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Adaption und Kreativität in Afrika — Technologien und Bedeutungen in der Produktion von Ordnung und Unordnung

Norman Schräpel (Ed.)

THE ORDERING POWER OF TECHNOLOGY

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Adaptation and Creativity in Africa: technologies and significations in the making of order and disorder

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I About the Working Paper Series

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Overview to the Working Paper Series

The SPP 1448 "Adaptation and Creativity in Africa"[1] held its second biannual results-conference in October 2014 in Saly, Senegal. Out of the discussions at the conference three Working Papers were organised. The Priority Programme has during the course of the past four years formed three 'clusters' to bring together the different topics, theoretical interests and regional contexts of the individual research projects. In these three clusters, the researchers concern themselves with 'technologies', 'narratives / significations' and 'space' as specific 'conceptual lenses' through which to explore the overarching objective of the programme, namely how creative adaptations enact specific forms of institutional dis / order. Aiming to elicit fruitful discussions within, but more importantly also between these three clusters, the format of the second biannual conference in Saly, Senegal centred on the presentation of short 'vignettes'.

The vignettes as a format promised to enable concise, insightful presentations of current empirical findings. In course of the conference, the 'thick descriptions' from the field were subsequently to be set in relation to the overarching framework of the Priority Programme and its key concepts *adaptation*, *creativity* and *dis/order*. Thus, the conceptual discussions were informed by rich empirical situations. Each vignette provided direct insights into the empirical material of the individual projects. This conference format was deliberately designed to circumvent all-encompassing project presentations and to facilitate a comprehensive discussion on possible conceptual and empirical avenues of the research programme.[2]

Conceiving vignettes as either a conceptual description of a particular situation (e.g. a meeting witnessed), a speech act (e.g. a radio show), a dispute (e.g. over the erection of a monument), the use of a technological device (e.g. a rapid malaria test),—or a combination thereof—sought to allow for the presentation of vivid portrayals from the field, to enhance the representational richness and thereby fuel inspirational discussions within and between the overarching clusters. Selected speakers, in turn, commented upon the vignettes in each session, either providing specific commentaries from the perspective of the individual clusters or more generally pointing to the manner in which these vignettes allowed for new conclusions to be drawn within the larger framework of the SPP 1448.

1 The Priority Programme 1448, funded through the German Research Foundation (DFG), focuses on current transformations in Africa and examines creative adaptations that enact specific forms of dis / order. Since 2010 more than 15 interdisciplinary projects—in collaboration with partner institutions worldwide—have contributed to this research agenda (for an overview of the participating institutions, researchers, and projects see www.spp1448.de).

2 The junior researcher of the SPP met in the summer of 2014 to collaborative design this format. In a number of reflexive discussions and by going back and forth between what were deemed ‚classic' presentation mode, vignettes were finally chosen as a more ‚open' form of conference contribution.

At the same time the format and the discussions it evoked allowed to carve out important differences and commonalities between the three clusters. For example, each cluster points to a different set of theoretical and methodological approaches to address dis / ordering practices. In this sense they sensitise the researchers to review their own empirical material in a certain way. Yet, clustering research findings does not mean to produce conceptual homogenisation — quite the contrary. Thinking dis / order through technology, signification and space opens up a discussion to draw together different objects of study, regional contexts and theoretical thinking. Thus, it is important to note that the aim of the clusters is not to rethink space, technology or significations and to provide a new comprehensive generalisation on these concepts. Rather the research findings presented in the clusters all show how these concepts can be fruitfully utilized to examine practices of ordering.

Finally, the discussions during the conference were marked by the then recent outbreak of Ebola in West Africa and. It was for example a painful reminder on the way global health infrastructures are often far from being functional in local settings precisely because the technologies, standards and people that these infrastructures circulate are often not creatively adapted to local contexts. In this sense the Ebola crisis gave a particular urge to the research agenda of the SPP 1448. But the close proximity of unreasonable death also put the finger on the ethical and moral dilemmas of doing research and organizing conferences in periods of distress. It heavily contested the idea that academic research can be apolitical or does not need to address current developments outside the established comfort zones. Here, the Ebola crisis helped the researchers of the SPP 1448 to review their own theoretical and empirical vantage points on contemporary challenges in African contexts.

About the structure of this Working Paper

This Working Paper offers seven vignettes that all draw on *technology* as a sensitising concept. During the course of the conference, two sessions were devoted discuss the way technologies can be conceptualised to understand process of dis / order in African contexts. The Working Paper starts with a brief introduction that draws on recent theoretical debates to summarise how technology can be conceptualised. The subsequent vignettes document the empirical material that was presented at the conference in Saly, Dakar. In addition to that, the Working Paper offers two prepared comments on the vignettes, each providing its own reading of the empirical situations by suggesting a number of ways to conceptualize technologies and dis / ordering practices.

II Technology — Some thoughts on the concept

Introduction

Richard Rottenburg (University of Halle)
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For quite some time, *technology* was almost exclusively in the hands of engineers and philosophers. As Werner Rammert points out, engineers constructed technologies usually rather uncritically as products of their daily work, while philosophers tried to grasp the essence or nature of technology (Rammert 2008: 341). Early historians, sociologists and anthropologists who were concerned with technology initially borrowed mainly from philosophical discussions when trying to describe the rationalities or meanings of technology or when inventing metaphors such as the extension of the human body. The social sciences neglected technology for a long time and tended to reduce it either to a beneficial device fully determined by the intention of its human users, or else to an evil power determining the human predicament. Only recently (of course, with a longer genealogy), technology has become an important analytic and empirical concept for investigating the making of social (dis)order. This new attention in the social science is in close connection to vivid public debates about technology.

While technological innovation continues to inspire imaginaries of modernist progress and to nurture beliefs in ever-more technology-driven human advancement, diverse public perceptions of technological permeation of social relations have also furthered and partly radicalized their criticism. Parallel to these age-old, rather political controversies, academic debates of technology also gained increasing importance. Since the late 20th century a separate field, Science and Technology Studies (STS), has emerged, opening up new methodological and conceptual approaches towards technology. However, defining the concepts and making them fruitful for larger scholarly debates has proved trickier than it may seem. Technology is still a fuzzy concept, ranging from very narrow definitions focussing on material devices to broader ones that include non-material technologies like forms of organisation and even procedures to structure all sorts of practices. In this introduction we argue that technologies are not given objects of study; to emerge, they need to be connected to comprehensive social-theoretical thinking.

With this introduction we have three aims. *First*, we want to briefly trace the debate of the term within our research group, the SPP 1448. This is to remind readers how this central term of the research programme came to be understood as a guiding concept for empirical work. *Second*, we offer a short conceptual history (Begriffsgeschichte) of technology, drawing on different disciplinary uses. *Third*, we briefly summarize the on-going discussion of the role of technology in African contexts by scrutinising the idea that technologies need to be re-located and traced to new contexts in order to allow an empirically driven and rich analytic analysis.

How is the word "technology" used in the Special Priority Programme?

To start our exploration on technologies we first consult the use of the term in our heterogeneous research group. The priority programme *Adaptation and Creativity in Africa—Technologies and Signification in the Production of Order and Disorder* (in short SPP) consist of fifteen research projects, offering a wide range of case studies on different topics and regional contexts in Africa. This constellation, we argue, is an ideal starting point to understand how technology is constructed as a vantage point for addressing larger issues.

Seen from the other end, by focussing on *adaptation and creativity in Africa* the SPP assumes that a particularly illuminating problematisation can be raised methodologically and theoretically to better understand the current challenges of the transformations of the African continent. The focus was put on moments and situations when something is being transferred from one context to another and new connections are created. Of the various transversal objects, the SPP has chosen to focus on technologies and significations. It was hypothesised that processes of transfer in most African contexts were marked by an imperative towards creative adaptations. It was further assumed that transfer always necessitates transformation since it would otherwise just not take place. The practices that lead to this achievement were termed *translations*. To understand the role of technologies in changing ordering practices, it was thus expected, the empirical work can most gainfully concentrate on traveling technologies.

The initial funding proposal defined the focus and boundaries of the articulated research interest, or in the language of the research programme, its priority. In the document we find the following definition on technology:

> *Technology is understood in the widest sense of the concept starting from enabling devices (e.g. metal axe or AK47), over infrastructures and large technical systems (e.g. roads or telecommunication systems), to modes of governance (e.g. segmentary opposition, commercial accounting, or forms of bureaucracy) and modes of subjectivation (e.g. age grade initiation, schooling, or counselling). (Rottenburg et al. 2008, 5)*

This broad conceptualization of technology was not readily shared by all scholars of the research programme and an intense, fruitful debate was provoked. Some expressed concerns that the term would be rendered meaningless by including a diverse range of non-material procedures. On the other hand, those in favour of a broad definition argued that using technology to refer solely to material apparatuses would concede the analytic value behind the concept as established in parts of the literature (see for a helpful overview Sismondo 2010). They argued that echoing this literature—which included broader questions from social theory—provided a revealing analytical perspective by bringing together issues usually treated separately. In reference to African contexts, this approach would produce novel and innovative research to understand the current shifts and transformations on the continent.

The vignettes of this Working Paper give a glimpse into the diverse uses of the concept of technology within the SPP. They deal with rapid diagnostic malaria tests in global health, alcohol breathalysers in policing, patrolling as a technology of policing, identity papers in border controls, infrastructures for water distribution, technologies to depict climate change, and ways to diagnose the condition of a diesel engine by its sound.

What's in the word "technology"?

The semantics of the word "technology" is marked by a fascinating shift made in translation. Eric Schatzberg (2006) identified the shift produced by the writings of American social scientists who transposed ideas from the German discourse of *Technik* into the English term technology.

> *In nineteenth-century English, technology was a somewhat specialized term sharing a common set of meanings with its cognates in French and German. These meanings centred on technology as a field of study concerned with the practical arts. In German speaking regions, a new discourse emerged around die Technik in the second half of the century, which referred to the practical arts as a whole. (Schatzberg 2006, 487)*

Thus the way technology is used in today's everyday language is rather new. In 1911 the Century Dictionary still defined technology as "that branch of knowledge which deals with the various industrial arts; the science or systematic knowledge of the industrial arts and crafts, as in textile manufacture, metallurgy, etc." (cited in Schatzberg 2006, 490) In this sense technology did not refer to an object or device but to a field of study, as the suffix –logy indeed indicates. In 1934 Lewis Mumford entitled his classic study *Technics and Civilization,* yet a few years later he would probably have said "Technology and Civilization". In those years, technology became popular as a term and received its now familiar sense when a few influential writers responded to the German usage of Technik in understanding its role in shaping modern industrial societies. This was the starting point for the success of technology as a term, at first only confined to the boundaries of academia. Leo Marx argues that technology filled a conceptual and semantic void and became a more apt signifier "for the new agents of change than any of its precursors, received terms such as the mechanic (or useful or practical or industrial) arts, or invention, improvement, machine, machinery or mechanism" (Marx 2010, 563). This might be surprising if one thinks of the ways technology is stabilized in today's everyday use. However, there is still some uneasiness about the term, exemplified by the sheer number of synonyms that emerge in academic debates and are all frequently used more-or-less synonymously with technology: device, technical object, artefact, technics, iron cage, equipment, infrastructure, apparatus (dispositif), deployment, actor network, assemblage, agencement, and lately again infrastructuring.

The uneasiness about the concept's meaning stems primarily from two issues. First, the fluid boundary between a stand-alone device (telephone) and an infrastructure (telecommunication system). Which device can really stand alone when even the metal axe presupposes a complex infrastructure for its production? Second, the relation between the material and the semiotic. How far is meaning attached to materiality, or, in the language of our programme, how far are significations part of technologies?

To address the first uneasiness, it is important to understand how a device always seems to implicate a socio-technical network infused with meaning. It would make little sense to look at a rapid diagnostic malaria test as stand-alone device that produces specific indicators when imbued with a drop of human blood. There are many more relations necessary to produce this result. There are, for example, a number of epidemiological assumptions inscribed into the test, these again induce organisational realms that reduce medical practice to dyadic decision-making, and this again is connected to the protocols of accountability for aid money. Digging deeper would unearth another layer of technology that functions as infrastructure for the first layer and so on.

If the usage of the word "technology" first appears to be a semantic confusion — it blurs a category of phenomena with the study of those phenomena — this very confusion now seems indicative of the phenomena. This is because the technical equipment of modernity is characterized by being encompassing, by infusing all aspects of world-making and being highly dependent on its own theorization and reflexivity. Hence the *logos* of technics and the technics themselves merged to become technology. This confluence of practice and theory, which took place at the beginning of the 20th century, is analogous to the one being debated at beginning of the 21st century under the term "anthropocene", encompassing bio and its logos, resulting in man-made nature or nature-culture.

This clarification leads on to the second uneasiness about the meaning of technology as a concept. If it makes sense to speak of technology as infusing all aspects of world-making, it is equally plausible to assume that technology unites material and semiotic elements or more consequentially: that technology is a material-semiotic assemblage. Conventionally, the realm of ideas and sense-making — which can be named differently according to the aspect one wants to emphasize, e.g. culture, semantics, web of beliefs, signification, narrative etc. — is dealt with separately from the realm of technology. While there is a long genealogy of challenging the separation of the material from the ideational, recent scholarly work is more radical by assuming so-called material-semiotic assemblages that cannot be disentangled analytically without losing grip on the problem under scrutiny. This proposal is the consequence of the logically preceding claim that reality, like nature, is not simply "out there", and ideas are "in here" in the human minds representing reality more or less accurately. It is rather assumed that reality is permanently in the making, that humans are involved in the enactment of realities, and finally, that they do so under conditions not of their own choosing. They are forced to struggle with an environment that is the sedimentation of previous actions. The core point of this claim is that the agents of those actions are not humans but heterogeneous material-semiotic assemblages (Law 2004).

If one subscribes to this view of material-semiotic assemblages, it might seem unfruitful to produce one Working Paper on technologies and a separate one on signification. Yet the difference lies in the analytical starting point, rather than overall focus. The vignettes of this collection use technology as starting point for their ethnographic inquiries and then go deeper by including ideational dimensions. Parallel to this Working Paper another one is published that uses narration as starting point on the ideational level to then go deeper to include the material dimension of sense-making. As for the vignettes of this collection here, we still need to introduce its third aim by summarizing the discussion of technology's role in African contexts.

Traveling technologies

On a more practical level, technologies offer a unique vantage point for empirical research. All the vignettes assembled here put one technology centre stage for addressing a larger issue. Technology is constructed as an object of inquiry to achieve a particular problematisation. More specifically, all the vignettes are, more or less directly, interested in the travelling of technologies as a way of problematising the creation of something new.

In most dominant public and academic debates, technology in African contexts is still primarily seen as linked to practices of development and social engineering. There is a widespread believe that technologies provide an effective solution to existing problems for most African contexts. In this sense technologies actually are a major force for driving the development agenda, even if

they rarely have the impacts they were supposed to have in the planning stage. However, these optimistic voices always were and continue to be accompanied by sceptical voices, which shift the attention to the unintended consequences, to the failures and disruptures. From this vantage point, a frequent conclusion seems to be a quest for more "appropriate technologies", for better adaptations or appropriations and sometimes for less imported technologies and more reliance on home-grown solutions. In its extremes this perspective sometimes leads to the conclusion that certain people, areas or social domains in fact should be protected from external interferences. While in some ways this argument sounds plausible in reference to certain interferences, in other contexts it is hard to distinguish from certain forms of paternalism, othering, marginalisation and — at the extreme — apartheid.

The vignettes of this collection do not follow either perspective on technology. They all avoid what after decades appears as a fruitless dichotomy between technology as an engine of progress versus technology as the cause of failure and disaster. Instead, the authors deploy the analytics suggested by the SPP and start from the assumption that the circulation of a technology — its travel from one context to the other — always depends on its translation. To be transferred, a technology needs to be translated and thereby changed. In this process, everything else that partakes in the translation also becomes changed, including the human actors. In this sense the vignettes inquire into the practices of translating a technology into a new context. Instead of asking if the process resulted in success or failure, they ask how something new emerges and this includes changing criteria of success. In the end they can still raise normative questions about the worth of the translation. Yet according to the analytics proposed by the SPP, this becomes an open question that can only be answered empirically and never by appealing to preconceived notions of "technology as saviour" or "technology as devastation"; technology does not have such innate qualities. It is intrinsically tied to ordering practices and thus not a separate tool in the hands of those attempting to bring predictability into their uncertain worlds.

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III First set of vignettes and comment

1 Technologies of border control

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Rural border-crossing point controlled by the hunters' association in northern Côte d'Ivoire

It was in the early afternoon during the dry season in March 2014. A limp piece of red cloth was hanging over the sandy road, moving gently in the hot wind. It was knotted to a rope that barred the dusty path. On the right-hand side, the smaller passage was equally blocked by a rope with a piece of red cloth. There, in the shade on the roadside, several men were sitting on a wooden bench, their guns resting against a tree. This is the scenery of a border crossing point in northern Côte d'Ivoire. The checkpoint is located at the top of the river bank on the Ivoirian side of the Léraba, the river that separates today's Republic of Côte d'Ivoire from its neighbouring state Burkina Faso. There is no bridge over the river, but people, trucks and cattle can cross the water—at least during dry seasons. It is the motorbike that counts as the most useful means of transportation on the sandy paths of the savannah. In the rainy season, small boats bring people and bikes across. On that day, coming on a motorbike from Burkina Faso, a man in an ankle-long *boubou* approached the checkpoint and stopped close to it. He turned his head towards the group of Ivoirian border guards and waited. One of them interrupted the talking and walked around the motorbike. The men greeted each other briefly, almost mumbling. *"Les papiers de la moto,"* (the papers of the motorbike) the man controlling said. The man on the motorbike searched his bag and handed over his papers for inspection. Motorbikes are often stolen in one country to be sold across the border—out of administrative reach, so-to-speak. After the comparison of the numbers on the documents with the ones on the bike, the passenger was allowed to continue his journey over the lowered rope.

Rural border-crossing point controlled by the hunters' association in northern Côte d'Ivoire

The scene just described features familiar elements of administrative technologies of power and control. The materiality of the border checkpoint may appear simple: ropes barring the road marked with red cloth to increase the visibility. With their bodily presence, gestures or habitus tout court, the armed men attribute further meaning—or signification—to the materiality displayed and thereby contribute to the ensemble of the technologies of control. All involved in the social drama seem familiar with the plot and the roles they are expected to play; the mere utterance of a noun phrase suffices for the intelligibility of the situation. For outsiders, it might look like any other checkpoint. This border crossing point, however, is solely staffed by hunters, called *dozo* in Manding, who are initiated members of the local hunters' association. Issued from local families, the *dozos* have a personal interest in securing people and goods. As masters of the wilderness with mystical knowledge, arms and medicine, the *dozos* have long had the role of protecting human settlements from all kinds of evil (wild animals, sorcery and illness as well as hostile attacks (Cissé 1964). Today, with the subjection of local societies to the territorial regime of state domination, the portfolio of the hunters' fraternity has changed accordingly (Hellweg 2011; Förster 2010). Even if the *dozos* perform border controls, their main interest is not so much to support the state to control its borders, but to alleviate the effects the border has on this region. The security provision by the state in this area is insufficient and bandits use the borders to go back and forth between Côte d'Ivoire, Burkina Faso and Mali. Borders demarcate and separate areas of state regulation and thereby create a close by and yet administratively distant space to hide and to resale stolen goods. Armed holdups in the bush are quite frequent and thieves often flee with their stolen goods across the border. To the *dozo* border guards, identity cards are more important than papers attesting ownership of motorbikes, for the time being at least. Thereby, technologies of border control are creatively adapted to fit present local needs. By performing border controls, the hunters mimic sovereign rights of the state. So, how is the relationship between the hunters and the state organised? In fact, the hunter association cultivates close relationships with local state agencies. The state keeps its activities to the towns and main roads, as it lacks the capacity to penetrate rural areas. In the bush, where state agents are nearly absent, the hunters perform security and control functions in consultation with local chiefs and in tacit agreement with the prefect and gendarmerie. Important for the social order seems to be that the *dozos* confine their field of action to this more or less clearly defined social space. This space is generally referred to as *"la brousse"* (the bush). It starts at the outskirts of towns and includes settlements and dwellings that are only rarely visited by security providers of the state. Both, state agents and the *dozos* take money from passengers for their private use. Consequently, there is a certain competition between both groups to occupy strategic points where they can collect as much money as possible without raising resistance from the population concerned. The division of space—a complementary spatial governance arrangement—helps at reducing conflicts between the *dozos* and the state, as I argue elsewhere (Heitz Tokpa in preparation). The state profits from the work of the *dozos,* as the state is unable to cover its vast territory with the means at its disposal. Policies prohibiting for instance the exportation of cashew nuts are difficult to implement without controlling the rural border crossing points. During the cashew campaign in 2014, the *dozos* have handed over traders to the police who wanted to cross into Burkina Faso to get a better price for their products. It can indeed be said that at some occasions, the *dozos* function as an auxiliary force in the bush to implement customs regulations. Not all state actors, however, appreciate the work of the hunters. In the 1990s, for instance, the government made efforts to reduce the hunters' field of action to their heartland in the north (Bassett 2004). The president at the time, Henri Konan Bédié, did not share cultural belonging with the northern hunters and feared that they might support his rival, Alassane Dramane Ouattara. The

fact that the state knew little about the hunters—their numbers and who their leaders were etc.—raised the government's suspicion. In order to conserve their niche beside the state (Bellagamba and Klute 2008), the *dozos* had to renegotiate their role with the government in power at the time. To be more accessible and acceptable to the state, the *dozos* drew on standardized technologies of identification familiar to the state. The *dozos* took photographs, created lists with names and distributed membership cards. Their fraternity—with origins that reach back to the Mande empires—received a bureaucratic structure with a chief, secretary-general and a treasurer—not unlike any other association in Côte d'Ivoire today. Meanwhile, other practices and realms of their fraternity have remained largely untouched by this reform (Hellweg 2011). Integrating technologies of bureaucratization into their fraternity increases the state's impression that the *dozos* are controllable, not unlike any other association, even though the number of arms they possess has never been assembled. The use of standardised, nationally-shared technologies of ordering created trust vis-à-vis the state. By adapting to the state's technologies of control, the *dozos* carved out a space for themselves. Their good relationships to local state agencies, allows them to make use of further technologies of ordering—namely border control—for their own ends at rural border crossing-points in Côte d'Ivoire's north.

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2 Drunk-Driving Operation Technology in Uganda: Anxiety and Excitement on the Police-Citizens Interaction Platform

Jude Kagoro (University of Bremen)

Introduction

In the last couple of years, the Uganda Police Force (UPF) has embarked on what it calls the "modernization" and "professionalization" of the force process. In particular, Gen. Kale Kayihura, the Inspector General of Police (IGP), emphasized to me in an interview that "the main goal of the police leadership is to build modern, professional and effective policing systems." Among other strategies, the general further revealed that "the police force has rolled out a modern forensic laboratory, computerized management system and a cyber crime unit." Indeed, many police departments have been undergoing some form of transformation. The traffic police department, according to my ethnographic observation, is not only setting a precedent in as far as modernizing its organization and response procedure is concerned but also in several technological aspects. Notably, the department has introduced speed guns to electronically capture data on over-speeding drivers, as well as breath-analyser machines for the immediate roadside testing of drivers' blood alcohol content (BAC).

The breatha lysers provide an electric means to estimate a driver's BAC from his/her breath in order to check whether it is above the legally accepted national limit for driving, thereby removing the need for blood or urine samples to be taken to hospitals and speeding up the processing of cases. The breathalyser results are approved for evidentiary use in Ugandan legal terms. The technology, which was introduced in 2003, but effectively put into use only in 2008, is still alien to many and is yet to find acceptance in society, especially for those caught on the wrong side of it, as a routine law enforcement procedure.

Based on results from a larger ethnographic study of the Uganda Police Force conducted between November 2013 and April 2014, the major focus of this vignette is to describe the force's drunk-driving operations (I attended 11 such operations) commonly referred to as *Kawunyemu* [In English, "breathe into it"] in Kampala city, how technology is becoming incorporated in the activities of the police and with what reception. Using the example of the drunk-driving operation, I show how certain overarching issues in policing practices in Uganda, such as efficiency, authority, punishment, trust, evidentiary practices or corruption can be revealed by zooming in on the breathalyser as a new technology of police practice. In the interactions between suspects and police officers, the introduction of the breathalyser to law enforcement is both stabilized and contested in various ways. Outside the direct interaction between police and the suspects, the media also plays a major role in the debate surrounding the breathalyser as a new technology.

The *Kawunyemu* Operation in Action

Usually, at around 2200hrs, the officers converge at a parade and are addressed by the in-charge of the drunk-driving operation. The officers discuss the landscape and all the advantages of the particular spot where the operation is to be conducted and how they are to deal with suspected offenders, including the stubborn ones. The in-charge advises on how the officers should skilfully put up a performance to look friendly yet authoritative at the same time. On arrival at what they call "the rendezvous", signposts and traffic spikes are erected leaving a distance of about 20 meters between the two. One officer is stationed at the signpost to signal vehicles to stop. On stopping the vehicles, the officer explains the reason for his actions, and lets the driver slowly drive into the space between the signpost and the spike strip. Three to four officers select those suspected to be drunk, order them to step out of their vehicles, confiscate their car keys before ushering them to the spot, usually next to the spike strip, where two officers are stationed. One of the officers then does the paper work (fills in forms) while the other operates the breathalyser.

To that end, the suspected offender is handed a test tube, still sealed, and is advised to open it. The officer in charge of handling the device illustrates to the driver how the test tube is to be placed on the breathalyser. The particulars of the driver, name, car registration number, permit number, as well as the name and number of the testing officer are all entered into the breath analyser machine. The machine is then set to "read" mode and the suspected offender is instructed to blow air into it through the test tube. After the suspected offender has blown air into the machine for at least 12 seconds, the machine makes a particular noise indicating that a reading has been processed. A reading is interpreted against the accepted national BAC level for operating a vehicle under the influence of alcohol.

Those below the limit are cleared to go, and in the case of those above it, the results are recorded on the test form and counter signed by the driver, testing officer and the witness. For all public service vehicles such as taxis, buses, minibuses and passenger motorcycles (*boda-boda*), the accepted national limit is 0ug/100ml (micro grams of alcohol per 100 millilitres of blood/breath). For all private vehicles, the limit is 035.0ug/100ml. On average, every third person tested in the operation is above the accepted limit. The offenders are secluded and guarded at a specific spot and after rounding up about five to six of them, officers assigned to guard duties escort them to the station aboard a police patrol pick-up. At the station, the offenders are detained in the cell for the night.

Meanwhile, the offenders' vehicles are towed and parked at the police yard and an entry for custody is registered per vehicle. The operation continues through the night until the commander withdraws and assembles the officers at the station for debriefing. The next day, receipts for payment of a fine of about Ugx. 200,000 (70 Euros) payable to a bank account are issued. An offender's vehicle can only be released on evidence that the drunk-driving fine and additional breakdown fee of about Ugx. 120,000 (40 Euros) have been paid. The case file can then be closed and put away and records adjusted accordingly. Meanwhile, Notices of Intended Prosecution (NIP) are issued to those offenders who opt to go to court. Most traffic offenders prefer to pay the drunk-driving fine as following up the case in courts of law would be costly and time consuming.

Public Debates on *Kawunyemu*

Kawunyemu operations are game for the media by providing yet another form of entertainment. On some occasions television journalists accompany officers to capture the operation in action.

Nation Television Uganda (NTV, Uganda) has broadcasted snippets of such operations in the news and on the satire show, "Point Blank" as well as *Bukedde Television* on "*Agataliko nfufu*" (Luganda for "news in its raw form"). This prompted accusations from some Ugandan members of parliament (MPs) that the police was abusing its powers and deciding on drunk-driving cases arbitrarily so as to extort money from the public.

In April 2013, the police was summoned to parliament to explain to MPs and the general public how the operation actually works.[1] On that occasion the MP for Kalungu North, Joseph Sewungu noted, "Now, what police does … Sewungu is driving his Mercedes Benz car, he has a girlfriend, you don't know that it's his official wife or not, you arrest and you start displaying everything in the public". Such media debates are vital to illustrating how both the police and the public interact with the breathalyser as a new technology. The debates make the new technology more visible and help to stabilize its use in law enforcement in Uganda.

On the right, a young man tries to hide his face from the camera when asked to blow into a breathalyser; Left: a young lawyer is led away by a traffic police officer after protesting her innocence at length (source: NTV Uganda, "Point Blank", 11 April 2014).[2]

Police-Citizen Interaction: Mistrust and Excitement

The *Kawunyemu* operations generate drama and heated interactions between the police and the populace. It appears that there is mutual uncertainty and distrust on the part of both the police and the community in terms of accepting the breathalyser as a new component of law enforcement. In the first place, police officers refer to the drunk-driving offense as a "luxurious crime" or "a crime of the rich" because suspects can afford cars. This is not helped by the disrespectful attitude of many of the suspected offenders. In the initial stages of testing, many suspected offenders start out with an attitude of false bravado. Take for example the case of a lady in her early thirties driving a very expensive vehicle and as it later turns out, the wife of a very rich man. She arrives at the checkpoint clearly drunk and shouting instructions to the police, "do not waste my time because I am a breast breastfeeding mother and not ready to jeopardize my marriage! My husband is not aware that I am out." Of course, the officers were not having any of it and she was reprimanded like all the rest. In some cases offenders try name-dropping claiming

1 See NTV Uganda 30 April 2013 www.youtube.com/watch?v=DyqDs5FnxEk accessed on 29.11.2014.
2 See www.youtube.com/watch?v=zE5IvwCdil8 accessed on 12.11.2014.

close relations with senior police officers or influential politicians in the hope that the police will be intimidated into letting them go. It is usual for suspected offenders to mock and abuse police officers. Besides those who are out rightly confrontational and abusive, some choose to intensively negotiate with the police while others clearly take the operation lightly. One can see them making jokes, laughing and using humour to interest the police into letting them free. Some drivers arrogantly try to educate the police on individual rights and the law in general. However, at the point when the offenders' cars are towed to the station, their mood and body language quickly changes. Many get distressed and some, especially the ladies, begin to cry. When the offenders are bounded on a police pick-up truck guarded by AK-47 wielding constables and headed to the police station, they get panic-stricken and hysterical. At the station, most offenders, even those who were looking down on the police officials at the beginning, suddenly become submissive to their authority.

In the course of the testing process, civilians seem disempowered, understanding less, if not anything at all, of how the technology works or how the limit is read. In the process of testing, moreover, many test tubes are put to waste as some suspects intentionally drop them to the ground to foil results. Interestingly, some of those who are absolutely sure of having drunk no alcohol hesitate to do the test as well. Similarly, when those who have tested below the limit are told to go, one can clearly read the disbelief on their faces, suggestive of the on-going mistrust that have dogged police-citizen relations to date. A comment from a man in his late twenties illustrates this: "I cannot believe that police has let me go just like that. I thought they take money from everybody regardless of the results." On the contrary, some of those found to be above the drunk-driving limit complain of how defective the machines must be. Some claim that nothing in Uganda works, thus the police's machines must be dysfunctional. Others vehemently express that the police is deceitfully manipulating the machines to implicate them for the purpose of extorting money. This not entirely a farfetched perception, as I occasionally witnessed bribes stealthily being paid out. Moreover, some officers intimated that a few senior officers get a kick-back (a percentage of the final fee) from the privately owned breakdown operators hired by the police to tow traffic offenders' vehicles away from the *Kawunyemu* scene. Others, especially the females, doubted that the test tubes were clean, with some refusing to use them for up to several minutes. Obviously, the *Kawunyemu* operations are also very exciting to some people in some measures. At the operation spot, one can observe *boda-boda* (motorcycle taxi) riders and other passers-by ululating and giving moral support to police officers, encouraging them to capture as many offenders as they can. Ironically, in a few cases some drivers plead with the police to be tested. Some request for the test tubes and to have their pictures taken with police officers on *Kawunyemu* duty as souvenirs.

In sum, one can aptly argue that the relatively new technological aspects to drunk-driving operations in Uganda are re-configuring police-citizen interactions in a very particular way. Electronically generated evidence is enabling the Uganda Police Force (UPF) to charge drunk-driving traffic offenders in a much more efficient manner. Because of the legally binding evidence, most offenders prefer to pay the fines meted out to them rather than proceeding to the courts of law where the costs of following up a case are considerably higher. In the past, so I was told, it was impossible to prosecute a drunk driver due to absence of technological evidence. Not surprisingly then, the newly introduced technology is still alien to many members of society making it difficult for them to accept it. More importantly, an analysis of the different ways in which it is interpreted, contested and stabilized, provides rich data on issues affecting police-citizen interaction on a larger scale in Uganda.

3 Dis/ordering water supply in Dar es Salaam: The expansion of the water distribution network in Kimara Mwisho

Sophie Schramm (Darmstadt University of Technology)

I look at ways in which technologies and people bring dis/order to urban water access in Dar es Salaam to show how dis/ordering the city is an ongoing process that is relative to the perspective of actors. I focus on an expansion of the water distribution network in the north-western outskirts of the city, as a recent internationally funded attempt to improve water supply in Dar es Salaam and the ways in which residents appropriate this intervention and the technologies it provides.

Ordering devices

The most obvious components of the expanded water distribution network of Dar es Salaam are plastic pipes and water meters (fig 1). The light blue pipes connect households in the western outskirts of Dar es Salaam to the main lines of water supply. The main lines in turn connect the north-western part of Dar es Salaam to the Ruvu River that drains into the Indian Ocean some 70 km north of the city.

The water meters serve for the exact measurement of the amount of water that flows through the pipes at every household. Based on these meters, the utility, the Dar es Salaam Water and Sewerage Company (DAWASCO), is to prepare bills, which the customers have to pay within the time specified in the Waterworks Ordinance. If customers fail to do so, supply is discontinued until arrears are cleared (DAWASA 2000). The payment can be done through bank transactions, or through m-pesa, a tool, which allows customers to pay their bills directly through the mobile

Fig. 1: water meter

phone (fig. 2). M-pesa was introduced by Vodafone in the neighbouring country Kenya in 2007. It targets the "un-banked" as in Kenya, like in Tanzania, many people do not have, or do not want a bank account. Entrepreneurs in the sector regard this innovation in telecommunication as a potential means to solve the water and sanitation crisis in African cities (cf. e.g. Hughes and Lonie 2007).

Fig. 2: m-pesa promotion in Kimara Mwisho

Apart from arranging these technical objects, government offices and state agencies have formulated legislative documents, such as the aforementioned Waterworks Ordinance, which serve to make water supply in Dar es Salaam governable by public authorities. Legal documents stipulate the cost of water as well as payment procedures; responsibilities of the different actors and the set-up of the public-public partnership between the asset holder (Dar es Salaam Water and Sewerage Authority, DAWASA) and the utility; and sanctions in case of non-adherence to legal rules. More specifically to the recent expansion of the network, the authority has designed a map. The map illustrates the location of planned and existing pipes, as far as formally known to the authority. In fact, a large share of the pipes actually existing in Dar es Salaam is not officially known to the utility or the authority as actors within and outside these bodies engage in informal network connections of households (Smiley 2013). For staff from German international cooperation agencies, the mapping of the pipe network and the maintenance of respective databases are central ordering practices, they consider them a prerequisite for the functionality of the system as a whole (Interview KfW 2013 / GIZ 2013). Indeed, all these devices and documents facilitate particular ways of reordering the technological system of water supply in Dar es Salaam by formal state agencies: they render possible the exact measurement of water consumption of every connected household, the monitoring of their payments, and they make transparent the location of water pipes. Ultimately, they represent the modern ideal of a networked city, a centrally regulated sociotechnical infrastructure system that provides all urban dwellers with safe drinking water thereby extending the influence of the state over the population, while the population itself passively receives services (Bakker 2013). To date, this ideal remains the reference for formal urban water planning of Dar es Salaam, even though here just like in many other cities of the global South, since colonial times attempts to install such a system have brought about water shortages and highly unequal access to it (Kironde 2007; DAWASA 2008).

Technological drama

Also the recent 64 million USD project of the expansion of the water distribution network has not produced the results planned by the lending agency, the World Bank, or the water authorities. The pipes do not carry enough water and most households in the arid northwestern outskirts of Dar es Salaam get water in irregular intervals up to a duration of once a month, if at all. In a very general sense, this problem can be traced back to the limited amount of drinking water in the city, which is not enough, and the additional loss of the available water on the way from the source to the households. Water experts speak of technical losses, i.e. the leaking of pipes, as well as commercial losses through illegal tapping. In Dar es Salaam, an estimated 50% of the water provided to the city is lost—a high amount as compared to other cities in the region (EWURA 2013). Kimara Mwisho is a sub-ward in north-western Dar es Salaam and a target area of the expansion of water distribution networks. As I visited in 2013 and 2014, some residents showed me around and eagerly explained their situation and their activities to me. They showed me water sputtering from the underground pipes and flowing down the dust roads and workers repairing the pipes along the main roads, the empty household connections as well as the still meter in one woman's front yard (fig 3, 4, 5).

Fig. 3: water draining from the pipes
Fig. 4: disconnected pipe

A central source of discontent are the requests for payment by the DAWASCO. One person explained to me that once he opens the tap, the meter runs even if there is only air in the pipe. In effect, he does not pay for water, but for every time he tests whether there is water in the pipes. The test is necessary, as water in Kimara is "unreliably rationed", i.e. customers do not know in advance whether or not there is water in the pipes. The metering technology fails to monitor water supply the way it is intended to. As the struggle for clean water in Dar es Salaam continues, people in Kimara Mwisho take action. One the one hand, they invest considerable time and money into bringing the pipe network to a functional state. They do so by complaining to the utility and demanding them to repair the pipes or to review the water bills. One resident of Kimara Mwisho presented his bills to me—he had written eight complaint letters but never received an answer from the utility. He explained that he pays the bills including a monthly connection fee of 53,000 TSh even though he does not get water or answers to his letters by the

utility, as he fears that otherwise the utility might uninstall the household connection. Another resident had visited the local branch of the DAWASCO in order to complain about the situation and an employee told her that it was not the utility's fault, because it was the "Chinese project" that went wrong, referring to the Chinese company that won the contract for constructions in the project and to the installation of plastic pipes under dust roads frequented by trucks. These expose the pipes to intense pressure, resulting in permanent leakages. "What shall we do?" she wondered as we inspected the meter in her front yard and a blue pipe protruding from the grass, obviously disconnected from the meter, "Get water from China?" However, despite these setbacks, residents of Kimara Mwisho go to further lengths to make the failing system work as they pool resources to hire labourers who repair the broken pipes while the utility remains passive (fig.6). Still, water is available only sporadically through the household connections. Therefore people do not rely on them alone but additionally purchase water from private vendors. The bustling crowds gathering around a water station at the edge of Kimara suggest that business goes well for vendors. They fill water into 20l jerry cans, which they transport in pushcarts to customers. The water station manager has six water tanks of $5m^3$ directly connected to the formal network. She sells the water at a price of 50–100 TSh / 20l to private vendors who in turn sell it to customers at 300–500 TSh / 20l. The exact price depends on the availability of water and the distance water vendors have to cover on their way from station to households. One resident calculated that she pays roughly 150,000 TSh / month for water including the charges by the utility and the purchase of water from vendors, but excluding the costs for repair works. As a result, according to her, "here we don't only pay double but triple".

(fig. 5: repair works)
(fig. 6: water vending in Kimara Mwisho)

Thus, while the water supply system in Dar es Salaam appropriates innovations in IT and telecommunication, it is the hardware, the persistent lack of water, which brings about the greatest struggles and efforts of adaptation for people in the city.

Dis / ordering water supply

During my visit in Kimara Mwisho, the person who explained the problems around the expanded network to me, as well as the rest of the growing crowd of people around us, had a clear idea who is responsible: the DAWASCO who fails to repair the leaking networks and to measure and bill the consumed water correctly. In this regard, the inhabitants of Kimara Mwisho are in accord with the World Bank and the GIZ (Interviews GIZ 2013 and World Bank 2013). An employee of the DAWASCO and a member of the Ministry of Water (MOW) on the other hand, blame the faulty construction of the Chinese company for the current problems. Also, they see the "illegal tapping", or the "stealing of water" by people not formally connected to the network, as a central reason for the problems of water supply in Dar es Salaam (Interview DAWASA 2013 and Interview MoW 2013). An NGO representative on the other hand frames these connections as an adaptation to the overly bureaucratic process of formal network connection (Interview DPG-Water 2013). The difficulties to control Dar es Salaam's water supply system by state actors become apparent in a statement of a DAWASA engineer who was involved in the project in Kimara:

> *"[…] for years, Kimara has been problematic, people were stealing from transmission lines. In order to prevent this we wanted to lay down a few kilometres of pipes. But everybody wanted a connection. We were doing this for free. But people paid to get connections. We ended up constructing roughly 16,000 connections at the place of the original 12,000–13,000. We connected them in good spirit."*

While the project was to follow a formalized design process informed by engineering calculations according to fixed standards, engineers and customers in fact opened it up to negotiations, which allowed adapting it to emerging requirements. The residents of Kimara have not confined themselves to the role of passive consumers, as prescribed by the modern ideal of a networked city (cf. Graham / Marvin 2001). Instead, contrasting this ideal, they have taken an active part in the project from the very beginning and in alliance with project officials have continuously shaped process and outcome. The intention of this externally funded project, to make water supply centrally governable by means of a new pipe network and metering system according to formal standards, instantly failed while residents achieved to connect to the network through transactions with project officials and engineers that were unforeseen by formal project planning. These observations illustrate the "obduracy" of water supply in Dar es Salaam and related practices of users, vendors, engineers and authorities, who appropriate water distribution, metering and mapping technologies in particular ways (Hommels 2005). While this appropriation is demanding for all actors involved in the project, it is particularly the residents in Kimara, who make enormous efforts to overcome the difficulties to bring a modern sociotechnical infrastructure system to work in their ward through active engagement in project implementation, repair and maintenance.

With this vignette, I do not intend to single out actors or institutions responsible for the partially adverse effects of the recent expansion of the water distribution network in Dar es Salaam, a work that is still in progress. I rather want to give insights into the ways, in which this intervention was supposed to bring order; the ways in which it induced dis / order from the perspectives of people who engage in and shape water supply in the sub-ward in different ways; and how people make these processes of dis / ordering plausible as they deal with the precarious lack of drinking water in the city.

All pictures by the author

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4 Technology transfer or re-education measure? An insight into a climate change adaptation project in the Northern Ethiopian Highlands

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In Ethiopia's current development strategy—the *Growth and Transformation Plan* (2010)—climate change is depicted as a threat to the country's survival. Since the United Nations Climate Conference in 2009, several efforts have been made to push the topic forward. In 2011, the Government of Ethiopia presented its ambitious strategy to combat climate change, a government programme coined *Climate Resilient Green Economy Strategy* (2011). In this document, the introduction of new technologies is envisioned as a suitable and necessary measure in the fight against climate change. While I conducted fieldwork in Ethiopia, several programmes and projects were initiated, often generating a context of technology transfer. One of these programmes is the UNDP-African Adaptation Programme, which had its main implementation period between 2010 and 2012. In the context of this programme, several so-called demonstration projects were implemented in different parts of Ethiopia. All of them had the main objective to introduce new technologies to areas and people that were imagined to be in need of these new measures. One example for such a technology transfer is the *Bati Biofuel Demonstration Project*, which was conducted in the Northern part of the country, in a district called Bati located in the Ethiopian Highlands (2013). In the focus of the project is Jatrofa, an endemically growing plant and tree in Ethiopia. Within the time span of this demonstration project, two main objectives were pursued: 1) making the population understand different beneficial ways of using Jatrofa, for example as a plant which prevents soil erosion and 2) construct a factory where the production of biofuel from Jatrofa-seeds takes place and which would offer an opportunity to sell the seeds. During the implementation period of the *Bati Biofuel project* a movie was produced. The movie was commissioned by the donors and implementing institutions of the project, amongst others UNDP, the World Food Programme and the Environmental Protection Authority of Ethiopia. Zeleman Production, an Ethiopian-based film production company, produced the movie. It is titled *Jatrofa: Green and Sustainable Solution in Mitigating Climate Change*[1]. The movie resembles an advertisement of the project and its activities as the overall content—first and foremost statements—are consistently positive. Interview-passages of different actors which were involved in the project planning and implementation[2] as well as some farmers of the villages located in the Bati district are captured. A speaker frames the plot of the movie and connects the different contributions of the interviewed persons. The scenes are dominated by images of the Bati district: some show degraded and dry soils and others show parts of the community-land where Jatrofa is growing. The speaker´s voice as well as the

1 The movie can be accessed using the following link: www.youtube.com/watch?v=unwlcKR4gNM.

2 These actors are for example a Climate Change Specialist working for UNDP, the responsible expert for the demonstration projects of the African Adaptation Programme within the Environmental Protection Authority, a district expert working in Bati as well as several other involved people.

images of the Bati district are accompanied by melodies which evoke the sense that the project is dealing with nothing less than saving the endangered landscapes with its unique flora and fauna and its inhabitants who suffer from soil degradation and food shortage.

The film gives a fruitful insight into some of the contemporary debates about climate change in Ethiopia. Already in the beginning of the movie, specific narratives concerning the environment and environmental destruction in Ethiopia emerge. One of these narratives is that traditional agricultural practices are depicted as being backward and detrimental to the natural resources of the country. The speaker mentions that "traditional agricultural practices are still widespread", indicating simultaneously that the depletion of the vegetation cover has negatively affected the area. This hint at the role of practices and knowledge of the farming communities in Ethiopia and their influence on environmental degradation is a narrative which has been told in Ethiopia the latest since the 1980ies (Hoben 1996). Now, in the context of combating climate change, this narrative seems to become still stronger. Having interviewed many government officials at national and regional level, one important result was that many believe that the communities have to learn "what climate change is" and how the farmers should properly deal with its effects and implications. A second element of this narrative, which also becomes visible in the movie, assumes that scientific and strategic knowledge — and technologies — are necessary to change this detrimental situation. In this context, the project is seen as a suitable way of raising awareness amongst the population so that they can understand the benefits of using new technologies, in this case using the Jatrofa seeds for biofuel production and the growing plant as a measure to combat soil erosion. Another line of reasoning in the film is that the communities — after having participated in trainings and other awareness-raising measures — are and also should be thankful for the new knowledge that they obtained through the project. Adding to this is the depiction of the communities as being the owners of the project. The question of project *ownership* and the aspect of community participation in decision-making processes concerning the project activities are strongly emphasized in the movie. This topic is also not new within debates about environmental governance in Ethiopia. Hoben (1996) as well as Keeley and Scoones (2000) hint at the emergence of a participatory approach within environmental governance which approximately appeared in the beginning of the 1990s with the change of regime in Ethiopia. The effectiveness and realization of community participation has been debated and challenged by several authors (e.g. Pausewang 2002). The narrative about community involvement is quite visible in the context of climate change debates in Ethiopia, either in official strategy papers on climate change[3] or in statements made by interviewed governmental experts. It is also observable in the movie about the *Bati Biofuel Project*.

Against the background of having done research on climate change adaptation and mitigation in Ethiopia, the here presented movie does not necessarily appear as a description of a climate change adaptation project. Rather, it resembles an intervention which tries to change farmers´ — so considered — detrimental behaviour with regard to their environment, thus re-ordering patterns of agricultural life and also re-educating farmers in the context of agricultural production. In the film, the awareness-raising elements of the project are represented as if they successfully shifted the attitudes of farmers. They are described as having lost their fears towards the Jatrofa-plant, since this was traditionally looked at rather sceptically. Through the project, these fears turned into fascination and eagerness to use the plant. Besides — as depicted

3 See for example the Vision Statement for a Climate Resilient Green Economy (Federal Democratic Republic of Ethiopia 2011b).

in the movie — the educational components of the project lead to a greater responsibility of the farmers towards their environment. It is disputable whether this responsibility was really produced through the project activities.

To sum up, the movie builds clearly upon older environmental narratives by evoking specific images. First, the local population is portrayed as poor and backward destroyers of the environment that are in need of support, knowledge and — as is in the focus of the film — new *technologies* to make their lives better. Although the participatory approach of the project is stressed, the hidden message of the film is that the *better* knowledge and technologies come from other countries and organizations, in this case Japan and UN-organizations, which fund the project. The offering of new technologies is thus sold as the promise for *the* pathway to a sustainable future.

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Comment on the previous four vignettes

5 Technological happenings. Notes on temporality and technologies as sites of expectation

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More or less implicitly, the social scientific study of technology has for a long time been interested in the temporal aspects of technologies. Early comparative approaches in the wider field of cultural and social theory saw them as part of general historical transformations, taking the existence of specific technologies, such as irrigation systems or electricity, as indicators of divergent stages in the evolutionary progress of humankind. In this context, technologies were seen to mirror a people's cultural accomplishments, as well as functioning as catalysts for socio-cultural change. Yet, as is well known, the teleological and normative premises of these approaches, which later on also influenced modernization theory and development policies, came under severe criticism when a new generation of social scientists, such as Thomas Hughes (1983), started to question the determinism and temporal unilinearity implied in many earlier analyses of technological 'innovation' and emphasized instead the unpredictability and contingency that characterizes these processes. At around the same time, scholars in the newly emerging discipline of Science and Technology Studies (STS) developed an interest in the social practices involved when constructing and making use of technologies (see, for example, Bijker, Hughes and Pinch 1989). For those subscribing to prominent approaches in Science and Technology Studies, such as Actor-Network Theory (ANT) and social constructivist perspectives (SCOT), this means conceptualizing technologies *not* as something that is located 'outside' of sociality, but as an integral and indispensable component of making sociality possible. In other words, as has been proposed most prominently by Bruno Latour (for example, Latour 2005), this analytical perspective treats technology as being embedded in sociality, just as 'the social' is considered to be inscribed in 'the technological' (cf. Akrich 1994; Winner 1980). In this way, technologies can be said to be characterized by at least two temporalities, both of which influence each other: on the one hand, they are part and parcel of the temporal flow of social practices and interactions; on the other hand, technologies can be said to have their own agentive temporality, as in the case of the refrigerator which, in a manner of speaking, works like a 'time-machine' by slowing down the process of biological decomposition so that the intervals between purchasing new articles of food can be reduced.

In the present commentary on the first set of four ethnographic vignettes contained in this working paper, I would like to highlight an additional aspect of the temporality of technologies which, in my understanding, has not yet been taken account of sufficiently up until now. In making this aspect a topic of discussion, I take inspiration from William Sewell's recent

call for an 'eventful sociology' which, according to him, could benefit from the long-standing expertise of historians in analytically dealing with temporality:

> *'The conceptual vehicle by means of which historians construct or analyze the contingency and fatefulness of social life is the event. Historians see the flow of social life as being punctuated by significant happenings, by complexes of social action that somehow change the course of history' (Sewell 2005, 8; italics added).*

Of course, social and cultural anthropologists have also contributed to this discussion about the eventfulness of life, not only by studying public events in the form of more or less conventionalized public performances (e.g. Handelman 1998), but also by focussing on what happens when something unexpected breaks into the everyday, as exemplified by Edwin Ardener's investigations into 'periods of singularity' (Ardener 1989), Veena Das' discussion of 'critical events' (Das 1995) and the notion of 'rupture' that in recent years has gained some prominence in the anthropology of Christianity (e.g. Meyer 1998; Robbins 2003, 2007). But Sewell also makes another terminological differentiation which can be employed productively in anthropological analyses of the temporality of technologies, namely the distinction between 'happenings' and 'events': 'Most happenings … reproduce social and cultural structures without significant changes … Events may be defined as that relatively rare subclass of happenings that significantly transforms structures' (Sewell 2005, 100).

In social and cultural anthropology, technological *events* in the sense above have rarely been made the object of study, one of the few exceptions being Adriana Petryna's *Life Exposed: Biological Citizens after Chernobyl* (2002). In the field of Science and Technology Studies, on the other hand, Sewell's distinction between 'the flow of social life' and 'happenings' resonates with Susan Leigh Star's pioneering work on infrastructure because, according to her widely cited phrase, the 'normally invisible quality of working infrastructure becomes visible when it breaks' (Star 1999, 382; see also Larkin 2013). Thus, while normally operating as a tacit foundation of sociality, for most people infrastructure jumps into awareness through happenings in the form of breakdowns, unwelcome as they may well be.

In what follows, I argue that two conceptual notions, newly introduced here, can clarify the way in which technologies modulate the flow of social life, namely 'technological happening' and 'site of expectations'. I do so by suggesting that this modulation of social life is not only due to the fact that technologies are inherently relational and that they form associations with other human and non-human actants. On certain occasions they also interrupt the flow of social life, as a consequence creating the necessity for the social actors involved to reflect on the situation (i. e., the technological happening) and to creatively re-adjust their self-understandings, relations with others and visions of the future. As we will see, these interruptions can be deliberately produced and routinised, and may thus be expectable; but they can also be characterized by a suddenness that unexpectedly breaks into everyday routines. At the same time, technologies can be 'sites of expectations', that is, localized material entities with a potential for agency, anticipated by those dealing with them, which may interrupt the flow of social life in the future in the form of what I have called technological happening.

Kathrin Heitz Tokpa's case of the border post between the Republic of Côte d'Ivoire and Burkina Faso is concerned with a passage point that connects *and* interrupts (cf. Simmel 1994). The material technology employed to intercept the traffic flow from the one side of the border to the other — that is, the rope 'barring' the dust road — does not in the least represent a fortification, but is of a rather symbolic nature. At the same time, since this specific border tech-

nology has a fixed location, for those planning to cross the border there is a certain predictability regarding what kind of interactions will take place there. In the form of technological happenings, encounters at the border post usually culminate in the requirement to produce documentary evidence for one's personal identity, and in the Côte d'Ivoirian case also for the ownership of one's means of transport, such as motorbikes.

Similarly, Jude Kagaro's case of the Ugandan police's newly introduced Anti-Drunk-Driving Operations revolves around the verification of a specific physiological aspect of the drivers' identity at the time of testing, namely the drivers' blood alcohol content (BAC). Yet by contrast to Heitz's spatially fixed border post, in order to take offenders by surprise, police forces in Uganda do not always use the same location when conducting these operations. That they are fairly successful in doing so is vividly illustrated by the photographs in Kagaro's vignette which depict the drivers' appalled and shamefaced reactions to being tested. In that way, use of the breathalysers can be said to prompt an unexpected technological happening for suspected drivers that interrupts their flow of social life with sometimes quite severe consequences.

While the first two vignettes relate to cases where technologies are intentionally employed by specific groups of social actors to induce technological happenings, Sophie Schramm's analysis of the water distribution network in Dar es Salaam resonates with Susan Leigh Star's argument, mentioned above, that infrastructure tends to become visible only when it breaks down, thus unleashing a technological happening nobody had intended. One of the photographs in Schramm's vignette depicts puddles of water in the middle of a mud road, indicating that there is water spilling out underground from a broken waterpipe. This is an example of a technological happening 'surfacing' in the literal sense of the word, and in doing so demanding people's attention and often giving rise to creative acts of adaptation. What is more, Schramm's ethnographic vignette also makes it clear that technologies can be sites of expectation: since water distribution in Dar es Salaam is highly unreliable due to leaking pipes, the general water shortage in this region and irregularities in how the available water resources are allocated by the relevant municipal authorities, one can never be sure whether there is actually water in a given waterpipe. All the same, the technology of the pipes does represent *the* site where people expect to find water, checking every now and then whether that is the case or not.

In the latter regard, Schramm's case bears a similarity to what Julia Willers shows in relation to a climate change adaptation programme in present-day Ethiopia. At its core, this programme consists in the establishment of technological enclaves (cf. Ferguson 2006), so-called 'demonstration projects', where newly introduced technologies are meant to trigger economic and socio-cultural transformations in the wider population. Being envisioned as a climate-friendly technological role model, this programme aims at persuading local people to abandon their previous ('traditional') agricultural practices, which are said to have a negative impact on the climate. As such, the Ethiopian demonstration projects can be understood as the deliberate construction of technological sites of expectation by firstly emphasizing innovation and secondly holding out the prospect of socio-economic prosperity through further technological happenings in the future. In view of this finding, it is no wonder that development aid projects throughout the world have focused their efforts time and again on the establishment of technological sites of expectation, not only in order to come up with a thoroughly systematized 'ideal case' of the 'right' use of technologies, but also to demonstrate publicly that new technologies can make new things happen.

To conclude, I have argued that William Sewell's notion of the happening and Susan Leigh Star's work on infrastructure can help us gain new and interesting insights into the temporality

of technologies. The first two vignettes show by way of empirical examples how technologies, namely ropes at border posts and breathalysers, can be employed deliberately to interrupt the flow of social life of other people, who, by means of these technologies, are authoritatively forced to produce evidence for (the physiological condition of) their personal identity. By contrast, the third vignette on the dysfunctions of a water distribution network highlights the fact that not all technological happenings are deliberately induced. At the same time, no less than in the other ethnographic cases, the unsolicited and unwanted breakdown of technologies can trigger and catalyse a reorganization of social life for the actors involved. Finally, as became clear in the last vignette, the knowledge that technologies can afford opportunities for reorganizing society can lead to the construction of socio-spatially bound enclaves, for example, 'demonstration projects', within which certain technological happenings are supposed to take place which, in turn, are hoped to have a bearing on the world outside the enclave. It is in the latter sense that technologies can be said to be sites of expectations, that is, material and spatially bounded entities characterized by a potential for non-human agency which, in the perception of human actants, might with some probability have an influence on the flow of social life by temporarily interrupting it in the form of agentive technological happenings.

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IV Second set of vignettes and comment

6 ON THE BEAT
Technologies of Policing — Patrolling with the Police in Uganda

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Street setting in front of a police station somewhere in Uganda (picture SB).

Police work is paperwork and fieldwork. While the entire paperwork is done in the stations, administrative offices, police school, and trainings centers, behind desks and counters, at floors and benches, fieldwork is done along streets, in rough terrains and along tarmac roads, on top of hills, in forests and on lakes, in shops, office buildings, universities, private houses or village squares. Paradoxically, police work is very similar to ethnographic fieldwork. The ethnographer, like the police officer, follows her subjects of study into their offices, or houses, along streets, and rivers, forests or villages. The background of this vignette is exactly this — following the Ugandan police in their field, namely the streets of Kampala. More precisely, I will give a thick description of a night patrol[1]. In what follows, thick descriptions — in italics — and first attempts of reflection of the empirical material alternate. Doing this, my reflections seek to illustrate three main features of police technologies: order, violence, and education.

Kampala. I am on my way to the police station. Tonight I want to join the mobile team and attend the night patrol in the district. I arrive at the station. The district police commander (DPC) intro-

1 This text will not describe the whole night patrol, but parts of it.

duces me to the night patrol team: three men in uniform all armed with the usual AK-47 and black truncheons. The DPC briefs the patrol team in front of the station at the place where the police parade in the morning. He asks who of the three officers know the area. When one raises his hand, the DPC explains him the route we have to take. I ask the DPC about the need for night patrols. He explains to me that the police have to patrol for "three reasons. First, visibility, when we go on patrol, people see us, thieves see us. The second reason is safety. People feel safe when they see the police on the street. And the last reason is education. We want to talk to people, explain that they are doing wrong".

This short beginning of the vignette demonstrates already one important fact: the Ugandan police patrol. This does not seem to be a surprising result in regard to universal ideas and practices of policing (see e.g. work on police patrols worldwide Ericson 1982, Holdaway 1983, Bittner 1990, Young 1991, Marks / Flemming 2004, Hornberger 2007). However, against the background that little is known about the everyday practices of the police in Uganda, it is significant to know that the Ugandan police do what police do worldwide: they leave the police station in order to try to monitor a specific geographic area — day and night. Moreover, one feature of police becomes clear: education. The Ugandan police themselves describe education as an objective of their work. The DPC explains that the Ugandan police patrol because "we want to talk to people, explain that they are doing wrong" and he explicitly uses the term "education". Ugandan police officers see the police as guardian of law and order. Following this logic, the police understand their work not least as educational work. During patrol operations policemen turn this self-description into practice while they differentiate between good and bad behaviour of people.

The patrol starts, we leave the station. We walk down the main street, more side by side than in a correct line. We walk very slowly. All officers are male. All are uniformed and equipped with AK-47. The first destination of our patrol is a police post at the entrance to a slum, a march of about 20 minutes from the main police station. The police post is a timbered wooden booth. We enter the booth, a small room of about six square meters, lit by a candle. Two officers sit at a small wooden table. The patrol officers greet them and ask about the situation. Everything is calm. After a short chat the chief officer of our patrol registers us in the station diary of the post and we continue our patrol. Now we are joined by one of the officers of the police post who walks ahead. He knows the area. We walk along a small rill with grey water and cross a waste dump. The roads are small paths, all untarmaced. While we are walking, the officers explain to me that all women we would meet tonight must be prostitutes because prostitution would be the only purpose for solitary women to leave their homes at night.

After a while and with no incidents, we arrive at the office of the local council (LC). It is an approximately 15 square meters room with one empty desk in the middle of the room. The chairman is sitting at his desk, with the defense officer and some other members of the LC are sitting in a semi circle. We sit for a while, the police and the LCs talk about the situation tonight. Everything is calm. The LC defense officer joins us when we leave the LC office. Now he is the one who knows the area best and so he takes the lead of our group until the end of the night patrol. We continue our way through alleys and small paths in silence and at good pace. The alleys are muddy, no lighting except of the two torches the officers carry.

Interestingly, it is not the police who know the area best they patrol and where they are expected to keep law and order. Rather, it is members of the LCs. What becomes clear is that the police in

Uganda heavily depend on the support of LCs, otherwise they would not even be able to walk their patrol since in many cases they do not even know the area they have to control.

We check all the bars we pass, on the lookout for them. In most cases, not the officers, but members of the LC enter the bar while the policemen wait outside. During one of these checks, the LC stays more than ten minutes inside. Outside, the policemen start to wonder and finally three policemen enter the bar. After some minutes, they come out with a young man of 18 years at the most. The common procedure starts: torch light in his face and the control of the eyes to find any indications of drug use. This time the officers seem confident and handcuff the young man. "Let's go!"

With him in our tow we continue the patrol. The members of the LCs are ahead, they walk at a good pace and determined. The police follow them. We pass a wooden shack near a dump. After a short discussion between LC and the officers, we enter the shack and find five men sitting around a table. A big plastic bag full of herbs lies on the table and demonstrates what the men are doing: they are chewing khat. Asking, "Don't you know that is it forbidden?" one officer starts to explain to the men the negative consequences of their drug use.

When the Ugandan police patrol, they have an objective. It seems as if the police construct a kind of danger to the society emanating from certain groups. Sitting in a circle and playing cards arouses immediate suspicion. Whenever policemen encounter young men, the officers stop, illuminate their faces and eyes with the torches to check if they had been smoking. Gambling and smoking are one of the main offences the patrol officers target. The officers explained to me that smoking causes madness so that people who smoke also burgle houses and assault people. Against this background, young men in groups are suspicious, as are solitary women at night. Maybe the police have to be geared to such a pattern because the officers know that they cannot control the whole society. It then serves to rescue the illusion that they are able to ensure social order.

That the police do not hesitate to turn their mandate into violent practice demonstrates another short empirical description. It is about the arrest of another suspect, but this time, the attempt to arrest was complicated and gave rise to a row between officers, the suspect and other visitors in front of the bar.

The LCs take a suspected man from a bar. He has a bottle of beer in his hand. A row occurs, someone shouts. One of the officers pull out his truncheon, he is about to beat the suspect. The officer in charge shouts "No, don't beat him, don't beat him!". The suspected man throws his bottle and drops his joint or cigarette. Immediately the head of the patrol instructs an officer to pick it from the ground "for evidence". Someone wants to give him back the bottle "Don't give him the bottle, he will beat someone!" The row calms down. The officer in charge asks a policeman "Do you have the evidence?" The man opens his hands and shows three butts. The police handcuff the suspected man together with the young man. "Let's go, let's go!" pushes the officer in charge. We leave the dark backyard.

Policing is violent, at least in some cases, and violence is another feature of police patrols. Clearly it is an act of violence to threaten someone with a truncheon. In the empirical example it was only the officer in charge of the patrol who intervened in the moment another officers was about to use physical violence against a suspect. The officer who pulled out his truncheon was obviously convinced to behave in the right manner. Other violent acts of the Ugandan police are the controls of young men the police team encountered. They stopped them, took their heads,

and illuminated their faces and eyes in order to check if they consumed drugs. Although this action does not seem to be brutal, these controls are acts of arbitrary physical interventions.

This vignette only provides a short insight into the night patrol of the Ugandan police. However, it gives detailed insights into some nightly policing routines in Uganda. I will finish this short piece with some final words on order. Order is the main issue here, even though in very different forms. First of all, patrolling is an act of ordering itself. Even if not strict, the order of a patrol is usually walking behind each other in a line. The person who knows the area best, independent from the police rank, walks ahead. The others follow. Thus, the patrol itself has an ordered function for the police officers and their (walking) behaviour. The order of a patrol is also organized through uniforms and equipment. Patrol teams usually wear dark blue or blue camouflage uniforms and, depending on the weather rain jacket or coats, and are equipped with AK-47s, truncheons, and sometimes handcuffs. Patrol teams can be easily identified not only through their walking behaviour, but also their equipment. Another aspect of order is the order of the terrain. Patrols also depend on the terrain. Terrains give the order. Terrains command. The police have to follow a specific geography, they cross areas on existing paths and alleys, they go to clubs and neighbourhoods, they have to follow the given structure of the terrain. And they have to know it. According to my observation, the police do not patrol areas, which they do not know. The officer who knows the area best tackles the route. In most cases it is not the police, but the members of the LC who know the neighbourhood in detail. They do not only know the environment, but also people living there. Since policing depends on detailed knowledge about society, police work heavily depends on the support from the LCs. Otherwise, the patrol officers would be lost in the area many times, also very literally. On the other side, it is the police themselves, who structure the area they patrol, in particular because they identify "black spots", places, which they assume need to be patrolled more than other places. The police also structure the area along people. Young men are suspected to consume drugs and commit crimes, men who sit together are suspected to gamble. Do the police produce order through their patrols? This is hard to tell. Empirically there is no evidence that the presence of patrol teams reduce crime rates. One cannot know what would have been happen if the police would not have been patrolling. The police however clearly believe in the preventive argument of patrols and it seems to be right what David Silverman observes, "social order depends upon the co-operative acts of men in sustaining a particular version of the truth" (Silverman 1970, 134).

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7 Blood, Sweat and Tests Institutionalization of 'non-adherence' and circulation of uncertainties in malaria control efforts in Uganda

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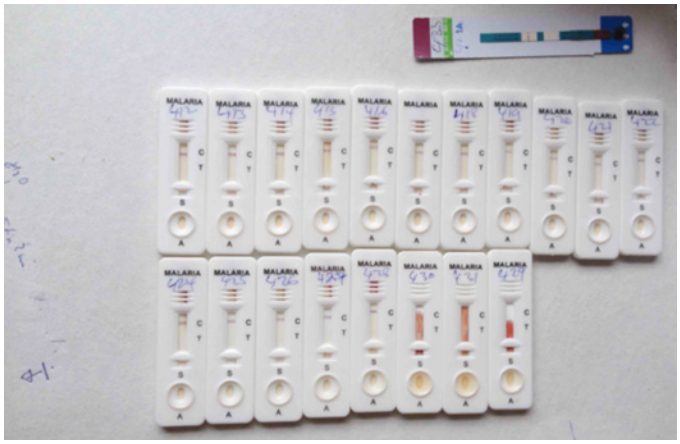

The following example deals with the question of how to best describe and conceptualize deviations from formal user-scripts of technologies and what the consequences are for the institutionalisation of a rational drug use. In medical language deviations from standard use of technologies are called non-adherence. In global health it is assumed that non-adherence to antimalarial drugs is best tackled by changing diagnostic capacities mainly through the introduction of *Rapid Diagnostic Tests* or RDTs. In what follows, I will first give a brief overview of the therapeutic context and how standardisation of diagnosis is assumed to rationalize the use of drugs and related treatment practices in Uganda. Subsequently, I will present a brief empirical situation, which will finally be linked to the above-mentioned conceptual issues. On this basis, I will suggest that drawing from pragmatist sociology can help illuminate what kind of ordering is involved in these standardizing interventions.

The context of self-treatment

In what has been coined 'self-diagnosis' and 'self-treatment' of fever, aims to capture people's first response to cope with their ailments before attending a public health facility where treatment is free of charge (McCombie 2002). The treatment can be 'traditional medicine' (e.g. herbs) or western drugs but in most of the cases it is a mixture of both. In the case of fever / malaria there seem to be a myriad of ways, drugs and practices fold into each other. One common practice of people suffering from fever is the use of drugs that are 'left-overs' or have been saved from the last regime of e.g. anti-malarial drugs. This 'saving' of drugs is in itself a complex entanglement of economic considerations and bodily reactions in endemic settings. While this type of saving of antimalarials is mainly carried out with drugs from health centers, drugs also play a role as commodities. Buying drugs in formally or informally operated drug shops is a common way of treating fevers associated with malaria. Ethnographic case studies have

referred to many different motivations underlying people's patterns to start therapy in these settings (Adome et al. 1996; Folley 2010). The saying 'It cures what is in your pocket' points to the widespread practice that instead of spending time and money for transport to the health center, people often buy *only half* of the formally required / recommended dosage: A practice, which again saves money. Form a biomedical perspective, this type of therapeutic action is considered a malpractice with potentially adverse consequences for the individual (e.g. delaying treatment of other diseases like pneumonia) as well for populations / the public as this type of partial taking increases the risk of drug resistance.

Introduction of Rapid Diagnostic Tests

Rational use of drugs can be perceived as global standard that needs other social and technical standards in order to become institutionalized. These standards not only help to stabilize rational *taking* of drugs and *adhering* to treatment regimes but should also inform decisions about the taking of the *right* drugs.

In biomedical / public health reasoning, identifying parasites in the blood of an individual *before* prescribing or taking anti-malarial drugs is assumed to not only save public health budgets but is also considered to lower *or* delay the risk of drug resistant strains of parasites. Performing RDTs before prescribing drugs should align actors to a binary mode of action: When the RDT is positive, antimalarial drugs should be given — when the RDT is negative, no antimalarials *should* be prescribed. At this point it is important to recognize that for the case of Uganda it is estimated that in up to 50% of the *negative* RDTs antimalarials are *still* prescribed. On the contrary, for positive RDTs we can assume that up to 95% adherence exists making the following example rather an exceptional case.

Testing with Gad

RDTs have been introduced in settings where until four years ago malaria was diagnosed clinically. *Clinical diagnosis* of malaria involves history taking of the patients and ideally the use of a thermometer in order to determine presence of fever beyond face-to-face impression.

Now, the story goes like this: I was with Gad, one of the oldest and most experienced Health Worker in Mukono District. It was a rather quiet afternoon with only a few patients waiting when Gad called for "the next" and a middle-aged mother with her child entered the examination room. After filling in required records of name, sex, age, and sub-county, he eventually asked what the problem was. The mother described that her son had fever for the last couple of days and was also vomiting and not eating well. To me the kid looked comparatively fine and vivid chewing on a piece of cassava. While the mother was talking, Gad — as he usually did — interrupted his writing down of the symptoms and complaints and reached out for the kid in order to check the temperature. Due to a lack of a thermometer he used the back of his hand, which he briefly put in the child's armpit. Being the only one working this afternoon, he took the mother into the next room in order to do a "rapid" — the local name for a Rapid Diagnostic Test.

While performing the test I asked him what he was suspecting. As his hand couldn't detect any fever he doubted that it was malaria but he quickly added, "I can't rely only on my hand. You know it's just my hand!" 15 min later when he reached out to collect the test result, it

was clearly positive indicating that the child had antibodies in the blood. He returned to the examination room and started to ask the mother some more questions — mainly if she had given the kid any antimalarials already. This was the case. As it was a Monday afternoon Gad had suspected this already as most of the public health centres are closed during the weekend. After further enquiry on what kind of drugs and how many, he found out that the mother had bought some Coartem in a private drug shop on Saturday and given the child almost the full dosage of antimalarials. It seemed to me that Gad was struggling with his decision and eventually turned to me in order to tell me how complex the situation was. He looked at the child and once more used his hand to check the temperature. Fearing overtreatment and potential drug resistance, he eventually voted against the positive test result — which recommended to give antimalarials — and instead prescribed some antibiotics: "Against the cough" as he explained to me.

In order to better understand the here given example we need to briefly open the "black-box" of the RDTs and outline some of the inscribed scientific principles. As antigen-antibody reaction, one can say RDTs only *indirectly* identify parasites in the blood. This is potentially problematic as antibodies against falciparum parasites can persist in the body up to three weeks after the disease was identified *and* treated adequately. The test can show positive even if the person is not or no longer suffering from malaria (but maybe another disease): an effect also referred to as *'false positive'*. This is what Gad also was aware of now facing the dilemma of two types of evidence, which strongly depend upon and contradict each other in their consequences.

Interpretation

How can we make sense of a situation in which apparently *different modes of knowing* a disease produce conflicting *truth claims* that are not easily aligned? What is ultimately at stake are different versions of the disease: *It seems the disease is treated but is still present!* Due to the lack of a microscope both types of evidence underlying the disease conceptions were out of reach for Gad: First, the symptoms that initialized the mother's actions had already vanished. Secondly, being the in-charge of a Health Center II, Gad wasn't equipped with any other technology e.g. a microscope that could help him 'double check' — i. e. to verify or falsify the RDT result. For Gad, the RDT did two things: First, it contradicted his hand and opened a realm of uncertainty about the status of malaria. Secondly, however, by showing positive, the RDT legitimized the mother's action *ex post* — meaning if the mother had given antimalarials she'd done the right thing!

If Gad would in this instance believe the RDT, he would potentially overdose with antimalarials and not only risk — in his reasoning — drug resistance but also miss out to treat another harmful disease (e.g. pneumonia). In turn, if he relies on the mother's narrative, he would implicitly contradict the RDT result which actually says "parasites *and* by definition malaria is present". The example shows that no policy regulation or formal guidance exists that could direct action within moments of uncertainty. Gad's final decision to trust the mother's narrative — and the involved practice of self-treatment — can be read as a substitution for the inability to double check with the microscope and the need to still achieve the biomedical rational of avoiding drug resistance. In following, it will be shown how the substitution can be described as a series of testing practices (German: *Prüfungspraktiken*).

If we borrow from pragmatist sociology, we can assume that the delegation of tasks to a new actor — in this case a technology — enacts a series of tests (French: épreuves or German: *Prüfungen*). First and foremost, the users of the technology are tested in their capacities to adhere to new modes of ordering and handling of therapeutic situations. But the delegation

of tasks and the replacement of practices also produce new uncertainties, which in pragmatist accounts triggers critical engagement of actors with the new situations. As a way of engaging and eventually reducing uncertainty, actors start to test themselves. They put the technology, but also other humans (or their practices), to a test. How does this exactly apply to the example? If it is assumed that RDTs are a better technology that should replace other less certain ways of knowing the disease, the attention is drawn once again to Gad's hand. The positive RDT *tests* Gad's hand in its capacity to detect fever / malaria and ultimately contradicts it. But what is also seen is how the hand is connected to the mother's narrative and in return *tests* the RDTs. Instead of being simply replaced, his hand and the knowledge travel between competing or even contradicting disease concepts. Gad himself is put to a test in which he has to decide between two forms of evidence. This opens up new questions of what kind of choice health workers have and what kinds of competencies are required?

RDTs were introduced under the assumption that they would help Health Workers (and patients) in their decision-making concerning who gets antimalarials and who doesn't. But the example shows that RDTs don't serve that much as an objective reference, which might help legitimize therapeutic action. Instead RDTs become embroiled in various practices of coping with uncertainties.

Gad's fear of facilitating drug resistance in combination with non-adherence to a potentially false-positive RDT result can be seen as mode of rendering abstract biomedical knowledge productive in local settings. His critical engagement with the situation draws its legitimacy mainly from referring to this knowledge and by that modifies the role of the RDTs. RDTs are used to legitimize (potentially irrational) therapeutic action outside the public health care structure but also prevent over-prescription inside the formal system. But as every translation comes with a price so does the here given example: Gad not only tests antibiotics to stand in for his decision of non-adherence to RDTs but by doing that he implicitly puts the mother to a test whether she has told him right story.

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8 Roaring lorries: how sound shapes driving in the desert

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Sudan accommodates a dual road regime, in which paved roads serve urban centres in parallel with the trans-rural desert roads. Paved roads aim to adhere to international standards on road construction and road safety. The latter are formed of a network of paths stretching through the savannah and semi desert where lorry drivers navigate their vehicles to transport merchandise and passengers. The majority of lorries present on hinterland roads are locally modified and adapted to serve the specificity of the journey and the lack of paved roads. The technology is adapted to the needs and demand of its environment. One of the main purposes of these modifications is to enhance the capacity of the vehicles to carry more freight and to cover rough terrains. Most of the lorries have been designed and imported as dumper-trucks with a moving open-box bed. To increase their capacity, blacksmiths and other craftsmen apply systematic procedures to remove specific parts, such as the box bed, or extend and reinforce the chassis. The lorry constitutes the central part of a bigger community of *ahl al-lawâri* (Arabic for the people of the lorry). The term refers to the community of professionals who are engaged in all aspects of the lorry business, such as drivers, their crew, craftsmen, forwarding agents and lorry owners. For this vignette the focus will be on the end users of the lorries—the drivers.

The aim of this vignette is to argue that certain levels of interactions can arise between technological devices and users of these devices. The case of lorries and their drivers contributes to this argument through addressing the sensory experience on the lorry and listening in particular as a manifestation of this level of engagement. As direct users of the vehicles, drivers contribute to the meanings ascribed to the lorries, and the process of categorisation, endorsement and devaluation of vehicle's qualities. In other words, the drivers co-define what constitute a good lorry and what does not. Hence, their views on this technology provide a crucial input to how the lorry is put into use. '*Al-suâga ihsas'* (Arabic) for "driving is sensing" and '*al-suâga fann*' (Arabic) meaning "driving is an art" are the underlying explanations of drivers' understandings of what qualities constitute and define reliable technology. During the journey, each part of the vehicle produces certain sounds and contributes thus to a symphonic composition of each lorry. Listening to the lorry becomes central part of the *art of driving*. When in tune with his lorry, the driver can decide and assess the position of the vehicle, the optimal speed, gear and

angle for driving. The final version of the composition is comprised of multiple solo components recognised as specific conduct of the technology.

The central instrument capturing the melody is the engine. To be able to clearly distinguish its performance, drivers and mechanics boost the sound of the engine. In order to do so, a *kauz* is used (*kauz* is Sudanese-Arabic for a metallic cup used for drinking). The *kauz* of the lorry is a metallic cylinder (usually an empty tin can) placed on the top of the engine to emphasize the voice of the engine. The drivers are then better able to hear clearly what the lorry is conveying. For instance, *Tanagit* (Sudanese Arabic for hiccups), refer to the *hiccups* of the engine that occur when the lorry is entering sand dunes. The *hiccups* need to be stopped immediately, just like in the case of humans, as they indicate discomfort. In the case of the lorry, the sounds indicate the urgency to deflate the tires to successfully cross the dune. The gearbox is an interface between the driver and his lorry, conveying the attitudes and temperaments of the driver to the vehicle and regulating its performance. The gearbox is understood as a fragile yet wilful tool that is used to tame the lorry. When entering steep sand dunes, drivers tend to drive in minimum speed to avoid the loss of traction of the wheel that can lead to free rotation and eventually getting stuck in the sand. Listening to the engine becomes vital in such moments and drivers depend on their ears rather than observing the tachometer of the vehicle, skilfully ordering the gearbox with the right gear. Hence, the preinstalled interface such as the tachometer is overtaken with a sensory interface (listening to the engine). Such sensory skills are acquired also repair mechanics; however driver's listening skills are more accustomed to his own vehicles. The skills acquired and applied by lorry drivers sever during operation, diagnostic and repair of their vehicles as a result of the scarcity of technical assistance along the road. An additional, and probably the forthright sound tool is clearly the horn. Positioned at the central piece near the steering wheel the horn is at full disposal of the driver. Entering a village, approaching a coffeehouse, overcoming another vehicle or announcing ones' presence, the horn represents the reliability of the vehicle. The horn can always be relied on; the horn is the celebration of control. As in many other large vehicles in Africa, Asia and South America, horns are adapted to generate different sounds and melodies. Drivers practice to play multi melodic hoots on their horns, usually resembling a popular song or a tune. The horn in this context can be seen as a tool to communicate to the crew as well as the surrounding communities. Here hooting developed into a sonic phenomenon within roadside communities, as an identifier of different brands and models of lorries as well as their drivers. However, despite the rumble of hinterland road lorries, a quieter lorry is becoming an aspiration for drivers. *Al-kaddis* (in Arabic Sudanese means 'the cat'), the model ZS 700 Hino has been referred to as *al-kaddis*. With a modern suspension system, strong engine and a reliable gearbox the need for adapting the engine noise or even the multi-tuned horn vanishes. Another unavoidable sound on the lorry is the music coming from the radio or an attached music player, typically in a form of an mp3 player. With the presence of music shops all over market areas, drivers tend to keep up with new fashionable music by regularly taking their electronic storage memories such as USB sticks or memory cards to the music shops. Music on the lorry is an important element of the interior of the cabin. Drivers refer to the music as relaxing and helping to keep a rhythm to the tedious journey. Nonetheless, during the journey a balance is reached in order to keep the music on while keeping ears alert to the sound of the engine.

To sum up this vignette, technological elements of the lorry namely the locally reinvented user interface originates from the sensory experience during the journey. Drivers of hinterland lorries use different sources of sound to communicate with their vehicles. By doing so they replace pre-installed user interfaces.

Comment on the previous three vignettes

9 Technologies, agency and ordering: reflections on three ethnographies

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As I write these lines in Solwezi, a dusty and bustling town on the Zambian mining frontier, I am surrounded by technologies and the selective order they create. My table, which is slightly higher than the ones I am used to, forces my body to adapt in uncomfortable ways; writing on a laptop encourages a different flow of words than writing by hand; the wall around our compound facilitates creative solitude, but it cannot keep out the howls of the neighbour's dogs at night.

Once I start engaging with these things, or simply tolerate that they surround me and interfere with my social environment, the technologies embodied in them make certain events possible and likely, and render others impossible or improbable. If I want to use them, I have to tolerate that their qualities structure my actions, and that I lend my agency to their effectiveness.

In this sense, technologies order the world and change the way we act upon it. At the same time, the things I use never completely determine what I do with them. In writing a comment, in building a wall or in opening the gate to some people and not to others, I use technologies in my attempts to imprint my own order onto the world.

To some degree, I can choose whether or not to react to them at all. I can, and rather more comfortably, sit on the table instead of at it; I can get new ideas while talking to my neighbour across the wall; I can shut the laptop down and take a stroll through town. I have the choice to ignore technologies and try to either do without them or act against them. I might then be forced to engage with different technologies, but this choice is very often mine to make.

The three vignettes in this working paper offer rich and poignant ethnographic descriptions of the ways people use three very different technologies: police patrolling, rapid diagnostic tests (RDT) and motor lorries. They provide examples for the three variants of the relation between technologies and order I have outlined: technologies structure people's agency; people use technologies to impose order on the world; and people create new order by selectively applying and ignoring certain technologies.

What is a technology?

Rather wisely, none of the three vignettes' authors attempts to define what a technology is or to justify why what they describe actually constitutes a technology. Their choices indeed seem immediately plausible. Each author, however, at some point identifies things or actions which

s/he excludes from the field of technology. RDTs somehow seem to be more of a technology than feeling with the hand; reading the speedometer more of a technology use than listening to the engine noise. We can extract from the vignettes implicit images of what a technology is, images that, as I would argue, underlie much of the literature on technology and order.

Technologies in this typical sense have been *developed or invented* at a certain place and point in time; their development has been *intentional and planned*; in order to use them successfully, you have to follow *non-arbitrary scripts* which are intimately *connected to the technologies' design*; these scripts are never fully developed, but have to *leave room for their adaptation to different situations*; and *their distribution is linked to systems of meaning and knowledge that go beyond the mere technical*—that is to discourses and narratives.

In a nutshell: typical technologies are somehow objectified, and their use is not-yet-habitual. Because of their link to specific objects and their distinctness in relation to everyday agency, they have a dimension of externality for the actors who use them. The opposition between feeling with the hand—an embodied technique that has become an internalised skill—and testing with the help of an RDT—an external technology objectified in the dipsticks whose photograph accompanies the paper—tellingly illustrates what a typical technology is.

Heuristically, it is certainly useful to analyse technologies in this sense. Externality and objectification are most visible in newly introduced objects or technological ensembles. Clearly discernible as new, external and distinct to the societal actors who use them and to the ethnographer who describes their use, they enable us to identify and isolate the ordering consequences of their use. They make us realise that new technologies necessitate social adaptations—both in technology and society. Police patrols on, say, Texan highways will differ from those in Kampala's informal settlements, since, what Sarah Biecker calls, the terrain would otherwise render them impossible. Yet through their commonalities, they impose elements of a very similar order on these very different terrains.

This becomes more pronounced where a technology is backed by a powerful institution and integrated into larger infrastructures. Then, the power to define 'wrong' and 'right' uses of the technology often largely lies with the institution, and other societal actors have less power to impose their own order. Even then, though, the conceptual link of a technology to accepted institutions sometimes serves to legitimise uses that differ widely from the ones the institution intended.

It is easiest to analyse such consequences of the use of technologies while the technologies are discernible as new and distinct. Once their use becomes routinised, they tend to be no longer looked upon as technologies, but as simple tools or as elements of habitual skills. Their externality—the discernable difference between an action's motivation and its form—gradually vanishes, until the orders such technologies helped creating become implicit and less visible. While it is legitimate to concentrate on newly introduced and external technologies, we should be careful not to seek the ordering effect of technologies in them alone, but to include the more habitualised and taken-for-granted ways of engaging with the objects and skills linked to specific technologies.

Standardisation and practices

All three vignettes show very clearly how local practices change when people engage with new technologies, but also how standardised technologies are adapted to local circumstances. Such adaptation is crucial wherever universal norms or practices are applied on circumstances

which had no hand in their creation. Henry Sumner Maine described 150 years ago how legal fiction, the assumption that a new social fact fit into old legal categories, created the possibility of using law flexibly and transferring it to a different context. In a similar vein, technologies have to be changed while the image of their immutability is kept up.

Rapid malaria testing in René Umlauf's text gains its legitimacy through its relation to universalised medical knowledge, to standardisation and to institutional practices that make patients and doctors similar and exchangeable. Whoever the patient, whatever the circumstances, the test will submit them to a universal digital logic of either being infected or not. The test's strength, just like the law's, lies in its universal objectivity.

Like the law, however, the test can only prove its validity and universality if applied to real-life situations, and this application is never as universal as the necessary fiction implies.

People who apply technologies in real life therefore need competences on both sides, the technology and the specificities of the context. Policemen have to know how to patrol. They have to be trained in the use of the universal tools of this technology of control: in the use of guns, truncheons, handcuffs just as in the cooperation as a team and the norms which should be enforced or disregarded. Yet they also need to find their way back to the office, or have to be able to discern what looks suspicious or normal in a specific environment. Sarah Biecker's example shows that this often needs an alliance of two sets of specialists: those who know about the technology and those who know about the context. Ethnographies in such diverse fields as health work, humanitarianism, long-distance trade or human rights have again and again illustrated the importance of middlemen. Their work is just as crucial for the adaptation of technologies as for their gradual integration into everyday routines. Perhaps the process of adaptation is finished and closure reached when middlemen are no longer needed; in this moment, a technology becomes habitual and turns into a tool that only commands our full attention when it malfunctions. Rami Waldenour shows us that this process can also define new social groups: the 'people of the lorry' are those people who, in different roles, have adopted the lorry's technology into their everyday lives.

Malfunction and resistance

Technologies frequently malfunction. Even for the most smoothly integrated technology, a small part of our attention is always directed at supervising its correct functioning. We always 'test' a technology and, literally or figuratively, listen to our vehicle's motor. Very often, technologies influence which data we accept as meaningful for such a test. Strange engine noises might become more alarming if a control lamp lightens up, and an insignificant bout of fever might be reinterpreted as severe illness once a test shows results.

But just like the necessary adaptation to a context, the fundamental experience that technologies can fail enables us to reassume control and the power of definition. The health worker in Umlauf's text does just that: he assumes control over the technology and resists its ordering effects. He can do so because no technology can completely eliminate uncertainty, and, as a consequence, an inconsistency between one's own experience and the technology can always be defined as an outlier. The space different technologies leave to such interpretations is a crucial factor for their effects on ordering practices.

As important is the degree to which they remain external. When the use of technologies becomes habitualised and integrated into our everyday life, we often find it less easy to resist their ordering effects or to decide against them. Our habitual experiences can gradually lose

their character as independent corrective tests and can become consistent with the technological device — at least as long as it does not grossly malfunction and thus directs our attention to its instrumental and external character.

Ordering effects of technology

Police patrols, RDTs and lorry speedometers are instruments of ordering and control. They are supposed to generate information about the world and to enable people to act upon it. They create order in a very specific sense: by generating structured information and making the scope for individual decision both smaller and clearer. The scope becomes smaller because the technology assists us to regard most situations as "more of the same", and to react to them with routine behavioural scripts. The scope becomes clearer because unusual situations are singled out as such and can be addressed more carefully.

Such technologies of control can only fulfil their function if we accept the data they create, just like any technology can only fulfil its function if we accept to use it in a specific manner linked to its intrinsic design. Once we do so, we delegate a part of our control over the world to the technology. The ensuing ordering effect is not an unfortunate side effect, but a direct consequence of the very reason why we use technologies at all: their design makes them efficient by structuring our relation to the world.

In my eyes, the three nuanced ethnographies bring out how strongly a technology can alter our agency and order the world, but they simultaneously reject the image of technologies as all-powerful instruments of governmentality. The people who use technologies in the three examples never trust them completely and never give them the power to completely override their common sense. They often rely more on embodied skills and experience than on mechanic controls.

Conclusion

I have begun this reflection by differentiating three ways in which human agency, technologies and social order relate to each other. Technologies can become a part of our routine repertoire of acting and structure how we act upon the world, influencing our habits until we learn to sit in a way that make the table seem just the right height. We can use technologies strategically and consciously in order to achieve our own aims, turning them into tools to order the world, but still remaining subject to their structuring effects. Or we can leave them aside, ignore or boycott them, limiting their ordering power without completely escaping it.

The three ethnographic descriptions present examples for each of the three ways of using technologies. They invite us to analyse how the design, the institutional embedding and the degree of social internalisation of a technology influence how free the members of a society are in ordering the world through, with or against technologies. In this analysis, we should be careful not to concentrate on the material side of technologies in a way that separates a technology from its application, nor to see too sharp a line between technological artefacts and the habitual skills of those who use them. Whatever orders emerge from the presence of technologies in a society, they only become real when people engage with technological artefacts and thus transform their design into lived reality.

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