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Sub-theme 54: Rethinking the social, technical and material foundations of
organizations

Technologies - media - hybrids / Toronto - Berlin - Paris

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Abstract

The observation of organizations being “variously entangled with the technologies and the material world in ways other than trivial” (cf. call for papers of subtheme 54) asks for reviewing and discussing conceptualizations of relevant terms such as technology, tool, medium and materiality. Here, media theory offers a set of sophisticated and time-tested elaborations. Actor-network theory also provides pertinent concepts drawing on terms such as non-human actor and hybrid. This paper gives an introduction to and a brief overview of concepts from media theory and actor-network-theory that seem suitable for researching the status of technology, media and materialities in organizations. It concentrates on three streams of research: early Canadian media theory, so called new German media theory, and actor-network-theory. Following their presentation (overview and exemplary study), the paper briefly maps intersections and differences between these streams of research as well as their respective outlook on the subject of organizations.

Introduction

The observation of organizations being “variously entangled with the technologies and the material world in ways other than trivial” (cf. call for papers of subtheme 54) asks for reviewing and discussing conceptualizations of relevant terms such as technology, tool, medium and materiality. Here, media theory offers a set of sophisticated and time-tested elaborations. Media studies and media theory are versed, but also vast and fragmented fields of study. There are different competing schools, paradigms, methodologies, canonic readings, justifications, and orientations. It can be seen as an “interdisciplinary crossover or a transdisciplinary pursuit” (Horn 2007: 8) from the beginning. The strongly resonating stream of research summarized under the label of actor-network theory also provides pertinent concepts that are field-tested in the examination of all sorts of human-technological entanglements. Actor-network-theory is now slowly becoming a permanent member of media studies’ “theoretical tool-kit” (Couldry 2008: 98), though ANT can by no means be reduced to this. It has its proper focus on heterogeneous relations and as such it finds application in diverse fields of study. But the present paper does not aim at sorting out the relation between these apparently separate fields of research. Rather my intention is to offer an introduction to and a brief overview of concepts from media theory and actor-network-theory that seem suitable for researching the status of technology, media and materialities in organizations. To do so, I will concentrate on three streams of research: early Canadian media theory, so called new German media theory, and actor-network-theory. They were picked and molded so as to create an easily accessible and clearly structured account. Of course, this account does not correspond to the far more chaotic, overlapping, and knotty existence of scientific knowledge in reality (Serres 1997). Both, ANT and media theory, are not in themselves coherent and cleanly separable theories. The actual impossibility of clear-cut demarcations of scientific streams and schools of thought should be kept in mind.

The text’s structure follows the places that each stream of research came to be largely associated with: Toronto, Berlin and Paris. Each school will be presented through a short overview of its development followed by the demonstration of one specific study that metonymically stands for the stream. The Toronto School will be presented by Marshall McLuhan’s *The Gutenberg galaxy* (1962/2002), the Berlin

School, or new German media theory, by Cornelia Vismann's study *Files: Law and Media Technology* (2008), and the Paris School respectively actor-network theory by Bruno Latour's Essay *Circulating Reference: Sampling the Soil in the Amazon Forest* (1999). In a last section, I will discuss how the streams relate to each other and hint at overlaps and differences. A final remark will be made on their respective outlook on questions surrounding the entanglement of organizations with technology, media and the material.

Toronto

Overview

Some view Harold Innis as the true founding father of media theory. He was a colleague and one of the central mentors and motivators of Marshall McLuhan who is commonly associated with having furnished the basic texts on which many media studies communities still rest. Harold Innis was employed at the department of political economy at the University of Toronto. He started studying the Canadian Pacific Railway (Innis 1923), fur trade (Innis 1930) and cod fishery (Innis 1940). By doing so he ended up with the well-bolstered hypothesis of certain staples, transportation systems and media of communication being central to the specific development of states. His railway study suggests that "technology is not something external to Canadian being; but on the contrary, is the necessary condition and lasting consequence of Canadian existence" (Kroker 1984: 94). Turning back to antiquity in his following studies, Innis carves out how media can be either time- or space-binding depending on their material properties. Clay and stone are carrier media that are enduring over time. These media are related to empires that "tend to last through time" (Watson 2006: 314). Radio's and television's broadcasting signals are more intangible (though not completely), light and less durable in their materiality. They can easily travel from one place to another and thereby manage to cover a vast space (Innis 1950: 27). They produce short-dated empires "that control great hinterlands" (Watson 2006: 314).

But what classifies as a medium for Innis? Staples, the railway, stone tables, electro-magnetic waves? He takes as a medium whatever enables, structures or determines certain types and scopes of societal and governmental action (Engell 2000:

279). This is his common ground with Marshall McLuhan who appreciated and pursued Innis' work (also his "enigmatic style of presentation" and methodological experiments, Watson 2006: 404) in the same way that Innis appreciated and pursued his (Heyer 2003: 86). Literary scholar McLuhan follows Innis in studying roads, housing, money, clocks and light bulbs next to more apparent media such as the telephone, the press or the telegraph (McLuhan 1964/1994). The famous quote "the medium is the message" summarizes McLuhan's strongly resonating position: The media themselves should be the focus of study, not the content they carry, since content cannot be conceived of beyond the medium (no differentiation between content and carrier medium). The medium *as* message has to be studied for every object in particular. For instance, the case of the light bulb shows how its message is commensurate with the medium: It creates spaces and enables actions (McLuhan 1964/1994: 8). McLuhan conceptualizes the medium as "any extension of ourselves" and "any new technology" introducing a "new scale" (McLuhan 1994: 7). Anything can be considered as a medium then, if it somehow feeds back on the context of application (Engell 2000: 279).

Exemplary study *The Gutenberg galaxy*

McLuhan's book *The Gutenberg galaxy* (1962/2002) is one of the central and much cited studies of early media research. It comprises three chapters, "Prologue", "The Gutenberg Galaxy", and "The Gutenberg Galaxy Reconfigured". While the first and the third chapters are only about ten pages long, the second makes up the whole book (p. 11-264). It consists of 107 subchapters each of them being one to three pages long. Each subchapter is titled with a thesis-like phrase in big bold letters, e.g. "The world of the Greeks illustrates why visual appearances cannot interest a people before the interiorization of the alphabetic technology." (McLuhan 1962/2002: 54) This composition establishes the book's mosaic approach. The text is described as "a mosaic image of numerous data and quotations" (McLuhan 1962/2002: 0). Throughout there are rather extensive quotations (up to two-thirds of the page, cf. p. 82) from very diverse, but historically oriented fields of research, such as history of economics (Karl Rodbertus), history of art (William Ivins), science theory (Alfred North Whitehead), cognitive science (Colin Cherry), philosophy of history (Oswald Spengler), and religion studies (Mircea Eliade). James Joyce's *Finnegans Wake* and Shakespeare's *King Lear*

(dramatizing the “dissolution of the tribal state”, McLuhan 1962/2002: 8) also figure prominently. McLuhan briefly introduces and frames the books he cites, paraphrases and explains the quotations (or quotes from quotes) and relates them to other statements so as to advance his argument. The book is not intended to be read from beginning to end, but to be browsed or read circularly (more corresponding to the electronic age). For instance, the last chapter is announced to be “the best prologue” (McLuhan 1962/2002: 0). The writing is described as being closer to slogans than to scientifically secured statements, but it is actually quite sober and accessible compared to some of the later postmodern writings (e.g. Derrida, Bhaba). In the foreword to the German edition, Wolfgang Coy says: “It is a sort of Zen, with contemporary Koans, rarely with a definite closure.” (Coy in McLuhan 1962/1995: XI)

The main reasoning, lines of analysis and findings appear repeatedly in different places of the book. After browsing it for some time they begin to assume a definite shape. The book makes a media-genealogical era classification. Non-literate, oral tribe culture (1) is followed by the scribal or manuscript culture (handwriting) (2). It is superseded by the Gutenberg galaxy, the culture of the printed word (3), which is about to make room for the electronic age in the 20th century (4). Each time, the occurrence of a new dominant medium causes a blanket reconfiguration of cognition and perception and thereby has a significant effect on social organization. This observation informs the book’s main thesis: “Technological environments are not merely passive containers of people but are active processes that reshape people and other technologies alike.” (McLuhan 1962/2002: 0) It poses the refutation of the idea of media constituting only the form of an independently existing content. As a key argument of media theory it describes the basic assumption of a structural tendency inherent to any technology. The structural tendency alters “the posture and relations of our senses” (McLuhan 1962/2002: 55). Technology – in its broadest understanding as “the extension of one or another of our senses by mechanical means” – “can act as a sort of twist for the kaleidoscope of the entire sensorium” (McLuhan 1962/2002: 55). A look at each condition of McLuhan’s four media-eras renders this idea more tangible.

McLuhan identifies a first era as the non-literate, oral culture. It produces orally composed forms of literature such as the Homeric poems. Today’s nursery rhymes, children’s songs or sayings can be referred to the mode of oral tribe culture McLuhan

(1962/2002: 90). McLuhan states that his study is greatly inspired by Albert B. Lord's examination "The Singer of the Tales" (McLuhan 1962/2002: 1) where Lord shows how the form of epics like the Homeric is dependent on practicing them in the absence of reading and writing technologies. Non-literate cultures necessarily bear on memorizing techniques, e.g. repetition. It follows that the "mental outlook" (McLuhan 1962/2002: 1) of oral tribe cultures is oriented towards the auditory-tactile senses, whereas the visual sense is diminished. Non-literate cultures are "the product of speech, drum and ear technologies" (McLuhan 1962/2002: 8). The bias towards the auditory-tactile is related to certain "magical obsessions" (McLuhan 1962/2002: 8, quoting from Popper) as opposed to abstract, dialectical reasoning that comes only with alphabetization: "Tribal, non-literate man, living under the intense stress on auditory organization of all experience, is, as it were, entranced." (McLuhan 1962/2002: 24) With the auditory mode of experience goes that oral culture's dominant experience is that of interdependence as it is the case in the village. It is a collective culture aware of the "instant interplay of cause and effect" (McLuhan 1962/2002: 21).

The "invention of the alphabet" (McLuhan 1962/2002: 45) turns the kaleidoscope of the sensorium and changes the character of perception. The existence of the written word rearranges the senses in that the visual sense takes on a dominant role. It substitutes the auditory dimension of experience (McLuhan 1962/2002: 67). The production and reception of *documents* enables the fixation of stories and ideas. The written text can be read and re-read. The state of constant movement related to iterative, modifying oral-auditory transmission comes to an end. The invention of movable type intensifies the disposition already attached to literate manuscript culture: the strong emphasis on the visual sense and the possibility of studying fixed entities of knowledge: "The print reader is subjected to a black and white flicker that is regular and even. Print presents arrested moments of mental posture." (McLuhan 1962/2002: 158) This arrested mental posture enables text analysis, dialectical discussion and systematic scientific method. The Reformation is the product of addressing the written text – endowing it with superior authority than the spoken word – intensified through the greater circulation of the Luther Bible by means of printing technologies. Also, the increasing trade activities (and hence the emergence of a middle class, McLuhan 1962/2002: 117) from the 15th century onwards are unthinkable without techniques of reading, writing,

and calculating (contracts, book-keeping). Those techniques not only allow to conduct certain intellectual operations but also to store information and knowledge about those operations (Coy in McLuhan 1962/1995: VIII). Print technology “detrivializes or decollectivizes man” (McLuhan 1962/2002: 158) by making her less dependent on the village’s word-of-mouth. It enables opposition, self-expression and individualism (McLuhan 1962/2002: 235), a connection that is “entirely self-evident” (McLuhan 1962/2002: 131) to McLuhan.

It seems also a matter of course that “[i]f men decided to modify this visual technology by an electronic technology, individualism will also be modified” (McLuhan 1962/2002: 158). Again, a new dominant technology re-shapes “the perceptions and biases of the entire human community” (McLuhan 1962/2002: 68). The electronic age with all its networks (electricity, radio, television, logistics, global trade) leads to the re-appearance of the perception of interdependence and “superimposed co-existence” (McLuhan 1962/2002: 32). To McLuhan, the electronic age therefore constitutes „a plunge back into non-literate patterns of awareness“ (McLuhan 1962/2002: 68). Issues of collectivity, association and corporation appear on the agenda demanding the reexamination of questions concerning “transnational, legal or political governance” (Coy in McLuhan 1962/1995: XVII). McLuhan coins the popular term of the global village as the social organization of the electronic age (McLuhan 1962/2002: 21). The term underlines how the electronic age is, to a certain degree, “connatural” (McLuhan 1962/2002: 46) with oral tribe culture.

It is important to stress that McLuhan’s interest in this media-genealogic segmentation of history is in no way evaluative or morally pervaded, but purely descriptive and analytic. He explicitly notes that he does not “raise a moral complaint” (McLuhan 1962/2002: 158) about the changes of the conceptualization of personhood and society that go with entering the electronic age. Rather it is his goal “to clear away some of the moral fogs that surround our technologies” (McLuhan 1962/2002: 158) and to potentially master “the nature and effects of all our technologies, instead of being pushed around by them” (McLuhan 1962/2002: 6).

Berlin

Overview

The key corners of the Toronto School were assimilated in German media studies taking shape from the 1980s onwards: (1) the idea of media producing each their proper practices, ways of thinking and of shaping the world (Engell 2000: 279f.), (2) the consequential concentration on the medium itself, the “in-between-ness” (Horn 2007: 8), instead of (never independently existing) content, and (3) the experimental and at times distinctly cryptic style of doing research. The first figure to name is literary scholar Friedrich Kittler who is, like McLuhan, associated with a quote summarizing his research: “Driving the spirit out of the humanities” (orig.: *Austreibung des Geistes aus den Geisteswissenschaften*) (Kittler 1992). His book *Discourse Networks 1800/1900* (orig.: *Aufschreibesysteme*) (Kittler 1990) draws attention to the “technological-medial apriori” (Horn 2007: 7) of literature: to its carrier and storage media and to the tools of producing literature, the typewriter being a crucial object, for instance. The study turns against the interpretative tradition in the humanities of working on questions related to text, sense and meaning. In the further course, the field of media studies emerges around research on the technical-material blind spots of primarily humanist and later other disciplines. In the case of history, these blind spots were the “material and technical foundations of communication, knowledge and power” (Horn 2007: 9). Studies follow that describe, analyze and present the past while being aware of the mutual constitution of history and media (history of media - media of history). This kind of media theory and history could also be perceived as a broadening of the Foucauldian project of an archeology of knowledge and power by more explicitly including material foundations, objects and technologies (Horn 2007: 10-11).

The stream of research only now comes to be summarized under the label of new German media theory, since the MIT press journal “Grey Room” named its fall 2007 issue that way. In the editor’s introduction “There Are No Media”, Eva Horn elaborates on the idea of rejecting a fixed definition of the medium, but instead including very “disparate objects and phenomena” (Horn 2007: 8) into the purview. This puts the stream in continuation with the Toronto School, but with a twist: Due to a rigorous anti-ontological attitude, media are not conceptualized as given, solid and observable objects. The focus lays on “networks of technologies and institutions”

(Kittler 1990: 369) or “constellations of certain technologies, fields of knowledge, and social institutions” (Horn 2007: 8). These heterogeneous associations of technologies, discourses, and institutions constitute the object of study in this stream of research. Methods are historically oriented (archival work, looking at “a single, specific, and thus paradigmatic historical example”, Horn 2007: 10), but remain largely undefined. After all, what is method? Here, methodological discourses (e.g. of precision) and practices (e.g. handling of instruments) would rather turn into an object of analysis than something to adhere to (Rheinberger 2010). However, the least common denominator in terms of method can be found in a consistent questioning of fixed entities, and a thorough inquiry after how they come into being, through what kind of discourse, what kind of institutions, technologies and media. Those entities can be anything from New World emigration (Siegert 2006), to the construct of *homo oeconomicus* (Vogl 2002), the stock exchange (Reichert 2009), cinema (Engell 2008) or cybernetics (Pias 2003). Therefore, this stream of media theory can be defined as a certain kind of questioning and a certain vein of examination, rather than as occupying a specific area of objects of investigation (such as: the media).

Exemplary study *Files: Law and Media Technology*

A pertinent example of the approach of new German media theory is Cornelia Vismann’s study titled *Files: Law and Media Technology*. Just like McLuhan, Vismann is “not concerned with the content of the files” (Vismann 2008: xii). Instead the focus lays on the contribution of files and other recording devices to “the emergence of the notions of truth, the concepts of state, and the constructions of the subject in Western history” (Vismann 2008: xii). Files, filing practices and record keeping are presented as the central media technology of the law, rule of law, modern subject and state. Following Vismann, files and the law are not independently definable entities, but they “mutually determine each other” (Vismann 2008: xiii): The law is “a repository of forms of authoritarian and administrative acts that assume concrete shape in files”; on the other hand files are “that which generates a certain type of law” (Vismann 2008: xii-xiii). In media archaeological manner the book gives an account of the relation between record keeping and the law from classical times to the middle ages and the present by taking snapshots from certain constellations, for instance the chancellery of late Roman

emperor Frederick II where registers of any kind were fabricated. Different settings from a media history of law are presented and combined with references to cultural and philosophical writings (Lévi-Strauss, Lacan, Derrida, Foucault, inter alia). Also, literary fictions are used (Kafka: *The Trial*, Melville: *Bartleby, the Scrivener*). They are considered to unveil certain aspects of the practice of law that scholarly accounts “tend to overlook or even suppress” (Vismann 2008: xiii). Vismann herself explains that her inquiry “does not directly draw from the archive, it has no pure source; rather it will move in roundabout ways much like its object of investigation” (Vismann 2008: 13).

The book starts off by expressively narrating the materiality of files: “files pile up on desks, accumulate in offices, and fill attics and basements. Though registered, their order collapses time and again; though collected, quashed, dispatched, sold, shredded, or destroyed in some other way, they keep mushrooming. Their incessant proliferation seems a natural phenomenon.” (Vismann 2008: xi) The existence of files is linked to the practice of record keeping. Files are “authorless recording machines” (Vismann 2008: xii). The immense proliferation of files “turns out to be a medial effect of records” (Vismann 2008: xii). Record keeping and hence file production are essential to the administrations of the Western world. What then follows and fills up the book are (very) dense descriptions and analysis that flesh out this connection. One of the first is about the “media-technological conditions” (Vismann 2008: 41) of Roman law and it will be brought out as an example.

Vismann detects a “gradual transition from scrolls to codices” (from the second century AD onwards) each of them representing “different realms of law and writing” (Vismann 2008: 41). The first is the realm of scroll-files made of papyrus and inscribed with a “tube called *calamus*” (Vismann 2008: 43). Scroll-files or *rotuli* result from gluing together individual reports written by scribes in strategist’s offices (Vismann 2008: 41). They only permit serial reading and searching with no jumps (Vismann 2008: 42). The papyrus is not very durable; it decays after about one hundred years. That is why the scrolls or parts of them were transcribed in the interest of conservation and preservation (Vismann 2008: 44). The transmission was “fragile, at times ruptured” (Vismann 2008: 41). On the basis of these material characteristics, scrolls are related “to the purely actual, coextensive law of an imperial administration” (Vismann 2008: 43). They constitute “a living law that incessantly updates itself” through “irregular,

nonauctorial, and nonauthorized currents of transmission” (Vismann 2008: 44-45). In legal history, the body of legal texts materialized in scroll-files is referred to as the mother literature (Vismann 2008: 44).

The second realm of law and writing reflects the bias of a different guiding medium (Innis in Vismann 2008: 43): the codex-file that gradually replaced the scrolls. The codex-file resembles today’s files consisting of paper documents “held together by a metal fastener” (Posner in Vismann 2008: 41). Parchment is used instead of papyrus and the new writing instrument is the *stilus* (Vismann 2008: 43). Unlike the scroll, the codex-file allows to quickly leaf through a text in search for specific items, leaves can be rearranged or added (their order “does not have to be identical with the temporal sequence of the actual recording”), in short, it offers “optimized usage features” (Vismann 2008: 43). The parchment is more durable than papyrus. It allows re-usage, since its surface can be scraped off. The scrapping off of text that is no more considered as relevant constitutes a technology of cancellation (Vismann 2008: 44). Cancellation, deletion, and compilation become the main characteristic of the law that is now taking shape: codification, “abstract Roman law” (Vismann 2008: 40), “stratified, circumcised law” (Vismann 2008: 43). In the sixth century AD, emperor Justinian ordered the compilation of legal texts that are now known as the *Corpus Iuris* (consisting of the Digest, the *Codex Justinianus* and the *Institutiones*). It is a corpus cut out from the mother literature, a compilation of various abridged legal writings. What is not transcribed does not become part of the codex. Vismann concludes that “once diverse and heterogeneous texts were turned into a unified, closed codex” (Vismann 2008: 41). Ever since, this Justinian Roman law is considered as “the occidental law of all laws” (Vismann 2008: 39), the father of the law. Within the discourse of self-justification of abstract, normative law it is an “absolute reference” (Vismann 2008: 41), a source of unquestioned legitimizing. But the texts behind the codex, its origins are the fragile and rupturedly transmitted scrolls, single administrative reports glued together. Codified law was cut out from this body of texts and gathered in codex-files. Codices and codex-files put an end to the stream of tradition of “a living law that incessantly updates itself” (Vismann 2008: 44) coextensive with daily administrative activities. It begins a “patriarchal order of the law” (Vismann 2008: 46) related to the idea of an *ur-text* legitimizing abstract “normative legal texts” (Vismann 2008: 43).

Paris

Overview

A place most likely to be associated with actor-network theory is the *Centre de sociologie de l'innovation* (CSI) at *École des Mines de Paris*, even though actor-network-theory is the result of a more and more internationally networked, “placeless” state of science. The list of the centre’s members and visitors includes the central figures of this stream of research: Bruno Latour, Michel Callon and John Law. But there are many other international scholars having contributed to what the CSI presents in very plain words on its website: “The CSI is well known for developing Actor-Network Theory (ANT) which renewed Science and Technology studies.” (<http://www.csi.ensmp.fr/en/>) The theory’s origins lay in the CSI’s early program of working on the relation between research and innovation. It included anthropological studies of scientific practices, the most influential being (1) *Laboratory Life: the construction of scientific facts* by Bruno Latour and Steve Woolgar (1979). From these and other studies (e.g. Knorr-Cetina 1984) emerges the perspective of *Science as Practice and Culture* (Pickering 1992) as well as the idea of objects being equipped with agency. In further course, the latter observation was extended to areas “outside the laboratory” (Latour 1983: 141) and applied to diverse fields of studies such as politics and transportation (Latour 1996), philosophical anthropology (Latour 1993/2008), sociology (Latour 2007), engineering (Suchman 2000), popular music (Hennion 1989), management (Callon 2001) or financial markets (MacKenzie 2008).

A couple of analytically productive and widely circulating concepts and terms emerged as ANT-key words: symmetric accounts, nonhuman actors and hybrids. The principle of symmetry positions itself in contrast to technology or media deterministic approaches that Innis and McLuhan came to be (unduly according to Watson 2006) associated with. It is the idea of neither over-focusing humans (cf. the *humanities*), nor objects or technology. Following Latour, a symmetric position can be copied from anthropology. Here, entities as diverse as systems of kinship, plants, representations of plants, political organization, medicine, myths, and hunting techniques can be analyzed within the same account and with the same instruments (Latour 2008: 128). They are

presented as a web from where action emerges. This kind of symmetric research is seen as adequate in the areas of anthropology because the societies and places studied count as premodern. For modern contexts, this symmetry is unthinkable since the strict separation of the material world (objects, nature) from the human world (discourse, culture) forms the constitutive agreement of modernity. Adhering to this agreement leads to asymmetric accounts of either natural phenomena – cleared from anything human – and human phenomena – ignorant of any materialities involved. A symmetric account, in contrast, includes the whole socio-technological network, technologies and animals as well as humans, objects as well as texts, the material world as well as its representation. It discloses the negated hybrids, mixed creatures of nature and culture or associations between humans and nonhumans (Latour 2008: 19).

With regard to the discipline of sociology, Latour suggests to rework its object of study as well as its methods so as to fit the principle of symmetry. In what Latour names the sociology of translations, alternatively the sociology of associations (Latour 2007), the existence of stable associations (such as organizations, institutions, processes) presents the central object of sociological inquiry. In order to understand their functioning (opposed to their dissolving) it is necessary to look at what it is that makes associations exist in an enduring and stable way. They are, following Latour, distinctly nonsocial entities (Latour 2007: 64). Hence, a study on associations extends the spectrum of “acceptable entities” (Latour 2007: 28¹) and integrates nonhumans such as instruments, tools and other practical means “necessary to delimit groups and to keep them in existence” (Latour 2007: 64). In order to recognize those entities, Latour introduces the concept of mediation (Latour 1999: 307). Human beings as well as material resources are considered as mediators when it can be observed that they “translate, distort, modify, and transform those meanings or elements that they were to transmit” (Latour 2007: 70). The mediators’ output can never be properly predicted (Latour 2007: 70) which is the central characteristic of the mediator. It is the kind of agency independent of intentionality that can be ascribed to both humans and nonhumans. Acting and action resulting from these heterogeneous networks becomes intransparent and turns into “a knot, a mesh, a conglomerate of many surprising actors”

¹ All quotations from books that were only available in German to me – either because they are not translated or because I could not get hold of an English copy – are translated by myself.

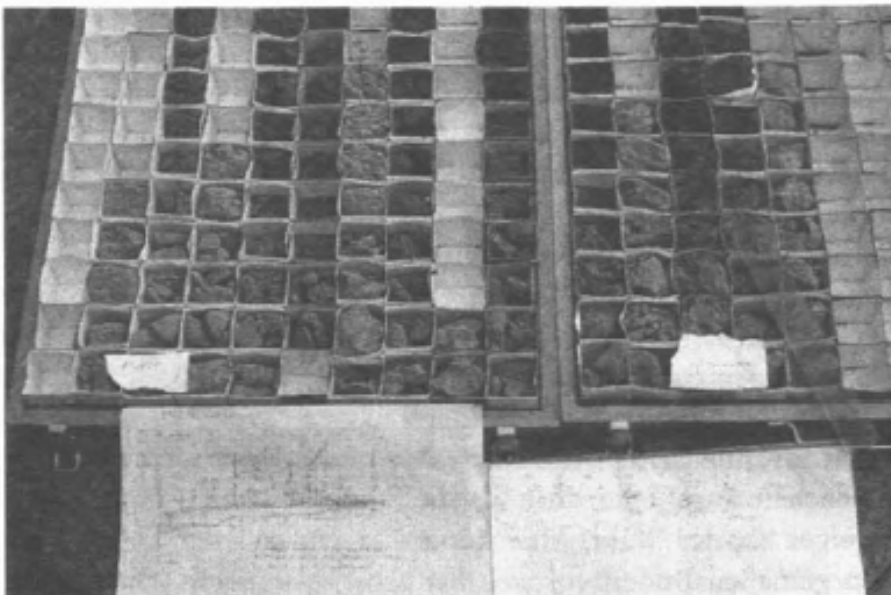
(Latour 2007: 77).

Concerning method, Latour basically pledges for sociology to become “as good as anthropology” (Latour 2007: 74). Studies in the area of actor-network theory resort to fieldwork (observation, interviews). Latour underlines, that in order to produce a (premodern) symmetric account of a phenomenon and in order to discern the variety of hybrid actors involved, it is necessary to listen carefully to people’s reports. According to him, anything counts as an actor, if it is presented as doing something and if it is equipped with a certain consistency of properties in these reports (Latour 2007: 92-93). Further, there is a pragmatic or post-constructivist twist in ANT’s empirical research. It integrates the central findings from the laboratory studies which means that there is an acknowledgement of instrumental agency and of all kinds of contingencies involved in the research process. Research is seen as “immersed in many lowly problems of money, instruments, and know-how” and caught up between “hot and cold, subjective and objective, human and nonhuman” (Latour 1999: 20). During the research process, a phenomenon undergoes a long chain of transformations: documentation, selection, reduction, translation (e.g. into numbers). The instruments, tools or media of transformation contribute to the formation of the findings that are therefore not independent from the research process. Thus, in Latour’s vocabulary: ANT’s laboratory and field studies adhere to “a more ‘realistic realism’” (Latour 1999: 15) or “radical realism” (Latour 1999: 17).

Exemplary study *Circulating Reference: Sampling the Soil in the Amazon Forest*

An exemplary study to present the way of questioning a phenomenon and the way of researching within the frame of actor-network theory is Latour’s essay *Circulating Reference: Sampling the Soil in the Amazon Forest* published in *Pandora’s Hope* (Latour 1999). It is a philosophical empirical study on “the epistemological question of scientific reference” (Latour 1999: 26). More provocatively put, Latour asks: “Do science and fiction differ?” (Latour 1999: 30) In order to approach this question he chooses to accompany a fieldtrip to the city of Boa Vista in the Amazon forest undertaken by an interdisciplinary group of researchers from botany, geomorphology, and pedology. Their study has a different guiding question: They are looking at an area of the landscape where the savanna abruptly changes into dense forest inquiring

whether the forest is advancing or retreating (Latour 1999: 27). Their aim is to resolve “the dynamic of the forest-savanna transition” (Latour 1999: 30). For the pedologists “it is the savanna that must be eating up the forest little by little”, but for the botanists the evidence is confused; “the same tree may be playing either of two contradictory roles, scout or rear guard” (Latour 1999: 27). Latour participates in the field trip observing the processes of data collection and analysis (“the practices that produce information about a state of affairs”, Latour 1999: 24), asking questions, taking notes and photographs (cf. fig. 1). The result is a “photo-philosophical montage” (Latour 1999: 24). In his report he portrays the trip from beginning to end, from its funding to the drafting of the expedition report. Within the portrayal he focuses on a number of situations where the question of reference is particularly at stake. He then relates his observations to concepts from philosophy of language: “The philosophy of language makes it seem as if there exist two disjoint spheres separated by a unique and radical gap that must be reduced through the search for correspondence, for reference, between words and the world. While following the expedition to Boa Vista, I arrived at a quite different solution.” (Latour 1999: 69)



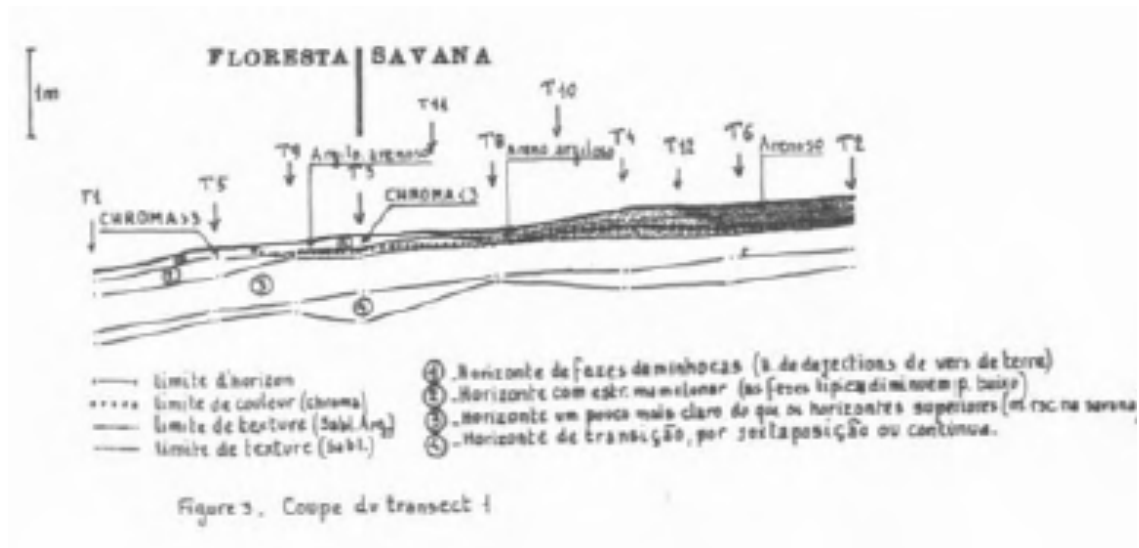


fig. 1: material: pedocomparator (Latour 1999: 55) and diagram (Latour 1999: 57)

First of all, Latour realizes that the forest is already a laboratory. It has already been measured and divided in squares that are marked with little tags. The forest is affiliated with the science of cartography, which in turn is indebted to “orbiting satellites, data banks, draftspeople, engravers, printers” (Latour 1999: 29). The expedition is not strictly pioneering, but it builds up on a lot of previous scientific work of making the area accessible and the gathered data re-localizable. The researchers’ next task is “claiming a place with stakes driven into the ground to delineate geometric shapes against the background of noise” (Latour 1999: 41). An orange cotton thread is used, a pedologic instrument of admeasuring and setting-out a succession of triangles. The triangles will serve “as a reference and will be added to the numbering of square sections of the field site” (Latour 1999: 42). Latour concludes: “For the world to become knowable, it must become a laboratory.” (Latour 1999: 43) And for this area of forest to become a lab, such equipment as maps, compasses, tags, and thread (the “pedofil”) are a necessary requisite.

The pedologists dig a hole and remove samples with a tool from it; the samples are then collected in plastic bags with “the number of the hole and the depth at which it was taken” (Latour 1999: 44) written on it. The goal is to “maintain the traceability of the data” (Latour 1999: 47) at any cost. At the same time there is “a very economical metonymy” (Latour 1999: 36) at work that allows for one sample to represent the whole context from where it was extracted. The extraction is necessary for the work of

abstraction to begin: “what would be the point of transporting the whole forest? One would get lost in it.” (Latour 1999: 36) The lumps of earth taken from the hole are not only collected in plastic bags, parts of them are put into an object called pedocomparator. It is a series of empty cardboard cubes aligned to form a square; it resembles a chart capable of accommodating lumps of earth. Putting the earth into the pedocomparator is “the very instant when the future sign is abstracted from the soil” (Latour 1999: 49) and when “the real soil becomes the soil known to pedology” (Latour 1999: 51). The profile of the soil that the pedologists are able to perceive from digging the hole is translated into the pedocomparator. The profile is now “able to travel through space” (Latour 1999: 51) in cabinet-suitcases. And it is ready to be further observed and to be further dealt with. The researchers produce a diagram on millimeter paper and “the forest-savanna transition becomes paper” (Latour 1999: 55). The diagram summarizes a lot of the information gained through the pedocomparator and other instruments. The diagram turns into the internal referent of the final report, the scientific prose.

Latour now abstracts his findings on the question of reference: The worldly phenomenon in question undergoes a series of transformations. At every stage there is a kind of rupture or discontinuity since “there is never a *resemblance* between the stages” (Latour 1999: 57) (e.g. the “rupture between the handful of dust and the printed number” of the Munsell code, Latour 1999: 60). Things are turned into signs in a cascade of transmutations. Yet, they are assured and regulated because there is a “constant that is maintained throughout these transformations” (Latour 1999: 58). Latour depicts a “conservation of traces that establish a reversible route” (Latour 1999: 61). As a result the final report “truly speaks of the world” (Latour 1999: 61), even though it does not resemble the world it describes. The boundary between world and words, between the phenomenon and its signification, between matter and form, is crossed many times, not just once. Every time there is selection, translation (e.g. colors into numbers), aggregation, and reduction. And every time matter and resemblance are lost. Only “an infinitesimal fraction of the original situation is preserved” (Latour 1999: 66). What is gained is the possibility “to oversee and control a situation in which we are submerged”. Inscriptions like the diagram even “reveal to us features that previously were invisible” (Latour 1999: 65). Through the reduction we gain “a hundredfold in the branching off to other forms” (Latour 1999: 55) such as the archive, data banks, or other

centers of calculation (sites where inscriptions are combined). It is a “dialectic of gain and loss” (Latour 1999: 70).

Latour's study itself reveals the indispensable participation of numerous nonhumans in the research process: tags, the pedofil, the mattock, the pedocomparator, the protocol book, the Munsell code, diagrams, and many more. They actively participate in making the Amazon forest accessible, ready to be studied, and they help transforming the forest step by step into knowledge about it. The phenomena are “what circulates all along the reversible chain of transformations” (Latour 1999: 71). The alternative would be to get lost in the forest and to go native (Latour 1999: 47), which is therefore not really an alternative.

Relations

All three schools are oriented towards materiality in all its diversity, its different qualities and degrees of complexity (technologies, media, objects, instruments, tools, things). They advocate the integration of the nonhuman, the technical, and the material into an analysis that is concerned with understanding genuinely social phenomena and processes, such as the law, scientific practices, or the changing arrangement of the senses. They work against the disciplinary divide between people, discourse, fiction, technology, hardware, animals, machines, and objects. This divide seems fundamental to the formation of modern western science. Yet, the sciences are constantly in movement and the disciplines permanently arrange and re-arrange themselves (Serres 1997). This affects the delineation of the so-called humanities as well as the “hard sciences”.

None of the three presented approaches defines its object of study in a conclusive manner. For Innis and McLuhan, the criterion to consider an artifact as a medium is the “change of scale or pace or pattern that it introduces” (McLuhan 1964/1994: 8). For new German media studies, anything turns into an object of examination if it contributes to the formation of an entity (cf. “There Are No Media” Horn 2007). The anti-ontological attitude is crucial. The inquiry after how an entity comes into being and subsists leads to the relevant objects. Actor-network theory develops out of the observation of instruments, tools, and practices of inscription in the

laboratory context (Latour, Woolgar 1979). Subsequent studies lead to the notion of nonhuman, material agency (Pickering 2010). It looks at the capabilities and properties of artifacts that interact with humans. Out of the interaction and exchange of abilities emerge action, organization(s), and institutions. Hence, there is no pre-defined restriction to what classifies as nonhuman actor or mediator except for the fact that those entities have to be seen as doing something (Latour 2007: 92-93).

All three streams show great interest in the medium or the artifact itself and not so much in the communications that are done through them. The most disinterested are Innis and McLuhan. To them, the structural tendency inherent in a medium highly outplays the processes of encoding and decoding messages. The medium itself is the message. TV says TV, a book says book, and the internet says internet. The main effect of these media on their users is a change of consciousness, a certain mode of perception prompted by the medium. Content cannot be thought of independently from its carrier media. The separation of content from form is hence negated. New German media studies are inspired by these assumptions. They argue for the examination of the neglected “in-between-ness”, of the channel itself, instead of focusing on the production and reception of messages (communication studies). New German media studies also lean towards the history of ideas as it was conceived of by Michel Foucault. Combining the history of ideas with McLuhan’s media genealogical approach leads to the stress on “material and technical foundations” (Horn 2007: 9) of whatever event or entity constitutes the object of inquiry. But the surrounding discourses and fields of knowledge are more prominent than in the writings by Innis and McLuhan. Kittler coins media studies’ emphasis on researching “networks of technologies and institutions” (Kittler 1990: 369). Actor-network theory wants to be “symmetric”. It aims at evenhandedly looking at humans as well as nonhumans depending on the empirical case at hand. It is strongly inspired by ethnomethodology (Harold Garfinkel) and follows the idea of developing theory out of qualitative empirical case studies. The focus lays on heterogeneous relations; ANT offers a way of approaching them. It parallels new German media theory in the aspects of not leaning that strongly towards the technical-material and in conceiving of itself as a way of questioning certain phenomena.

In terms of method, ANT differs from the Toronto and Berlin Schools. The latter are strongly oriented towards historical research. They deal with single historical cases

or produce genealogies of practices and institutions. Archival material is often used, combined with fictional accounts (literature, film) and secondary sources. Methodological procedures are rather unorthodox and often pushed beyond the limits of convention. This shows media studies' relation to postmodernist and radical-constructivist epistemologies (Jacques Derrida, Jean Baudrillard, Ernst von Glasersfeld, Niklas Luhmann). Actor-network theory opposes this tendency towards relativism and nihilism. Instead, it argues for a radical realism (Latour 1999: 17). It acknowledges the messiness, humaneness, but also the "thingy-ness" of the sciences no matter if we are confronted with procedures from the natural, the social or the human sciences. The question of methodological bias is completely nullified. Scientific instruments and practices transform the object of inquiry and there is no alternative to that. Rather, this transformation is conditional for gaining aggregated, distant, and abstract knowledge about a phenomenon.

In organizational studies?

What would it mean to locate an organizational research study either within early media theory, or within a media conscious archaeology of knowledge, or within the approach of distributed agency in heterogeneous relations? A study in organizational research choosing the McLuhanian concept of medium would focus on material properties of those entities that enable and scale certain organizational procedures. It would ignore its overt content, but instead search for its message in the "change of scale or pace or pattern that it introduces" (McLuhan 1964/1994: 8). The whole *Gestalt* of the organization would be analyzed as relating to the properties induced by the dominant media. In the perspective of the so-called new German media theory, an organization or an organizational phenomenon (the notion of organizational culture for instance) would figure as an entity to be questioned. Studying this entity demands its interrogation in terms of the surrounding discourses, the constellation of material artifacts and the technologies that contribute to its emergence. What are its material and technical prerequisites? What are the fields of knowledge that are employed in running and justifying the organization? In the perspective of actor-network theory, an organization would have to be examined in terms of what it is that keeps it from dissolving. The resources that contribute to keeping it together can be human, nonhuman, material, or

emblematic. The aim is to depict material agencies interacting with human ones in hybrid actor-networks. Action emerges from those networks which raises the question of where managerial intervention can take place.

Conclusion

In this paper I presented three different schools of media and technology research: early Canadian media theory, so-called new German media theory, and actor-network theory. Each of them offers manifold sophisticated elaborations on the question of the material and technological foundations of social phenomena. But they also presuppose some prior knowledge within the field. Becoming acquainted with their conceptualizations takes time and a lot of reading. Yet, they offer highly productive, original and time-tested concepts from which to draw. Of course, there are more areas of research to look for help and inspiration, such as mediology introduced by Régis Debray, praxeology (Pierre Bourdieu, Reckwitz 2003 for an overview) or material culture studies (Hicks, Beaudry 2010). Interestingly, all three presented schools are highly self-reflexive and experimental in terms of methodology and at the same time humble with regard to acknowledging the boundaries of scientific practice. To me, that is a quality mark within science. It is also an invitation for experimentation at one's own peril.

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