-habitate common spaces we already share. In *The Mushroom at the End of the World*, Anna Tsing proposes the idea of *latent commons* as sites where unpredictable collaborative futures might emerge, or »sites in which to seek allies« that remain undeveloped and difficult to notice.[52] She invites us to move beyond progress, »to focus attention instead on polyphonic assemblages of various rhythms, directions, and species«.[53] We might »listen politically« in order to »detect the traces of not-yet articulated common agendas«. Because for her, »the latent commons is here and now, amidst the trouble«[54] and we could reveal them only by »practicing the art of noticing«.[55] We could start by being aware of the materiality and sensoriality of the technology we produce.

These encounters also underline the critical and political value of the unknown and multiple, of undefined spaces and polyrythms we can find in such devices, if we follow the suggestion of Anna Tsing. It shows the profound and human materiality of such gigantic technological infrastructures, and the regular friction be-

52 Lowenhaupt Tsing: The Mushroom at the End of the World (as note 17), p. 255.
53 Katherine Sacco: Latent Commons in the City, under: https://culanth.org/fieldsights/latent-commons-in-the-city (19 December 2019).
54 Lowenhaupt Tsing: The Mushroom at the End of the World (as note 17), p. 255.
55 Ibid., p. 255.

tween high-tech and surroundings. What we consider as freaky and unusual is mostly due to a series of decision to define what is valuable and what is not. The encounters with the recording machine in concrete reality occur when there is a bug, but on the lens.

Picture credits:

Fig. 1: Google Street View, 353 18131, North Ostrobothnia, 2009.

Fig. 2: Google Street View, Minamitane, Préfecture de. Kagoshima, 2014.

Fig. 3: GoPro: Chimp vs. Drone at the Zoo, USA 2015, GoPro.

Fig. 4: Google Street View, 2013, image date: January 2010.

Fig. 5: top 10 creepy drivers of google street view cars, 2017, StreetViewFun.

Invading/Inviting

From Surveillance to Byzantium

Ulrich Meurer

0. Walk in Gold

There is a certain point of contact between migration and Byzantium: they intersect in their ways of seeing, of establishing a specific worldview (in the literal sense) which goes beyond mere visual cognition and touches on issues of far-reaching political as well as ontological significance.

A first warrantor in this matter is Georges Didi-Huberman who begins his study on the light-and-space artist James Turrell with two brief introductory chapters, one on the Book of Exodus, the other on the *Pala d'Oro*, the high altar retable of the Basilica di San Marco in Venice. First, Didi-Huberman recounts Israel's mythical departure from Egypt and forty-year migration through the Sinai desert to the Holy Land as a journey in a »gigantic monochrome. […] The man walks within the burning yellow of the sand, and this yellow has no limits for him. The man walks in the yellow and he understands that the horizon itself, however clear it is, there in the distance, will never serve as a limit or a ›frame‹.«[1] In this homogenous space of primal migration, suffused with light, the refugees are not guided by a line of sight or vanishing point – all markings are erased in a profound blurring of spatial reality. And it is this void, the empty desert, which then prompts to acknowledge absence itself as absolute and divine, to make a covenant with the ›Absent One‹ – signified by the Tetragrammaton – who will not allow the migrants to make unto them any graven image or likeness. Regardless of sporadic beacons, clouds or that transient furrow through the Red Sea, their world is a dimensionless monochrome that knows nothing of representation.

2.355 years later (according to Didi-Huberman's computation) man »no longer walks in deserts but within the labyrinth of cities« where he enters the cathedral of San Marco. Within its sacred space, in front of the heavily gilded *Pala d'Oro*, the »torrid yellow of the desert« may have turned into a »dripping yellow, a yellow that the humid light of Venice projects in fleeting waves around [the viewer], more

[1] Georges Didi-Huberman: The Man Who Walked in Color, translated by Drew S. Burk, Minneapolis 2017, p. 11 sq.

and more distant, without him ever knowing exactly from where […] it refracts«.[2] But it has retained its fundamental features – another vast, luminous screen with no focal point, the altar an unlocatable haze of heightened intensity. »The golden patch [*pan*] literally *appears*, it bursts forth from over there, but because it bursts forth within the brilliance, no one can actually say where this *over there* is located«.[3] Once again, this sphere of atopic holiness – using the »visible fire« of gold as a »dissimilar similitude« for the absent presence of God[4] – forbids any fixation or measurement; it oscillates between the distance of divine light and the proximity of a radiance that seems to approach me: what Didi-Huberman calls *un lointain qui s'approche*, a distance that nears.

1. Incoming

In October 2016, the photographer Richard Mosse sets up a highly sensitive camera system on a hill near Molyvos, a small seaport town on the island of Lesbos. At night, even the close shoreline is not discernible with the naked eye. However, Mosse's computer-controlled thermal imaging device registers heat radiation from more than thirty kilometers; on its screen appear numerous groups of refugees, led by human traffickers through the hills and to the coast of the Turkish mainland. On October 28, the camera detects a boat with more than 300 passengers sinking five kilometers off the coast of Lesbos. It records what is invisible from the shore – scores of bodies clinging to each other in the waves and, several hours later, the Hellenic Coastguard and local fishermen pulling survivors from the water. The apparatus registers the unfolding tragedy in glowing greyscales: the black »life-giving warmth left by the hands of rescue workers desperately working to resuscitate hypothemic victims, their skin appearing on screen as a pallid white in contrast to the black flesh of the surrounding figures« (Fig. 1).[5]

Such ›unflinching aisthesis‹ is a key feature of Richard Mosse's project *Incoming* that follows refugees on the two then busiest routes into Europe: one from the Near East via the Aegean to Camp Moria and Athens, through the Balkans to the detention center on Berlin's former Tempelhof airport; the other from Somalia and Senegal through the Sahara into Libya, across the Mediterranean to Italy and the ›Jungle‹ of Calais. The resulting images defy familiar photographic viewing patterns. They display a monochrome spectrum, from fluid white and light grey

2 Ibid., p. 18.
3 Ibid., p. 19.
4 Ibid., p. 22.
5 Richard Mosse: Transmigration of the Souls, in: id.: Incoming, London 2017, n.p.

Fig. 1: Still from *Incoming* (HD video, 2017). © Richard Mosse

to anthracite and leaden black, as the apparatus is entirely color-blind (and therefore also indifferent to the color of human skin).[6] Although providing nothing but a map of relative temperature differences, they sometimes appear like photographic negatives when Mosse changes his camera's mode of operation from ›white hot‹ (and ›black cold‹) to ›black hot‹ (and ›white cold‹). Since in digital thermal imaging the assignment of a unique color or shade to the value of each temperature data point is completely arbitrary,[7] reversing the palette's usual polarity will present warm objects like human bodies »as black signatures on a nearly white background«.[8] This is why Mosse's pictures do not present any ›portraits‹ – only de-subjectivized,

6 Ibid. Meanwhile, Paul Saint-Amour cautions against reading the figures' uniform, spectral white as »a naïve embrace of race-blind universalism«. Such an understanding »would have to ignore the cognitive dissonance experienced by viewers who look on whited-out images of bodies they know to be predominantly black and brown. [The images] trade on this cognitive dissonance – indeed, they might be seen as devices for both triggering and thematising it. The result is […] an object lesson in how the technological effacement of racial visibility functions as a warrant and alibi for state racism.« Paul K. Saint-Amour: Mapping Heat in Time, in: Richard Mosse: The Castle (companion booklet), London 2018, pp. 15–19: 18.

7 Website of FLIR Systems, Inc., under: https://www.flir.com/discover/ots/outdoor/your-perfect-palette/ (28.12.2019).

8 Kirk J. Havens and Edward J. Sharp: Thermal Imaging Techniques to Survey and Monitor Animals in the Wild: A Methodology, London 2016, p. 104.

Fig. 2: Still (detail) from *Incoming*. © Richard Mosse / Christ-Medaillon, Hosios Loukas (Plate II from: Ernst Diez and Otto Demus: Byzantine Mosaics in Greece: Hosios Lucas and Daphni, Cambridge, MA 1931, p. 32)[9]

schematic facial forms, mere traces of biological life that may exhibit a marbled patina of warmer and cooler zones but mostly remain flat and graphic, with disturbing black eye-sockets. In general, the images offer minute and sharply contoured details, textile structure, rough stone, polished metal, and at the same time, they border on simulation or abstraction. And finally, the excessive distances between lens and object tend to compress the represented space. It loses its regular dimensionality and depth, showing many of the coastlines, tent cities or landscapes in a peculiar fusion of top and frontal view – similar almost to the urban panoramas of pre-Renaissance copperplate engravings.[10]

In the spring of 2017, these unreal/hyper-realistic images are exhibited at London's Barbican Centre. The heart of the installation consists of the 52-minute HD video *Incoming*, projected on three concave eight meter wide screens and comple-

9 Otto Demus discusses an icon of Christ at the monastery of Hosios Loukas that shows inverted gradients of brightness to prevent its being swallowed by the luster of the surrounding gold decorations. The icon »recalls the inverted tonality of photographic negatives: the face itself is comparatively dark […]. The highlights […] are concentrated in the grooves and furrows of the facial relief – almost, in fact, in those places where one would expect to find the deepest shadows.« Otto Demus: Byzantine Mosaic Decoration: Aspects of Monumental Art in Byzantium, Boston 1955, p. 36.

10 See also Saint-Amour: Mapping Heat in Time (as note 6), p. 15: Mosse's *Heat Maps* »compress a great many depth planes into a single picture surface«. They appear like »the tiny castles, bays, and towns that occupy the horizon lines of so many late-medieval European paintings«.

mented by an equally immersive experimental soundscape by composer Ben Frost.[11] The video walls are surrounded by a series of monumental photographs of refugee camps from Lebanon to Germany, entitled *Heat Maps*, and a complex of smaller black-and-white flatscreens showing visual material like Mosse's *Grid (Moria)*.

2. Stray Dog's Eye

While such a pictorial arrangement might risk to transform migration into an object of sublime pleasure, it certainly challenges established divisions between contemporary art, documentary film and imaging strategies of the military-industrial complex, »bringing to attention the slippery nature of their ›distinct‹ and separate fields«.[12] In fact, Richard Mosse himself points out that his camera's mode of vision results from centuries of military research[13] – bringing to mind Paul Virilio's conception of the historical development of war technology as development of cinematographic televisibility, from the first employment of searchlights during the Russo-Japanese war or the target-acquisition techniques of the *Blitzkrieg* to the coherent light-beam of the laser.[14] This correlation is confirmed by the fact that Mosse's device (a ›Horizon HD‹ medium-wave infrared thermal camera, manufactured by the British-Italian telecommunication and armaments corporation *SELEX ES Ltd.*, now *Leonardo*)[15] is not only designed for tactical reconnaissance in coastal or sea areas and also as a targeting appliance for weapon systems. Beyond that, the camera itself is classified as a weapon and, according to *International Traffic in Arms Regulations*, subject to strict export regulations.

However, in order to grasp its manner of perception as a fundamental structuring of reality (and compare this invasive gaze to the shimmering flatness of a Byzantine icon) one must take into account that the monitoring operations of contemporary geopolitics rest on a much more expansive onto-symbolic order,

11 Barbican Centre (ed.): Richard Mosse: Incoming – Press Release, 2016, under: https://www.barbican.org.uk/richard-mosse-incoming (15.01.2019).

12 Charlie Mills: Bare Life: A Critical Analysis of Richard Mosse's Incoming (unpublished essay for the symposium »Welcome to the Fake: Photography and the Politics of Authenticity«, The Photographers' Gallery, London 2018), under: https://www.academia.edu/36747380/Bare_Life_A_Critical_Analysis_of_Richard_Mosse_s_Incoming_2016_ (20.01.2019), p. 10.

13 Mosse: Transmigration of the Souls (as note 5).

14 Paul Virilio: War and Cinema: The Logistics of Perception, translated by Patrick Camiller, London/New York 1989, p. 85.

15 I would particularly like to thank Richard Mosse for providing me with detailed information on the manufacturer and type of his camera.

namely on what could be termed ›perspectivism‹ in the broadest possible sense. Even ›perspective‹ in the narrow sense – as an optical pattern discovered by classical antiquity, reinvented in the Arabian Middle Ages and adopted by Renaissance art – constitutes an instrument of power. Hans Belting's study *Florence and Baghdad* delineates how the globalization of perspective has been tied to geographical, cultural and political domination. The Jesuits' missionary work in China in the 16th century, the Dutch presence in Japan during the 18th century, the British claims to India or French expeditions in the Middle East in the 19th century involve replacing the respective foreign culture's visual tradition with Western perspective[16] – a matter of art, politics, and politicized religion, for instance when fundamentalist Ottomans (in Orhan Pamuk's novel *My Name Is Red*) refuse to abandon the elevated position of God in favor of that new mode: »If someone removed a painting from Allah's vantage point and lowered it to that of a dog in the street, then he would lose his purity and become a slave of the infidels.«[17]

Besides marking the transition from artistic ›perspective‹ to the ideological worldview of ›perspectivism‹, this conviction (that perspective brings about a fall from the divine to the merely creatural) provides the key to its relentless despotism. For perspective rules not so much by subjecting the world to its universal ratio and geometry; rather, it is condemned to power by always seeing *too little*. Its illusion of depth arises from visual loss – one thing concealing another, size and sharpness decreasing, colors fading in the distance. Da Vinci calls this *prospettiva de' perdimenti*, perspective of disappearance;[18] Heinrich Wölfflin speaks of »elusiveness« [*Unfassbarkeit*] or a »lack of definition« [*das Unbegrenzte*] when objects are »not fully and clearly represented, but partially hidden«.[19] Thus, perspective space inevitably harbors the uncanny – not because it may at times appear dreamily unpeopled, like Francesco di Giorgio Martini's *View of the Ideal City*, but because its walls, pillars, arcades and even its well-lit expanses seem to hide the unknown. Despite all calculation, it is not transparent and governable; its disappearances give birth to subdued fear.

For that reason, perspective is closely entangled with surveillance. In order to compensate for its own constitutive deficiency and lack of knowledge, it must invade space (this is its ›epistemological‹ trait). Yet, it perceives from one point only; from Florence to *Frontex*, its monocular view is limited and therefore can never

16 Hans Belting: Florence and Baghdad: Renaissance Art and Arab Science, translated by Deborah Lucas Schneider, Cambridge, MA/London 2011, p. 42 sqq.

17 Ibid., p. 49.

18 Leonardo Da Vinci: Notebooks, translated by Jean Paul Richter, Oxford/New York 2008, p. 113.

19 Heinrich Wölfflin: Renaissance and Baroque, translated by Kathrin Simon, Ithaca, NY 1964, p. 33.

stop searching out the potentially unseen. After all, states Wölfflin, it is precisely its haunting elusiveness which makes the beholder »imagine what he cannot see. The objects […] seem as if they might at any moment emerge. The picture becomes alive«,[20] animated with ghostly projections of a sleepless and fanciful vigilance. What characterizes ›perspectivism‹ – even if modern surveillance has long replaced optical laws with digital imaging techniques – is its paranoid will to power in a world which must necessarily escape its gaze.

3. Sacratio

The phobic inspections and determinations of perspectivism penetrate the entire sphere of *being* – of being in the world, and of being human; they lay claim to the whole ›distribution of the sensible‹ and formation of reality. Due to this extensive political as well as ontological scope, weapons technology like the *SELEX* thermal imaging device can also generate a pictorial program of modern migration. Its gaze – »that sees as a missile sees«[21] – is not limited to combat operations or battlefields but captures the global movements of refugees as a new ›conflict zone‹. And in assigning political subjectivities, civic rights, or statelessness, military media not only differentiate between *bios* and *zoē*, between socially qualified and mere natural life; their specific »means of envisioning reality« might even dispossess a person of their basic existential certitude: by determining »who is and who is not the subject of ›bare life‹«,[22] surveillance technology can exile humans to the liminal existence of *homo sacer*, to the non-defined space of the Mediterranean Sea.

Giorgio Agamben discusses at length this ban that removes and delivers something over »to its own separateness«, but exerts power only *in relation* to that supposedly »nonrelational« something[23] – a paradox pointing to the clandestine primal link between rightless *homo sacer* and political sovereignty, so that the refugee can disturb the order of the modern state by causing »the secret presupposition of the political domain – bare life – to appear for an instant within that domain«.[24]

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20 Ibid.

21 Barbican Centre: Richard Mosse (as note 12).

22 Anthony Downey: Scopic Reflections: »Incoming« and the Technology of Exceptionalism, in: Barbican Centre (ed.): Richard Mosse (The Curve Nr. 27 / On the Occasion of Richard Mosse: Incoming, 15 February – 23 April 2017), London 2017, pp. 21–25: 24.

23 Giorgio Agamben: Homo Sacer: Sovereign Power and Bare Life, translated by Daniel Heller-Roazen, Stanford 1998, p. 65.

24 Ibid., p. 77.

Meanwhile, a central aspect (not least for relating *homo sacer* to Richard Mosse's *Incoming*) is only fleetingly touched upon by Agamben, namely the *image* as an operator that produces and is located on the border between the sovereign and the excluded, politics and bare life, *lex* and *sacratio*, life and death. The one image mentioned by Agamben is the ancient Roman *colossus*, an effigy made of wood or wax representing »that part of a person that is consecrated to death«, which, in the absence of a corpse that could be buried, is used in a funeral *per imaginem* to ritually confirm the difference between the living and the dead.[25] Agamben's remarks about this idol – that can also function as a custodian of boundaries between sedentariness and migration[26] – lead back to the *SELEX* system and its connection to the ›sacred‹. If the image regulates the borders of a community, one might ask whether Richard Mosse's videos and photographs evoke a logic of exclusion or surveillance;[27] and if the image acts as mediator between separate but interdependent spheres, can Mosse's installation constitute an ›interface‹ that no longer screens off the Other in order to invade it, but would be able to re/call and invite the expelled *sacrum*?

4. Tessera

At a first glance, Richard Mosse's camera is the perfect embodiment of sovereign perspectivism. It controls and partitions space regardless even of visible light or the proximity of objects. However, at this extreme peak of technological and onto-political perspectivism, the unthought-of happens: *Incoming* turns exclusion into a spectral ›presence of absence‹ and the depth of geopolitical landscapes into Didi-Huberman's flat and horizonless burning monochrome where culture has its origin in migration. Returning to the desert and to the icon, the ›post-perspective‹ images of Mosse's *Incoming* and *Heat Maps* introduce a visuality that shares several

25 Ibid., p. 60.

26 Agamben cites an ancient oath »that settlers leaving for Africa and the citizens of the homeland had to swear at Thera in order to secure their obligations to each other. [They] threw wax *kolossoi* into a fire, saying, ›May he who is unfaithful to this oath, as well as all his descendants and all his goods, be liquefied and disappear‹.« Ibid.

27 Richard Mosse refers to Agamben's distinction between *bios* and *zoē* when he describes his migrant figures as stateless, dispossessed heat traces of mere biological existence. Meanwhile, Charlie Mills submits that such a depiction might unintentionally repeat the exclusion of the ›subalternes‹ by sovereign power: »The refugees and migrants displayed are […] a biological fact tout court. This may be problematic in so far as it dehumanises the Other to the level of bare life […]. However, is this not exactly what they are, politically speaking, in the eyes of the Western nation-sates?« Mills: Bare Life (as note 12), p. 9.

Fig. 3: Left: Souda Camp, Chios Island (detail), digital c-print from the series *Heat Maps*, 2017. © Richard Mosse / Right: Still from the TV-documentary *Brilliant Ideas: Richard Mosse* (Oonagh Cousins, UK, March 19, 2018). © Bloomberg LP MMXVII

features with ›Byzantium‹, its light, its aggregate structure, its formulaic presence, its ›distance that nears‹.

First, the installation invokes the compositional structure and perceptional mode of the *mosaic*. The large-size *Heat Maps*, for instance, do not show continuous vistas or panoramas; every monumental landscape is a construct of almost 1.000 individual shots which are then manually rectified, adjusted in their brightness and contrast values, and assembled in a single frame.[28] In fact, the *SELEX* imager – whose type designation ›Horizon‹ seems quite misleading – cannot produce prospect or wide-angle shots. »Instead, it divides the picture area into a grid of square areas and sequentially fills in each square with thermographic data, a motion-controlled arm repositioning the camera head for each square«.[29] Although up to thirty kilometers away, it therefore only provides images that resemble close-up views (the manufacturer's brochure states that it owes its high resolution to an »ultra narrow field of view« of 0.6 degrees).[30] While the final picture may appear

28 Saint-Amour: Mapping Heat in Time (as note 6), p. 15.

29 Ibid.

30 Leonardo S.p.A. (ed.): SELEX Horizon SD/HD Thermal Imaging Camera (Product data sheet, 2014 © Selex ES Ltd), under: https://www.leonardocompany.com/documents/20142/114429/body_mm07756_Horizon_MWIR_LQ_.pdf (28.12.2019).

as broad expanse, it is actually a tile work, a meticulously composed mosaic of individual segments or scenes.[31]

On the one hand, such a simulation of visual continuity does not conform with classical Byzantine iconography. Otto Demus's time-honored survey of monumental church mosaics declares that their separately framed images »are not links in a continuous chain of narrative« and »must not flow into one another«. On the other, Mosse's *Heat Maps* – and even more so his *Grid (Moria)* – seem to reactivate the »almost indiscriminate covering of the walls with mosaic pictures which is found in […] Venice and other colonial outposts of Byzantine art«:[32] in one of San Marco's cupolas the panels and figures »appear as a continuous sequence without completely destroying the separate identities of the single scenes. Elements of setting are economically used for this purpose; where they were not sufficient, a simple line in the golden ground indicates the separation of two scenes. […] The little figures are still closely packed together; indeed, the whole looks like a close procession rather than a series of scenes following each other in time«.[33]

Fig. 4: Still from Richard Mosse: *Grid (Moria)* (16-channel flatscreen installation, 2017). © Richard Mosse

31 Paul Saint-Amour considers the First World War »photomosaic«, a compilation of aerial shots in a photographic map of the front line, as precursor of Mosse's media strategy. Saint-Amour: Mapping Heat in Time (as note 6), p. 16 sq.

32 Demus: Byzantine Mosaic Decoration (as note 9), p. 14.

33 Ibid., p. 71.

The relation between individual parts and complete view also informs a second, ›deeper‹ layer of the mosaic. With regard to their basic media structure, the scenes on both church wall and video screen are aggregates of stone and glass *tesserae*, or digitally encoded LED dots and pixels. According to the complexity theorist Georges Chapouthier, these building blocks are subject to a double operation of *juxtaposition* (collocating identical or similar entities) and *integration* (constructing from them a constellation of higher complexity). From micro-biology and the human body to urban planning and astronomy, the original units form a totality that subsumes its components without cancelling out their autonomous properties: »A convenient model for these juxtaposition and integration processes is the art of the mosaic: small ceramic tiles – *tesserae* – are juxtaposed and integrated in a mosaic to depict a figure, yet each individual tile retains its own distinctive features (shape, size, texture and colour).«[34]

Concerning Byzantine and post-cinematic images, it does, however, seem reductive to define the mosaic solely as a complex that ›juxtaposes‹ and ›integrates‹ without taking into account the specific nature of the single elements and, above all, the interrelation of media technology and perception, the influence of a mosaic structure on the process of seeing. In other words: a mosaic not only incorporates multiple parts in one pictorial scheme, it always plays on the *tension* between segments and totality. This is already implied in its construction principle of interruption and granulation, causing perception to oscillate between tile and image, fragment and whole. Thus, while Otto Demus certainly favors representational continuity and cohesion, he refers to the late antique method of undulating a wall surface to enhance the sparkling of gold *tesserae*[35] – a practice that exhibits media properties by turning pixilation into a visible attribute of the image. And likewise, Richard Mosse may expose the mosaic, for instance by designing *Moria (Grid)* as a video wall consisting of 16 asynchronously moving shots of a Greek refugee camp,[36] with the outlines of human bodies disrupted at the screens' edges.

34 Georges Chapouthier: The Mosaic Theory of Natural Complexity: A scientific and philosophical approach, Online edition, La Plaine-Saint-Denis 2018, under: http://books.openedition.org/emsha/200 (20.01.2019), p. 11.

35 Demus: Byzantine Mosaic Decoration (as note 9), p. 13.

36 »This piece […] was edited rather like a musical round – each screen is playing back the same piece of footage at different intervals.« Richard Mosse: Grid (Moria), accompanying text for the web-video, under: http://www.richardmosse.com/projects/grid-moria (22.01.2019).

5. Tactile

It is Marshall McLuhan who highlights yet another feature of the mosaic: from open-mesh silk stockings to illustrated magazines, from the mosaic of electric information to that of the TV image, *low definition* transforms the eye into a hand that explores and completes the object through touch.[37] The mosaic is diversified, sensual and demands the recipient's close perception and participation. Not only does the »powerful mosaic and iconic thrust in our experience« shift the entire sensorium of modern life to the *tactile*;[38] beyond that – and resonating with the political impetus of *Incoming* and its critique of Western televisibility – McLuhan seems to link these tactile media to the collective: »[The] mosaic form has become a dominant aspect of human association; for the mosaic form means, not a detached ›point of view,‹ but participation in process.«[39]

It is of course not only the mosaic's ›low definition‹ that ties Richard Mosse's project to tactility: touch as sensory association constitutes the fundamental practice of *Incoming*. Every thermal image acts as a contact zone which lets the eye feel the materiality of dry fabric, smooth metal, and human skin; every image carries black imprints of residual heat where a body or hand has touched a surface (Fig. 1); even the occasional artefacts and glitches – glaring white, sharply defined, phosphoric blotches that occur whenever a heat source (a burning refugee camp, the exhaust stream of a fighter jet, the muzzle flash of an aircraft cannon) lies outside the camera's thermal index – reveal the essential haptic quality of these images. One might even suppose that their pronounced materiality stems from the 23-kilo apparatus itself, its optics made of germanium, a rare-earth metalloid whose crystals are grown under laboratory conditions, polished and coated with a greenish iridescent protective layer; the cadmium-telluride sensor cooled down electrochemically to -323 degrees Celsius …[40]

Such an entanglement of optics and touch seems to revive prominent Byzantine theories of a ›haptic‹ visual perception, of sight as physical contact. In the late antique model of *extramission*, for example, »the eyes emit rays that graze the body of the object« so that viewer and world are linked »through the intimate tactility of sight«;[41] the alternative concept of *intromission* holds that it is the things which

37 Marshall McLuhan: Understanding Media: The Extensions of Man, Cambridge, MA/London 1994, p. 29, 185, 223 sqq.
38 Ibid., p. 227.
39 Ibid., p. 210.
40 Mosse: Transmigration of the Souls (as note 5).
41 Roland Betancourt: Tempted to Touch: Tactility, Ritual, and Mediation in Byzantine Visuality, in: Speculum: A Journal of Medieval Studies 91/3 (July 2016), pp. 660–689: 660.

send out rays to touch the eye; and the ritual practice of *aspasmós*, of touching, embracing and kissing the icon, also leaves its ›imprint‹ on the act of seeing.

What is more, the Byzantine icon's materiality implicates aspects of temperature or ›thermal imaging‹: in his tract on the *Heavenly Hierarchy*, Dionysius the Areopagite expounds that God's essence »prefers the sacred description of fire«[42] whose flames then spread to the ranks of the *seraphim*, a name which »denotes either that they are burning or kindling«. Down to the celestial order and manifest world, the divine fire illuminates and, above all, warms all entities, »rekindling them to the same heat«.[43] As a consequence, and due to their high temperature, holy beings are best depicted by ›fiery‹ substances. Since the immaterial nature of the godlike is only graspable through its thermal and tactile imprint on matter, the Byzantine icon applies the heat of gold, brass, amber (electron),[44] or enamel – »glass powder, placed in a metal mold, and fired to high temperature«[45] – as a dissimilar reflection of the unfigurable.

In any case (whether through touch as a mode of communication, the physicality of the image, the tactual range of the gaze, or the temperature of depiction) *Incoming*'s thermal images invoke a many-faceted discourse on the haptic traits of Byzantine vision. And it is this invocation of a ›substantial connection‹ to the depicted Other which adds to *Incoming*'s potential of resistance: against the space-consuming rule of perspectivism and exclusions of sovereignty Mosse's installation deploys an aesthetics of receptivity, to the visual action of invasion it answers with the sensory passion of the tactile.

6. Gold

From here it is not far to the gilded ground and its luster which, according to Andreas Cremonini, always seems to touch the eye: »To the movement of plunging into the depth of radiance responds a movement of light approaching«[46] –

42 Dionysius the Areopagite: On the Heavenly Hierarchy XV.2 (translated by John Parker).

43 Ibid., VII.1.

44 Ibid., XV.7: »Electron […] denotes the incorruptible, as in gold, and unexpended, and undiminished, and spotless brilliancy, and the brightness, as in silver, and a luminous and heavenly radiance. But to the Brass […] must be attributed either the likeness of fire or that of gold.«

45 Bissera V. Pentcheva: The Performative Icon, in: The Art Bulletin 88/4 (Dec. 2006), pp. 631–655: 639.

46 Andreas Cremonini: Über den Glanz. Der Blick als Triebobjekt nach Lacan, in: Claudia Blümle and Anne von der Heiden (eds): Blickzähmung und Augentäuschung. Zu Jacques Lacans Bildtheorie, Berlin 2005, pp. 217–248: 219 (translated by Ulrich Meurer).

another distance that nears. However, unlike the dull sand, glistening water, or marbled skin as material constituents of migration, ›gold‹ relates more to the dense, radiant photos and video projection themselves. The light-emitting screens and moving images of *Incoming*, the large aluminum-like digital c-prints of *Heat Maps*, even the book publication done in reflecting metallic tritone printing echo the complex visuality of gilded icons: the images not only ›represent‹, they take on their own intense, partly introversive and partly effluent light value that makes it difficult to decide whether their surface appears opaque, reflective, or luminous.

Indeed, the distinction between *lux* and *lumen* in medieval light metaphysics might help best to apprehend that specific visual mode between matter, mirror and light which *Incoming* shares with the Byzantine gold ground. The scholastic theologian and scientist Robert Grosseteste, for instance, conceives of *lux* as the »simple being« or substance of light in its source, whereas *lumen* denotes its fullness or »spiritual body« when it is reflected by and diffused in the object world: *lux* as internal essence becomes *lumen* when it multiplies, expands and joins matter.[47] In this respect, the Byzantine icon belongs entirely to the realm of *lumen*. It never depicts God's *lux* in its original place, as unmediated presence of the divine; it rather shows the light of God in its refractions and impact on visible matter – in its becoming flesh. This pious preference for light in its dispersed and incorporated state even informs the icon's ›perceptional field‹: the Byzantine decorator »never represented or depicted light as coming from a distinct source, but used […] its effects in the space between the picture and the beholder«.[48] Light fills the image, the eye and the entire extent between and around them – a diffused luminosity which *Incoming* adopts by divesting itself of any light source, of any figure or object that would be illuminated by, or reflect light from a discernible origin (after all, the *SELEX* Horizon only registers invisible radiation). Instead, it is the metallic image itself which collects, hoards, intensifies, and releases brightness, so much that *lumen* is no longer only a formal disposition of the picture but becomes the medium that envelops both screen and viewer.

Such an envelopment in a golden monochrome erases the distance of televisibility and perspectivism. While the »imperious reign of vision« of Renaissance marches »unimpeded across the surface of the scene« and rejects all »bothersome

47 Clare C. Riedl: Introduction, in: Robert Grosseteste: On Light (De luce), Milwaukee 1942, pp. 1–9: 5.

48 Otto Demus, cited in: Roland Betancourt: The Icon's Gold: A Medium of Light, Air and Space, in: West 86th: A Journal of Decorative Arts, Design History, and Material Culture 23/2 (2016), pp. 252–280: 259. See also Didi-Huberman: The Man Who Walked in Color (as note 1), p. 19: »The object is over there, surely, but the radiant brilliance encounters me, it is an event by way of my gaze and my body.«

reflections [that] dazzle the eye«,[49] Byzantium, with its dim lighting of orthodox churches and glitter of gold, tolerates and even welcomes the vague, obscure and indiscernible. Thus, Byzantine sight appears ›precarious‹ because it does not treat light as linear emission from a single point but as an incalculable and mutable body. It is also precarious because the luster emanating from the divine may materialize in the icon, but that material gold never becomes the place of a reliable presence or ontology of given objects. What we see when we see the gilded ground of an icon, says Roland Betancourt, is a mere precondition of visual perception, a *chōra* of pure potentiality. Its open expanse – »where all is not always already immanent but bursts upon the viewer's perceptual horizon in a flash of light«[50] – can be actualized by receiving a form or body: until then, most of it is not shape, but the possibility of an uncertain emergence. In a similar way, Didi-Huberman grants to the monochrome of chiseled gold »the absolutely virtual, elementary power, of a ›figureless‹ figurability«.[51] Being a mere elicitation of *Darstellbarkeit* (in the Freudian sense), it appears emptied, abandoned by objects, but since it is haunted by their past or future presence, it harbors not the »curiosity of the visible« but the »passion of its imminence«.[52]

In the end, the receptivity of the icon's gold, its expectation or invitation of a figure that could arrive from somewhere else, indicates its most essential and ›sacramental‹ feature: the icon is *relational*, states Massimo Cacciari; it represents neither the human nor the divine, it neither merges them, nor does it separate one from the other. Instead, it marks a point of transition and makes the icon painter an agent of communication: »Open the doors«, is what the icon sings.[53] Marie-José Mondzain calls this an ›economy‹ based on the principle of relative terms: since Christian theology itself produces nothing but correspondences (rather than equivalences) between disjunctive realities, the religious icon serves as structural relay.[54] It is a token of *skhesis* – a relation in the economic and not the logical sense – that binds it to its prototype not as an *image* but through a living connection.[55] Following Cacciari and Mondzain, amongst many others, the icon therefore cannot be seen as depiction or projection of the imaginary onto a reflective screen. It

49 Rico Franses: When All that Is Gold Does Not Glitter: On the Strange History of Viewing Byzantine Art, in: Antony Eastmond and Liz James (eds): Icon and Word: The Power of Images in Byzantium, Aldershot 2003, pp. 13–24: 20.

50 Betancourt: The Icon's Gold (as note 48), p. 267.

51 Didi-Huberman: The Man Who Walked in Color (as note 1), p. 46.

52 Ibid., p. 21.

53 Massimo Cacciari: Die Ikone, in: Volker Bohn (ed.): Bildlichkeit, Frankfurt am Main 1990, pp. 385–429: 391 sqq.

54 Marie-José Mondzain: Image, Icon, Economy: The Byzantine Origins of the Contemporary Imaginary, translated by Rico Franses, Stanford, CA 2005, p. 20 sqq.

55 Ibid., p. 78.

operates like a permeable membrane or switch allowing the Other to enter the material inside, and to reach out to the Other's outside.

In fact, this vital relationality arises from the nature of the divine: In his essay on the »Migration of the Holy«, Philipp Stoellger returns to the primal revelation of holiness – Moses who, on Mount Sinai, does not behold Jehovah directly, but through his brief contact becomes a receptacle of God's light, his face henceforth surrounded by a shining halo. This event demonstrates that, while dogma relies on the »grammatical difference« between God and world and circumscribes the sacred as a closed sphere, the holy – precisely because of its inaccessibility – always depends on, and brings forth, practices of *mediation*. It cannot exist as separate and impervious *sacer*, in an asocial sphere without opening to the human; it rather forms a communicative *sanctum*.[56] Its remoteness incessantly yields media techniques, transitions, and border traffic, be it the pilgrimage of St. Jacob or the incarnation of the absolute … With this joining of migration and the holy, with holiness as a light effect on the prophet's countenance and migratory movement between absence and presence, we have come full circle to Didi-Huberman's shining monochrome, his trek through zones of divine elusiveness and theophany, and his formula of a ›distance that nears‹.

Fig. 5: Still from Richard Mosse: *Incoming*. © Richard Mosse

56 Philipp Stoellger: Migration des Heiligen und heilige Migranten oder: Machen Medien Menschen – heilig?, in: Friedrich Balke, Bernhard Siegert and Joseph Vogl (eds): Medien des Heiligen, Paderborn 2015, pp. 177–188: pp. 183 sqq.

For his part, Richard Mosse invents an imaging strategy that partakes in these migrations and in the icon's economy of communication. Using surveillance technology for his ›Byzantine‹ media operations, Mosse documents the many crossings from Syria and the Maghreb, through vast areas of sand or water, as a monochrome, luminous surface effect in and around the things and formulaic figures. His videos and photographs develop an *aisthesis* that belongs to the icon, to the desert, and apparently also to some contemporary imaging techniques. On this ground, *Incoming* can transform the invasive military monitoring of migration into a material, post-optical perception that invites multiple, obscure, uncertain encounters. It disaggregates the screens of Re(con)naissance and eliminates the distances of onto-political speculation, suggesting a worldview in which *homo sacer* or bare life are »no longer separated and excepted, either in the state order or in the figure of human rights«.[57] Its conceptual image is the gilded ground, the vapor-plated gold foil that you put around the shoulders of the incomer.

57 Agamben; Homo Sacer (as note 23), p. 78.

Abstracts

Emanuele Coccia: **Das Museum für zeitgenössische Natur**

Im letzten Jahrhundert hat sich das Museum von einer Institution, die sich auf die Vergangenheit und ihre Bewahrung konzentriert, zu einem Instrument der Wahrsagerei über die Zukunft von Kunst und Gesellschaft gewandelt. Der Aufsatz schlägt vor, ebenso die Museen für Naturgeschichte zu transformieren und für das Konzept einer Zeitgenossenschaft der Natur mit den entsprechenden Untersuchungsinstrumenten zu öffnen, sodass sie sich zu neuen Museen für zeitgenössische Natur entwickeln können.

During the last century, art museums evolved from institutions focussing on the past and its preservation to instruments of soothsaying about the future of art and society.
This article suggests transforming museums for natural history in the same way, introducing them to the concept of a contemporaneity of nature via proper investigative tools in order to help outdated museums transforming into modern institutions, showcasing contemporary nature.

Noémie Etienne: **Through the Looking Glass. Dioramas, Bodies, and Performances in New York**

Dioramas are multimedia installations used in museums and popular culture since the 19th century. I study two sets of anthropological dioramas: the ones made for the Museum of Natural History in New York by Franz Boas; and the ones fabricated at the New York State Museum in Albany by Arthur C. Parker. As I will show, dioramas are not only visual displays but also installations with a proper materiality and temporality: they are the stage of multiple performances and work as contact zones between objects, models, makers, and beholders.

Lisa Parks: **Global Networking and the Contrapuntal Node: The Project Mercury Earth Station in Zanzibar, 1959–64**

In 1960, the US government and British protectorate of Zanzibar signed an agreement that allowed US contractors working for the National Aeronautics and Space Administration (NASA) to build an earth station that would support Project Mercury, the first manned US satellite mission. This article focuses on the development of the Project Mercury earth station in Zanzibar during 1959-1964. To historicize the earth station's establishment, the focus lies on the geopolitical and sociotechnical relations that resulted in the Zanzibar station.

Debatte: **Medienwissenschaft ohne Medien**

Der Beitrag von Claus Pias geht von zwei Beobachtungen aus: einem Zurücktreten des Medienbegriffs innerhalb medienwissenschaftlicher Forschung und eines Desinteresses sogenannter ›Digitalisierung‹ ihr gegenüber. Er untersucht, inwiefern Medientheorie (von McLuhan und Kittler bis zu den sogenannten Digital Humanities) durch einen starken Medienbegriff an der Herausbildung von Zeitsemantiken und Narrativen von ›Digitalisierung‹ beteiligt war und von ihnen profitiert hat. Als Konsequenz fordert Pias zu medienwissenschaftlicher Grundlagenforschung auf, die mit einer strategischen Revision und

Aktualisierung von ›Medien‹ als Begriff und Gegenstand einhergeht.
Der Beitrag von Kathrin Peters stimmt mit dieser Lagebeschreibung nur teilweise überein. Die Skepsis gegenüber den Zukunfts- und Dringlichkeitsrhetoriken gegenwärtiger Digitalisierungsoffensiven wird von ihr geteilt, dass allerdings vor allem eine Medienwissenschaft des ›medientechnischen a priori‹ eine Antwort auf den gegenwarts- und anwendungsfixierten Digitalisierungsdiskurs liefern könnte, erscheint Peters als zu kurz gegriffen. Andere medienwissenschaftliche Ausrichtungen sind dazu ebenso in der Lage: medienwissenschaftliche Analysen zu Kolonialität und Postkolonialität, feministische, gender- und queertheoretische Fragestellungen, eine medienwissenschaftlich informiert Wissenschaftsforschung und Affekttheorie – um nur einige zu nennen. Es geht um Konzepte von Medienwissenschaft als Fragestellung, die ihre Gegenstände in den verschiedensten Bereichen hervorbringen, dabei aber zugleich als Mittel und Mittler immer wieder unsichtbar werden.

Debate: **Media Studies without Media**

Claus Pias' article starts out from two points of observation: a recession of the term media within the field of media studies and a disinterest of the so-called digitalization in this particular term. Pias examines the impact media theory (ranging from McLuhan and Kittler to the so-called Digital Humanities) had on the development of time semantics and the narratives of ›digitalization‹ due to the use of a strong media term, and how media theory profited from it.
As a result, Pias calls for establishing basis research in media studies, going hand in hand with a strategic revision and update of media, as a term as well as a subject.

In her article, Kathrin Peters only partially agrees with this evaluation. She shares the scepticism concerning future-rhetoric as well as priority-rhetoric, both featuring heavily in current digital offensives; however, in her opinion it is not enough to hope for answers on today's digitalization-discourse from media studies hailing the media-technical *a priori*.
There are other approaches in media studies which are able to offer these answers: analysis of colonialism and post-colonialism, feministic, gender- and queer-theoretical questions, a media-informed science of knowledge and affect theory, just to name a few of them. It is all about concepts of media science being perceived as problems which bring forth their own subjects in various areas of research, yet as a tool as well as an intermediary, they are frequently overlooked.

Alexander R. Galloway: **Medien und Mathematik**

Unter Bezugnahme auf Philosophie und Mathematik schlägt dieser Artikel allgemeine Formeln für das Digitale und das Analoge vor, wobei das Digitale als das Verhältnis der diskreten Terme (a/b), das Analoge als eine Verhältnisgleichung (a/b = c/d) definiert sind. Mit diesen allgemeinen Formeln zur Hand werden wir in der Lage sein, zwei der häufigsten operativen Ontologien (Digitalität und das Analoge) zu erforschen und gleichzeitig ein ontologisches Szenario zu enthüllen, in dem keines der beiden zutrifft.

Taking into account both philosophy and maths, this article suggests general formulas for both the digital sphere and the analogue, defining the digital sphere as a relation of discrete terms (a/b) whereas the analogue is described as a proportion (a/b = c/d).
Falling back on those general formulas, one will be able to study two of the most frequently used operative ontologies (the digitality and the analogue) while at the same time unveiling an ontological scenario to which none of the aforementioned ontologies apply.

Alexander Waszynski and Nicole C. Karafyllis: **Re-Collecting Microbes with Hans Blumenberg's Concept of »Reoccupation« (*Umbesetzung*): from Isolating/Cultivating towards Digitizing/Synthesizing**

Based on Hans Blumenberg's philosophical concept of »reoccupation«, the study analyzes why the microbe has never really been situated in the world, demarcating ontological shifts in modeling microbes. The shifts are related to techniques such as sequencing and digitizing, to microbe banks acting as world models, and to metaphysical vacancies co-created. These can be operated on a historiographic level, as highlighted by the world formula of bacterial photosynthesis. It allowed for imaginations of the Early Earth and an Iron-Sulfur-World. In sum, collecting and cultivating are shown to be crucial pre-operations for operative bio-ontologies, exemplified by a case study on the *German Collection of Microorganisms* (DSMZ).

Christina Vagt: **Predicting and Shaping or How to Close the Future**

Behavioral design of so called »persuasive computer technologies« is the result of a merger between psychology, economics, and computer engineering. The article discusses its genealogy from the strategic response of military, governmental, and academic players to the general problem that the behavior of complex systems such as humans, societies, or markets is difficult to predict, and that controlling these complex systems means shaping them by designing their technological and social environments.

Adam Knowles: **Martin Heidegger: Force, Violence and the Administration of Thinking**

In 1929, Martin Heidegger announced a new fundamental term in his thinking: *Walten*. Heidegger uses *Walten* to designate the primal ontological force of nature, but also brings it into connection with administration (*Verwalten*), specifically linking it to university administration. The article argues that in the Black Notebooks Heidegger develops a philosophical conception of administrative practice in the midst of his own administrative practice as university Rector in the era of *Gleichschaltung*.

Pauline Chasseray-Peraldi: **Something that Disturbs: Encounters between Animals and Recording Optical Machines**

Images of encounters between animals and drones or Google Street View cars are quite viral on the web. This article focuses on the different regimes of animacy and conflicts of affects in these images using an anthroposemiotic approach. It investigates how otherness reveals something that exceeds us, from the materiality of the machine to systems of values. It suggests that the disturbance of animal presence in contemporary digital images helps us to read media technologies.

Ulrich Meurer: **Invading/Inviting: From Surveillance to Byzantium**

While border surveillance produces geopolitical realities and distinctions between types of human life, Richard Mosse's video installation INCOMING (2017) uses a military high-grade thermal camera to challenge this onto-political project. Recording refugee camps and crossings via the Mediterranean into Europe, his techno-images' specific mosaic structure, tactility, and luminous flatness evoke the visual mode of Byzantine icons, thus switching from a paranoid, invasive world/view to an economy of mediation and contact with the Other.

Autorinnen und Autoren

Max Bense (1910–1990) war Professor für Philosophie und Wissenschaftstheorie an der Universität Stuttgart und Leiter der Abteilung Information an der Hochschule für Gestaltung Ulm. Arbeitsschwerpunkte: Kybernetik, Wissenschaftstheorie, Logik, Ästhetik und Semiotik. Ausgewählte Veröffentlichungen: Konturen einer Geistesgeschichte der Mathematik (Hamburg 1946/1948); Aesthetica. Einführung in die neue Ästhetik (Baden-Baden 1965); Ungehorsam der Ideen. Abschließender Traktat über Intelligenz und technische Welt (Köln 1965).

Emanuele Coccia ist Professor an der École des hautes études en sciences sociales in Paris. Arbeitsschwerpunkte: Geschichte der europäischen Normativität, Konzeptionen des Lebens, der ontologische Status und die normative Kraft von Bildern in der Mode und der Werbung. Ausgewählte Veröffentlichungen: Das Gute in den Dingen. Die Werbung als moralischer Diskurs (Berlin 2017); Die Wurzeln der Welt. Eine Philosophie der Pflanzen (München 2018); Sinnenleben. Eine Philosophie (München 2020).

Pauline Chasseray-Peraldi is a graduate student at the Sorbonne University in Paris and currently completing her PhD in Media and Communication studies on the topic of *Before, during and after digital images of the web.* Main focuses of research: optical machines, sensory turn, ecological approach of new media. Selected publications: with Yves Jeanneret: Everywhere and Nowhere. The Body in Absentia in Epiphanic Devices, in: Béatrice Galinon-Mélénec (ed.): L'homme-trace, Inscriptions corporelles et techniques (Paris 2017*);* Processing the Territory. From Taking a Picture, to Online Archiving, in: Questions de communication 37/1 (2020).

Noémie Etienne is professor of Art History at the University of Bern. Main focuses of research: materiality and temporality of artefacts, dioramas, conservation, cultural heritage. Selected Publications: The Restoration of Paintings in Paris (1750-1815). Practice, Discourse, Materiality (Los Angeles 2017); Les autres et les ancêtres. Les dioramas de Franz Boas et d'Arthur C. Parker in New York, 1900 (Dijon 2020).

Alexander R. Galloway is Professor of Media, Culture, and Communication at New York University. Main focuses of research: philosophy, technology, and theories of mediation. Selected Publications: Protocol: How Control Exists after Decentralization (Cambridge, MA 2004); The Interface Effect (Hoboken, NJ 2012); Laruelle. Against the Digital (Minneapolis, MN 2014).

Nicole C. Karafyllis is Full Professor of Philosophy at the Technische Universität Braunschweig. Her areas of specialization are Philosophy of Science and Technology, Phenomenology, Collection Research and early 20th century philosophy. Selected publications (ed.): Biofakte. Versuch über den Menschen zwischen Artefakt und Lebewesen (Paderborn 2003); Putzen als Passion. Ein philosophischer Universalreiniger für klare Verhältnisse (Berlin 2013), Willy Moog. Ein Philosophenleben (Freiburg im Breisgau / München 2015), (ed.): Theorien der Lebendsammlung. Pflanzen, Mikroben und

Tiere als Biofakte in Genbanken (ed., Freiburg im Breisgau 2018).

Adam Knowles is an Assistant Teaching Professor of Philosophy at Drexel University. Main focues of research: continental philosophy, phenomenology, Holocaust studies. Selected publications: Heidegger's Fascist Affinities: A Politics of Silence (Stanford 2019); A Genealogy of Silence: *Chora* and the Placelessness of Greek Women (philoSOPHIA: A Journal of Continental Feminism 2015); Hospitality's Downfall: Kant, Cosmopolitanism and Refugees (Journal of Speculative Philosophy 2017).

Ulrich Meurer ist Gastprofessor für Bild- und Medientheorien an der ›Visual Studies Platform‹ der Central European University in Wien. Arbeitsschwerpunkte: Politiken und Philosophien des Bewegtbildes, Alternative Historiographien/Archäologien der Medien und des Kinos. Ausgewählte Veröffentlichungen: Topographien. Raumkonstruktionen in Literatur und Film der Postmoderne (München 2007); Übersetzung und Film. Das Kino als Translationsmedium (Hg., Bielefeld 2012).

Lisa Parks is Professor of Comparative Media Studies and Science, Technology, & Society at MIT. Her main focuses of research are: Media history and theory; satellite technologies; media and globalization; media infrastructures; surveillance; experimental methodologies. Selected Publications: Cultures in Orbit: Satellites and the Televisual (Durham, NC 2005); Rethinking Media Coverage: Vertical Mediation and the War on Terror (London 2018).

Kathrin Peters ist Professorin für Geschichte und Theorie der visuellen Kultur an der Universität der Künste Berlin. Arbeitsschwerpunkte: Geschichte und Theorie der Fotografie, Gender und Medien, Mediengeschichte der Architektur und Planung, Film und Kunst der Gegenwart. Ausgewählte Veröffentlichungen: Rätselbilder des Geschlechts. Körperwissen und Medialität um 1900 (Zürich/Berlin 2010); zus. m. Andrea Seier (Hg.): Gender & Medien-Reader (Zürich/Berlin 2016); zus. m. Kathrin Busch, Christina Dörfling, Ildikó Szántó (Hg.): Wessen Wissen? Materialität und Situiertheit in den Künsten (Paderborn 2018).

Claus Pias ist Professor für Medientheorie und Mediengeschichte an der Leuphana Universität Lüneburg. Arbeitsschwerpunkte: Wissens- und Wissenschaftsgeschichte digitaler Medien, Geschichte der Medientheorie. Ausgewählte Veröffentlichungen: Computer Spiel Welten (Zürich 2002); (Hg.): Was waren Medien? (Zürich 2011); zus. mit T. Beyes und R. Holt (Hg.): The Oxford Handbook on Media, Technology, and Organization Studies (Oxford 2019).

William Stewart ist Doktorand am Department of German der Princeton University sowie im Princeton Interdisciplinary Doctoral Program in the Humanities (IHUM). Arbeitsschwerpunkte: Kultur- und Geistesgeschichte der deutschen Nachkriegszeit, Rezeption der frühen Kybernetik und Informationstheorie innerhalb der deutschsprachigen Avantgarde, Geistesgeschichte der Mathematik im 20. Jahrhundert. Ausgewählte Veröffentlichungen: Intertextueller Reichtum, in: Johnson-Jahrbuch 24/2017 (Göttingen 2018), S. 261–267; Human Organs: On Ernst Kapp's »Elements of a Philosophy of Technology«, in: The Los Angeles Review of Books, 2 May 2019.

Christina Vagt is Assistant Professor of German and European Media Studies at the University of California in Santa Barbara. Main focuses of research: media philosophy and history of knowledge. Selected Publications: Geschickte Sprünge. Physik und Medium bei Martin

Heidegger (Berlin/Zürich 2012); Education automation. Verhaltensdesign als Ästhetische Erziehung, in: Jeannie Moser and Christina Vagt (eds.): Verhaltensdesign (Bielefeld 2018).

Alexander Waszynski is post-doc researcher at the Friedrich-Alexander-Universität Erlangen-Nürnberg and member of the research project MIKROBIB (*Contamination and Readability of the World: Articulating Microbes in Collections*) at the Technische Universität Braunschweig. Main focuses of research: phenomenology, media and literature theory. Selected publications: Was betrifft – Lesbarkeit nach Hans Blumenberg (forthcoming in 2020).

Adressen Autorinnen und Autoren ZMK 11|2020

Pauline Chasseray-Peraldi
Sorbonne University
Media and Communication Studies, GRIPIC
76 rue de la Villette
City 75019 Paris
Pauline.chasseray.peraldi@gmail.com

Emanuele Coccia
EHESS PARIS
CEHTA
2, rue Vivienne
75006 Paris
emanuele.coccia@ehess.fr

Noémie Etienne
University of Bern
Institut für Kunstgeschichte
Mittelstrasse 43
3012 Bern
noemie.etienne@ikg.unibe.ch

Alexander R. Galloway
New York University
Department of Media, Culture, and Communication
239 Greene Street, 8th Floor
New York, NY 10003
galloway@nyu.edu

Nicole C. Karafyllis
Technische Universität Braunschweig
Institute of Philosophy
Bienroder Weg 80
D-38106 Braunschweig
n.karafyllis@tu-braunschweig.de

Adam Knowles
Drexel University, Department of English and Philosophy
3141 Chestnut st.
Philadelphia, PA 19104, USA
ajk358@drexel.edu

Ulrich Meurer
Central European University, Wien
Visual Studies Platform
ulrich.meurer@univie.ac.at

Lisa Parks
Massachusetts Institute of Technology
The Media Lab Complex, E15-322
20 Ames Street
Cambridge, MA 02139-4307, USA
lparks@mit.edu

Kathrin Peters
Universität der Künste Berlin
Fakultät Gestaltung
Grunewaldstr. 2-5
10823 Berlin
k.peters@udk-berlin.de

Claus Pias
Leuphana Universität Lüneburg
Centre for Digital Cultures
Am Sande 5
21335 Lüneburg
pias@leuphana.de

William Stewart
Department of German
Princeton University
203 East Pyne Building
Princeton, NJ 08544, USA
ws8@princeton.edu

Christina Vagt
University of California Santa Barbara
Department of Germanic and Slavic Studies
Santa Barbara, CA 93106, USA
vagt@ucsb.edu

Alexander Waszynski
Technische Universität Braunschweig
Institute of Philosophy
Bienroder Weg 80
D-38106 Braunschweig
a.waszynski@tu-braunschweig.de

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