Hacking the Probe-head: Manipulations for social sustainability

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Abstract
Design designates; it guides and leads us towards specific types of behaviors. Designers serve to defend and propel the interests of the client, who wants to lead their customers or users into a relationship of dependence and addiction. Through the clever use of devices, apparatuses and affordances, design sorts and consolidates human behaviors to propel the status quo. However, there can be many forms of resistances, and one form is hacking – the manipulation of the mechanisms which guide and exclude, such as locks. In this way, the craft of manipulation is the central feat of hacking. It is the material intervention of trespassing into systems in order to change and tune them towards becoming counter-systems. This text examines how hacking can be used to manipulate systems of exclusion into more inclusive systems; affecting the designed guidance devices in order to propel both sustainability and social justice.

Keywords: Hacking, sustainability, activism, probe-head, social justice

Designations: coercive affordances
To most of us, the everyday environment that we call home is shaped by human intentions, ideas of function and aesthetics. Even our nature today bears marks of human engagements, and some propose we now live in a geological age which carries a mark of human actions on a planetary scale (often referred to as the *anthropocene*). As humans, on both an individual as well as a collective scale, we are born into design. We wrap our bodies into design and use design to get by in our designed everyday. We live in designed environments, and even our exit from this life happens within a designed space of objects, techniques and rituals. At every occasion, design structures and devises our course of life as we are framed, coupled and networked by traditions, intentions and practices.

Design *designates*, and I would like to draw attention to how it does so. Design *directs* our attention and perception to notice what is regarded as important, such as language, signs, abstract concepts, symbols and machines, which makes us see things we could not see with our own senses (just think of microscopes, x-ray cameras or space probes). Design *assigns* itself to be of use, enhancing and modifying human behavior (just think of everyday tools, functional clothes or ergonomic furniture). Design also *delegates*, it takes over some of my own labour, decisions and troubles (just think of washing machines, pocket calculators and suggested playlists), while also creating dependencies on others, such as specialist repairs or abstract systems of service or updates.

The more user-friendly design is, the better it designates our behavior. It also leaves us ignorant to how we are being directed. A user-friendly design manipulates us; it coerces us into a designed path of action. The better and more efficient it is, the less we notice our obedience to it. We are so consumed with our own empowerment, we fail to see how our new powers came at a price: our compliance to be guided and coerced. This is especially problematic when shifting towards more sustainable solutions for living. Not only are many of our unsustainable environments very user-friendly (our addiction to cars, or recent coffee-to-go lifestyle), we often fail to see how intricately bound to them we are (such as our rising need for electricity in order to be 'social' with each other).

Other designations are more blatant. They can be explicit obstructions, such as speed bumps, or mechanisms of exclusion, such as gates at the metro which make sure I have paid for my ticket. They can be seemingly innocent, such as can-openers for right-handed people, which are impossible to use with the left hand. Other designation mechanisms can be more abstract forms of exploitation, such as offshore sweatshops or economic systems of segregation and extortion. Human culture revels in

design and this can be both a benefit and a hazard. Yet, when we speak of design, we most often focus on the benefits.

Mechanisms of designation
Any randomly chosen issue of a popular design magazine will be full of designation machines; endless images of *devices* and *apparatuses,* each and every one with its own designated *affordances.* As objects designate our behaviors, they are often amalgamations of these mechanisms. Some types of designs are *devices*. As highlighted by design researcher Martin Avila 'a device (Latin *divisa, divisus*; division) divides, that is, organizes, arranges, frames our environment and defines limits and possibilities of relation.' (Avila, 2012, p31) The device fragments the world, sharpens action towards certain uses but also delimits other fields of action. Other designs are *apparatuses* (Latin: *apparare*; to prepare). As emphasized by cultural theorist Vilem Flusser, the apparatus is tool that 'lies in wait […] it sharpens its teeth in readiness' (Flusser, 2000, p21), ready to spring into action. Such tools can be simultaneously a mechanical object, such as Flusser's example of the camera, as well as its abstract reflection, the regime of visuality manifested through photographic representation, which in turn resonates well with Giorgio Agamben's notion of the apparatus as a mechanic of power (Agamben, 2009). All forms of design also have designated *affordances*, symbolic or material properties that guide the user's actions with them, their intended purpose of use (Norman, 1988). The concept of affordances may also serve us well as we trace how everyday design coerces, sorts and consolidates our behaviors.

If we focus on how design designates, as in the previous examples, it can be useful to think of these mechanisms as 'abstract machines', to use a term by philosophers Gilles Deleuze and Felix Guattari (Deleuze & Guattari, 2005). According to Deleuze and Guattari, two of the primary abstract machines are those of *sorting* and *cementing*. As we move through life we are guided through psychological, social, material and environmental settings, already put there before we were born, and these guiding operations are further reproduced by our own actions: we make others repeat what we want them to do. We take part in 'sorting operations' and 'consolidation operations' through our everyday actions. These designed systems organize, stratify and code the world.

Sorting is the compartmentalising of people through micro-categorisations through classifications, distinctions, symbols and rankings, using all kinds of means (clothes, dialects, forms, passports and grades for example). Using the vocabulary of Cassirer we could call these distinctions 'symbolic forms' as man is a 'symbolic animal' (Cassirer, 1944). The other force is the *cementing*, the concrete materialization of symbolic categorizations. This implies the sorting process materializes into physical structures of society, congealed into inalterable forms, which strictly limits the potential for the emergence of new and different determinations: the mortar which reproduces social and material processes has fixed the result of the sorting Following the thinking of Deleuze and Guattari, the form and shape of society is ordered and affixed by these two structure-generating principles, the concrete forces embodying the same abstract machines or engineering diagrams.

Yet, the sorting does not happen with any pre-ordained course or inherent meaning. There may be strategies or overarching ideologies effecting the construction of the everyday environment. However, sorting always happens at the local level, sometimes in what seems like a haphazard way, yet governed by behavioral repertoires supported by several guidance devices. The sorting can be an evolutionary event, such as natural selection of a germ-line from a population, or a social event, such as a court of law, distinguishing between the innocent, or the guilty. Whereas natural selection is replicated and consolidated through reproduction, the decision from a court of law in turn is firmly coupled with the prison, which consolidates the verdict into freedom or imprisonment. This kind of sorting takes place in many fields; amongst other things it can for example be *coded*, such as compatible or incompatible languages, or *genetic*, such as which populations can intermix and reproduce, or *medical*, sorting between healthy and sick, whom to medicate and whom to not, or *national*, sorting between passport-holding citizens and undocumented aliens. Within the everyday realm of design, it also sorts us into right-handed or left-handed, who can access a space through the

stairs and who cannot, what size of feet fits into women's shoes or not, who has the strength to twist open a can or not, what file-format can be copied, and so on.

Concerning sustainable design, the sorting may happen on the level of how regulations deem what is considered a 'healthy' life. An example can be levels of hygiene, which in itself is also pushed by lifestyle markers and consumption patterns. For example, what smells an individual may suggest (how often must we shower and wash clothes, use of perfume etc.), which in turn affects other sustainable behaviors, such as cycling to work. I may choose not to bike, or push for more sustainable laundry habits, if I feel socially excluded by tacit norms at my glamorous workplace.

To bring attention to where sorting and consolidation takes place, Deleuze and Guattari suggest a function they call *probe-heads*, or '*tetes chercheuses*, guidance devices' (Deleuze & Guattari, 2005, p190). This is the sharp-edge of sorting and guidance operations, or what we could call the 'front-end', bearing in mind it is an intrusion and, sometimes violent, conflict zone. The probe-head is a switch that sorts, in or out, right or left, free or captive, just before the following compartmentalisation and consolidation mechanism kicks in. The probe-head is what philosopher Manuel DeLanda translates as 'searching device', a shortsighted sorting device that 'explores a space of possible forms' (Delanda, 1997, p139). He defines the sorting 'strictly as the result of the coupling between a population of replicators […] and a sorting device (of any kind)' (DeLanda, 1999). The probe-head, as an abstract device (not a metaphor), is enacted through natural, material or social forces, laws or design. It is the very edge of the sorting device; it orders and pushes matter, populations or ideas into the cementing process and the formal operations of society, replicating and materialising designs, orders and commands through social obligations, like abstract categories, such as citizenship, or qualities, such as degrees or diplomas, etc. Probe-heads also manifest in material functions that include or exclude us, unlocks or locks the doors and exits, borders or exams. DeLanda gives the example from biology, of species and populations, geology, of rocks and sediments, and of various social contracts and conditions, such as laws and religious codes, guiding weddings, offspring and trade agreements (DeLanda, 1997).

Especially DeLanda's last examples of probe-heads interact smoothly with the realm of design: the tacit social contracts such as custom, tradition and informal praxis. The social ways of being and our value systems are most often hidden to us, we are shaped by them and have trouble noting how we are formed by them, and socially addicted to them. Everyday behavior is intrinsically guided by minimal social rewards and punishments. They are part of the consolidation processes which makes sure that life stays somewhat predictable; they preserve the status quo for good and bad. Through continuous feedback-loops, recognition and affirmations, or judgments and penalties, such behaviors anchor us into our everyday, while simultaneously make sure we don't resist or 'rock the boat', even when we are faced with wrongdoings. Indeed, as peace researcher David Cortright notices, most of us fail to speak out even to blatant oppression: 'We fear the loss of job security or position; we worry how family, friends, and employers will view us. We are so entangled in the comforts of society that we find it difficult to take risks, even for causes we hold dear.' (Cortright 2009, p33)

Designated systems and countersystems
According to the acclaimed critical designers Anthony Dunne and Fiona Raby, most everyday designs reinforce the 'status quo' (Dunne & Raby, 2001), rather than questions the conditions of consumer society. On a similar note, design theorist Tony Fry has convincingly put forward the claim that most design not only sustains the existing order, but is also a form of 'defuturing', which severely constrains our options to make our societies more sustainable (Fry, 1999). Even acclaimed design perspectives (such as participatory design and co-design) risks reproducing tacit forms of coercion, or turning the change agent into a *collaborateur,* colluding with current exploitative regimes of consumerism and politics of domination (Cooke & Khotari, 2001). The very system of consumerism compels us to collaborate with unsustainable conditions and lifestyles, which severely limits the avenues to radically address the roots to the unsustainable paradigm of consumerism. Sociologist Gideon Sjoberg has made a call to examine alternative social arrangements that explicitly challenge

the systems supporting the status quo; a move towards perspectives that offer a 'countersystem' approach (Sjoberg et al, 2003).

Sjoberg calls for a countersystem approach, highlighting how systematic wrongs needs to be confronted by opposing systems, not just small 'fixes'. This, however, necessarily produces various levels of conflict. Over the last few decades there has been a calling to expose disagreement, dissensus and 'agonism'. Agonism shows how there is asymmetry of power, and 'wrongs' are being committed within the existing system, thus exposing tensions and contradictions. Agonism highlights how the system is not based on tacit consensus – that all parts are agreeing or everything runs smooth – instead it highlights how the system is a 'thing', an assembly of designed and conflicting parts, a product of imbalanced compromises (Bjögvinsson, Ehn & Hillgren, 2012). As underlined by interaction designer Pelle Ehn, the thing is both an object and a parliament of different opinions coming together to address the *political* – the conflict of forces, wills, populations, affects, trajectories and ethics, into a process of 'thinging' (Ehn, 2008). As proposed by design theorist Carl DiSalvo, design agonism is a central concept in his 'adversarial design', which in turn is a strategy of critical design which exposes inconsistencies and disagreements, and becomes a type of political design, based on agonism and contestation (DiSalvo, 2012, p2).

Intervening in systems
A systemic approach to design unveils how parts interact, and are networked into larger wholes, into social ecologies. Yet, a systemic perspective of design also raises a specific question: where is design to intervene in a system?

Environmental thinker Donella Meadows text, 'Leverage Points: Places to Intervene in a System', is a much cited resource on identifying how to push systems towards more sustainable goals. In order to affect change in systems, Meadows stresses, one needs to find and intervene at specific leverage points, where a small local shift can produce big changes that ripple throughout the whole system: 'leverage points are points of power.' (Meadows, 1999, p1) As Meadows famously argues, intervening at the level of parameters (such as standards and taxes) has a low factor of impact, whereas the more abstract levels (affecting incentives, values and goals) produces deeper and more systemic change. Following Meadows' advice may however confuse designers used to intervening at the tangible level of the world, through the redesign of products, objects or tools.

On yet another level, a designer may ask how the tangible interventions of design may even touch such abstract phenomena as poverty or oppression, which are also most often parameters in unsustainable environmental conditions. Using Meadow's framework, a designer will need to mobilize a wide participation to change the social conditions that reproduces our current unsustainable culture waste-making. One way to address Meadow's call for action would be to follow Paulo Freire's *Pedagogy of the Oppressed* (1970)*, where the subjugated or marginalized must be active participants in their own emancipation, 'so that through transforming action they can create a new situation, one which makes possible the pursuit of a fuller humanity' (Freire, 1970, p32). Freire urges that this process is facilitated by a problem-solving education, which talks back to the current social condition, and 'strives for the *emergence* of consciousness and *critical intervention* in reality' (Freire, 1970, p81). So, what can designers really do on this social level?

One such critical intervention into reality, which has been popular within artistic endeavors such as 'social practice', is the reference to acupuncture. Artistic director Darren O'Donnel has called such artistic interventions on an interhuman level 'social acupuncture' (2008). They are strategic social acts in civil society, which aims to redistribute the energies throughout the social whole. According to O'Donnel, whereas Western medicine is focused on underlying reasons for disease such as bacteria, and aims at treating them momentarily, Eastern medicine sees the whole body in a continuous feedback process. Microbes are always there, but they just matter when your immune system is compromised. Similarly, O'Donnel sees holistic problems in the *social body* of today which affects its social immune system:

> *'The lack of free public space for unstructured discourse can be seen both as symptomatic of a democratic deficiency and as contributing to the situation, in what amounts to a feedback loop, each contributing to deterioration of the other.'* (O'Donnel 2008, p48)

Thus, interventions into the body as well as the social system require a holistic approach, with no aspect isolated or analyzed without taking the whole system into account. Releasing healing energies through the body could apply also socially, O'Donnel continues:

> *'Theoretically, then, the same thing should apply to the social body: small interventions at key junctures should affect larger organs, in turn contributing to feedback loops that can amplify and affect the distribution of energy resources.'* (O'Donnel 2008, p49)

As O'Donnel highlights, social acupuncture aims at healing and redistributing social energies, thus changing the processes of everyday life. Acupuncture does not work by putting the needles at any random place. Instead the interventions much touch specific conduits of social life, questioning the status quo, bringing awareness to the world and pushing for change of social practices; they must modulate and manipulate the social world.

The craft of manipulation: hacking
In much political theory, manipulation is done by those in power as a Machiavellian game of powermongering. Example of this may include the false directions of propaganda, the deception and deceit that reinforces obedience, and leaders who steer elections in their favor with spin and cunning. Manipulation is also the craft of deceptive mythical gods, such as Lucifer 'the deceiver' and not least Plato's *Demiurge,* who the Gnostics made into the knowledgeable craftsman who misleads man to take the world of appearances for reality (Meyer, 2003, p5). In this way, the craftsman was *cunning*; that is, 'artfully deceitful', 'crafty' and with 'fraudulent dexterity' (Herzog, 2006, p71).

Political theorist William Riker coined the term *Heresthetics,* after the Greek word for choosing and electing, for a specific form of political cunning, or a 'political art' (Riker, 1986, pix). Riker differs heresthetics from of other forms of political manipulation, such as rhetoric and persuasion, as it changes political outcomes *without* changing peoples' underlying preferences. Instead, Riker posits that manipulation is a form of politics which interferes with the decision-making process, setting it up in a partisan manner, of managing the act of choosing (for example by changing the order in which decisions are made). It is a maneuvering of political forces and positions, or as he puts it, 'this is what heresthetics is about: structuring the world so you can win.' (Riker, 1986, pix) Using game theory and examples of how politicians have manipulated rational choices in their favor, Riker expose how decisions can be tilted. Applying *Deleuzoguattarian* terminology, I would like to argue that Riker points to how the probe-head in decisions can be influenced, by the very specific 'craft' of guiding the processes of politics.

It is important to notice here that craft, also political craft, is an intervention, often a physical one, manipulating a system on both an abstract and concrete level. As Riker posits, it is a tinkering with material and procedural operations rather than a matter of persuasion or awareness of minds.

As craft theorist Glenn Adamson shows in *The Invention of Craft* (2013)*,* craft is a physical manipulation that overrides barriers between tools, systems and labor organization. In Adamson's example, Alfred C. Hobbs picking of the Bramah patent lock at the world exhibition in 1851 exposed how the fraudulent dexterity of a craftsman can outsmart the systemic ingenuity of the engineers, and how manual action can challenge the predictability of devices. Adamson objects to the modern perspective that industrialism marginalized craft, a view especially asserted by 19th century craft revivalists such as John Ruskin and William Morris, to instead highlight how the skilled hand has a tendency to continuously reinvent its place in the world (Adamson, 2013, p45). As Adamson states, industrialisation did somewhat push artisans onto the factory floors, but they also claimed a central position of manually building the mechanisms of mass-production through their specialization and division of labor.

These transformations did not, as is often claimed, de-skill workers. Rather, the modern invention of craft literally put artisans 'in their place'. In fact, it was precisely their workers' valuable skills that motivated capitalists to invent techniques of controlling them. As 'craft technique was isolated as a subject of concern in its own right through division and explication, the person executing the technique was – in a countervailing move – made to seem inconsequential or generic'. (Adamson, 2013, pxix) Thus, the potential of artisan skills were robbed of agency, displaced within cultural heritage institutions or dismissed as irrelevant, while in reality, they were at the centre stage of industrial innovation and modernity itself. It was the artisan's power of manual intervention and manipulation that needed to be supervised and controlled: both a necessity and problem of industry. Craft is itself a powerful form of control, but precisely because of that potency, a telescoping system of larger forces seeks to control it. 'Craft's fate in modern times has been to manipulate and be manipulated in turn.' (Adamson, 2013, pxx)

As I would like to argue, it is the fraudulent potency of craft, exactly that it can manipulate matter and systems, which adds to its tacit forcefulness in the world, and intimately connects craft practices to the contemporary phenomenon of hacking. Indeed, it is no accident hacking emerges out of the lock-picking community, inheritors to Hobb's feat of outsmarting the Bramah lock, a manual skill similar to the technical manipulation, or 'phreaking', of telephone systems (Levy, 1994; Thomas, 2002).

Whereas many theorists have highlighted how hacking can be seen as a form of Do-it-yourself (DIY) activity, or even forms of critical civic interventions (Ratto & Bolger, 2014), I would like to define hacking not as any form of making, but the specific manipulation of sorting and guidance-mechanisms, or the operational interventions at the level of the probe-head. Rather than being simply a productive craft, or a disseminated mode of production, hacking can manipulate probe-heads. There are thus 'better' objects to hack, instances which need more *strategic* intervention, and therefore unlocking more potential, short-circuiting more of the sorting and consolidation operations. Thus it is no accident that the concept of hacking has an undertone of illegality, as it challenges established systems of control, exclusion and sorting. Yet, this illegality should not be confused with crude sabotage. Hacking is a form of material cunning, a fraudulent dexterity; it not only opposes, it also proposes.

Even if the demarcation between hacking and cracking is highly porous, it could still be of interest to try to distinguish between the two. Whereas programming guru Eric Raymond simply makes the distinction: 'hackers build things, crackers break them' (Raymond, 2001), it is important to stress how hacking is the conscious 'trickery and manipulation of a system' (Cramer, 2003), which by its very nature is a form of interference and trespassing. The *Jargon File* (the lexicon for hacker slang) also exhibits traits of opposition rather than mere construction under the entry of 'hacker':

> *'A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn the minimum necessary.'* (Jargon File n.d.)

As financial activist Brett Scott argues, 'hackers challenge the binary by seeking *access*, either by literally 'cracking' boundaries – breaking in – or by redefining the lines between those with permission and those without. We might call this *appropriation*.' (Scott, 2015) However, as anthropologist Christopher Kelty (2008) points out, hacking, or the practice of 'geeks', by manipulating systems, trespassing and opening for new practices, the worldview of the geeks is infused into the world, and by being 'out of control', thus clashes with power. New practices intrude on closely guarded territories, upset modes of authority, and overturn previous divisions of power. Geeks are thus 'involved in the creation of new things that change the meaning of our constituted political categories' (Kelty, 2008, p94). Every hack contains elements of a crack, breaking into new territories in order to produce local change.

If hacking has a productive element, I think it would resonate well with feminist Barbara Deming's metaphor of the 'two hands', which both *oppose* and *propose* (Deming, 1971). Deming's form of resistance aims to control and reform the relationship between activist and opponent, or more precisely, to take active part in reforming the *guiding principles* between opponents:

> *'The more the real issues are dramatized, and the struggle raised above the personal, the more control those in nonviolent rebellion begin to gain over the adversary. For they are able at one and the same time to disrupt everything for him, making it impossible for him to operate within the system as usual, and to temper his response to this [...] They have as it were two hands upon him—the one calming him, making him ask questions, as the other makes him move.'*
> (Deming, 1971, p207)

As the hack confronts the probe-head, the opposing lock, door, policeman, court, or code, it aims to influence the guidance device through a double action: one hands interferes or stops, while the other points to the alternative. And not only that: whereas one hand stops or calms the opponent, the other constructs the alternative, making sure *means and ends coincide* in the same gesture, and at the same time. An act of opposition does not point towards an abstract goal, which will materialize in a distant future, but instead the moving hand produces and embodies the new, even in the smallest form.

From a more activist stance, lets take the example of the sit-ins of the American Civil Rights movement in the 1960s. By the very act of trespassing, of sitting at a segregated luncheon, the activist not only transgresses a symbolic border, but also acts constructively as the counter itself gets desegregated, if only for the moment the protester sits there. The segregating probe-head, the local directive as well as its physical manifestation, its device, is temporarily hacked. The one hand displaces injustice, breaks through a mechanism of exclusion, while the other enacts justice, promoting the act of trespassing and desegregation. The chair reserved 'for whites' was temporarily occupied and thus desegregated when a person of colour sat on it. Means and end coincided in one act, segregation was opposed, the seat was desegregated, even only for the time of the sit-in. Also, in order to oppose the sit-ins, the opponents had to stop the constructive act of desegregation, thus blatantly enacting their racist stance and revealing the direct violence of segregation and the probe-head itself. The manipulation and displacement of the probe-head enacted justice locally, but also exposed the cruelty of the sorting devices and turned public opinion towards the cause of the civil rights movement.

Hacking for sustainability
So what can hacking as a practice for sustainable design be? On a basic level, it can be any small modification that makes a gadget consume less energy, or a tinkering that prolongs the lifespan of a product. A well-known example may be the Toyota Prius hack, where car owners found a way to make the hybrid car run longer on its batteries, recircuiting the electronics of the car and installing an extra button to activate the new eco-mode of the car (Gordon, 2006). It may also be an intervention, such as repair or maintenance, which makes the user invest attention and time and thus prolong the products emotional durability (Chapman, 2005), which in turn often also adds to the product's patina (Fletcher, 2015). However, as I mentioned earlier, such wide interpretations of hacking may miss the confrontative qualities of hacking, that it is a craft that trespasses and manipulates systems, not merely adds to the existing world. Perhaps it may even be possible to say that the definitive quality of hacking, compared to any DIY-activity, is exactly that it trespasses, it challenges control and thus continuously borders on the illegal.

Illegal sustainable practices may be easier to find than one may first assume. For example, in some parts of the US, it is highly contested, or even deemed illegal to live off-grid, even if the homesteader is totally self-sufficient. Health and sanitation regulations, such as having an approved water supply or being connected to the electricity grid, clash with personal ideals of what is considered a healthy living environment, both on an individual and more collective level (Hren, 2011). In some instances, collecting rainwater may, for example, be counted as theft of property from downstream water-rights owners. Yet, as author and 'earthonaut' Stephen Hren emphasizes so eloquently, we cannot know

what conditions can be sustainable until we test, and all too often we face laws and regulations that challenge such experiments even before we set out to test. Popular initiatives in sustainable living, which may seem harmless to most (such as urban gardening) may clash not only with laws concerning plants or livestock within city limits, but also property values and the aesthetic ideals of a neighborhood. A small sustainable initiative may thus clash with regulations written to secure peace and consensus within a community.

In many cases, a hack highlights a conflict not only between individual and governmental regulations, but also between personal and collective values, and this is another contributing factor to the conflicts concerning hacking. In his approach to open sources programming, Eric Raymond starts with an aphorism, how 'every good work of software starts by scratching a developer's personal itch.' (Raymond cited in Moody, 2002, p150) As Raymond mentions, the itch, an immediate personal problem or obstacle in one's way, may be one of the individual impulses on why to put in the efforts to hack, trespass or improve something in the first place. But it may also distort the basic ethical model of hacking; in whose name does a hacker trespass, and what are the communal benefits of an individual's urge to scratch an itch? As hinted by political philosopher Michael Sandel, we may know civic virtues, because 'when politics goes well, we can know a good in common that we cannot know alone' (Sandel, 1998, p183).

Following Hren's discussions on how sustainable living may clash not only with modern conveniences, but also with regulations and laws, I would like to propose two basic modes of hacking. I will discuss their implications on social sustainability and how I would suggest a push towards sustainable manipulations for civic purposes. The first mode is the *clandestine* type of hacking, perhaps a style that most connote to the term 'hacking'; a secretive act, which aims to dodge the probe-head unnoticed, such as an act of lock-picking or phone 'phreaking'. The second mode is an *explicit* type of hacking, where the act aims to draw attention to itself, creating momentum and public debate, and thus aims to affect the public operations of the probe-head.

Clandestine and explicit forms of hacking
In the realm of sustainable design, one example of clandestine sustainable actions may be that of 'guerrilla gardening', where gardeners do not have the legal rights to utilise, often a private or public property that is not being cared for, or an abandoned site. As author and gardener Richard Reynolds puts it, guerrilla gardening is 'the illicit cultivation of someone else's land.' (Reynolds, 2008, p5) However, even if the act of gardening itself may be clandestine and done under cover, the results may be very obvious, and these results may be the strength of the action in the first place. The clandestine operations of the gardeners, often involving trespassing, point to the accessibility of abandoned places, and may thus produce leverage for political decisions concerning the underutilised green areas of the neighborhood. However, as with other forms of community engaged urban beautification, it may also lead to unintended forms of gentrification and displacement.

Cultivating capabilities or crafts may also affect the probe-head. The ability to forge a passport for refugees may enable migrant mobility on an international scale. This ability may be invaluable in order to transport someone over a crucial national border, yet the skill may prove less valuable for social movements or for getting a job once inside the new country. The manipulation of documents thus only locally and temporarily affects the probe-head of a national border. Yet the act of forging also affirms the border by reproducing its power, and the forging skill is indeed a perfect reproduction of the probe-head itself: the better I become at forging the passport will, if discovered, trigger processes to further sharpen the probe-head with more safe passports. Thus the clandestine hack tends to amplify the mutual and ongoing arms-race mechanisms between hacker and probe-head.

Another form of social hacking addressing the probe-head of national borders may be the US sanctuary movement, which was especially active in the 1980s, hiding refugees and asylum seekers. The assassination of Archbishop Oscar Romero while serving communion caught the world's attention to the civil wars in Latin America and the refugees fleeing the violent conflicts (Wuthnow & Evans, 2002). Following this, a lot of small Christian communities in North America offered to give

sanctuary to the refugees, even against the governmental decrees against doing so. Even if most of their practice was clandestine, hiding refugees and avoiding government crackdown, they also tried to challenge the ruling regime of fear, such as the fear of being caught. Instead, part of their tactic was emphasizing how citizens themselves can overrule one oppressive form of (state) government with their own form of governing; that a community itself decides to give refugees asylum and a residency permit for the very same community. Their emphasis was on how community itself is the basic form of *governing*, not the abstract government, governing by decrees from far off in the capital. Instead, the community itself claimed absolute sovereignty to decide whom to grant sanctuary (Lippert, 2005). 'The Sanctuary Movement argued that they were not committing acts of civil disobedience, but civil initiative, upholding laws their government disregarded. The Sanctuary Movement attorneys argued that the workers were not 'smuggling,' because their immigrants were refugees who had legitimate asylum claims.' (Smith-Christopher, 2008, p449) Thus the community's decision to grant asylum to a refugee was a higher moral ruling than that of the abstract entity called *law* or *state government*. The action of granting sanctuary thus displaces one form of abstract government with our own, more concrete form of direct governing; displacing state-appointed probe-heads to make sure means and ends coincide in action. What was first a clandestine hack became an explicit event, and even if the actions resulted in prison sentences for some of the activists involved, the public opinion pushed for reform of US refugee policies.

As apparent in the example above, explicit manipulations, which were what became of the clandestine sanctuary actions in the trials, tend to look more like acts of civil initiative or disobedience; a highly practical and material practice pushing against political boundaries. Like the Prius-hack, the aim is to make the trespassing or manipulation of the probe-head public and thus accessible to all. The point is to make it obvious and radical enough to affect the policies and laws guiding the probe-head in the first place. Some actions, such as the sit-ins discussed earlier, explicitly challenge immoral or unsustainable laws. Others become powerful symbolic events, such as the craft protests in the 1980s at Greenham Common Women's Peace Camp (Hopkins & Harford, 1984) or some of today's 'craftivist' actions (Greer, 2014).

An example of explicit manipulations that have a direct impact on the probe-head can be the actions by the Swedish organization GIL (Gothenburg's Cooperative for Independent Living). GIL is an organization supporting the rights of assistance and accessibility, especially for people with disabilities. The organization has for many years merged activism and media stunts with their lobbying and service to the community. An event that made many headlines was the production of a 'CP-doll' in 2012; a toy doll with cerebral palsy. 'CP' is also a Swedish insult roughly equivalent to 'retard'. The text on the packaging stated: 'The retard doll GIL. Treat her like a real retard!' The text continues: 'She doesn't swear, have sex, drink or poop. So much better than a normal retard.' The doll provoked a lot of discussion in media on the treatment of people with disabilities and the societal as well as social accessibility to people with variable or atypical abilities. The doll specifically addresses the often well-meaning but subjectively invalidating treatment of people with disabilities. Anders Westgerd, spokesperson of GIL tells in an interview:

> *We came up with the concept for GIL because the members of our cooperative, myself included, were sick and tired of people treating us with prejudiced niceness, as if we were kids or had an inferior intellect. We wanted to do something that provoked people to think about how they treat us. I am sick and tired of people talking over my head, saying stuff like, 'should he really be drinking when he's in a wheelchair?'* (Westgerd in Larsson, 2012)

The last remark in the statement above also became the point of departure for the next campaign of GIL, the production of a specific beer for 'retards', the 'CP-beer' (*CP-öl*), a CPA, 'a completely normal CP beer'. The beer sticker states: 'CPA is a beer that is especially suited for you with disabilities. It is designed to reach parts of the brain that does not otherwise activate. Not activated in you, the imbiber, but rather the people whose prejudice makes such a simple thing as going to the pub with friends harder. We CAN order ourselves. We MAY drink beer. We may even get drunk.' (author's translation from Swedish) 'There's a moral panic about disabled people wanting to drink

alcohol. Why shouldn't we be able to get drunk just like anyone else?' Westgerd states after the release. 'Many people don't think about how hard it is to have to go in through the backdoor or be carried down stairs. When something like that happens you feel diminished at once', and he continues: 'The beer will become like an accessibility certificate.' (Westgerd in Genborg, 2013)

It is this last feature that is special about the CP-beer, and made it radically different from the previous media stunts of GIL. In order for an establishment to sell the beer, it had to be wheel-chair friendly and follow the accessibility regulations set by GIL and its members. Thus the beer not only became a tool to raise discussion and awareness, but also materially it became a probe for changing the environment and layout of bars, so they could sell the beer. The beer thus tackled two probe-heads: both the prejudices of people, and the material properties of gaining spatial access from a wheel chair. The bar, a device that makes a division between the abled-bodied and disabled, allowing access to the first while excluding the second, has been manipulated – its lock has been picked. With the beer, means and ends coincide in action to promote the cause of inclusion, accessibility and social sustainability.

Conclusions
While hacking may have many similarities to DIY activities, many which are initiatives towards sustainability, forms of home-steading, renegotiations of agency and divisions of labour and liability, I find it important to stress how hacking engages with conflict. In every hack there is a little crack, and, like Leonard Cohen sings, it's through the crack the light gets in.

Very few struggles for justice have affected political institutions successfully without confrontation. But, likewise, few struggles have brought about social betterment without the constructive part of actively building the alternative. The strength in Deming's 'two hands' approach is that it reminds us how two movements can be combined, and means and ends made to coincide.

The world of design is full of probe-heads, and substantial monetary and political interests have rigged them to preserve power to the few. This has produced societal dependencies on unsustainable regimes of production and distribution in everything from food, clothes, housing, care, energy and transport, as well as within the cultural fields, such as education. The democratic struggle to change such regimes and affect the probe-heads is both a matter of environmental design, but simultaneously, an urgency to enact social justice. As with the Sanctuary Movement, justice is a matter of civil initiative; we, the people, need to uphold the laws and moral obligations our governments and especially the market disregard. Hacking is a call to mobilize our skills and efforts towards such goals, not only on an abstract level, but by concrete interventions into the systems we need to change.

But as Brett Scott argues, we need to be aware the means and methods may easily be hijacked in the interest of preserving the status quo. We need to stay sharp, keep raising the bar. As Scott posits, the 'hacker' is today not necessarily a subversive character, but has also been bought by an innovation-obsessed venture capitalist culture. To Scott, in today's entrepreneurial culture, hacking has become gentrified:

> 'Gentrification is the process by which nebulous threats are pacified and alchemised into money. [...] The process is repetitive. Desirable, unthreatening elements of the source culture are isolated, formalised and emphasised, while the unsettling elements are scrubbed away. [...] We are currently witnessing the gentrification of hacker culture. The countercultural trickster has been pressed into the service of the preppy tech entrepreneur class.' (Scott, 2015)

Yet, in its manipulation of the probe-head, a hack mobilises a mix of entities, devices, laws, people and practices. These are not easily controlled, not even by the forces of gentrification, but may continue be tools for trespassing. As Adamson argues, the craftsman has always the potential of manipulating the engineered system of control and exclusion. One cunning hand is for trespassing and opposition, while the other is for redirection and propositions.

The DIY magazine *Make* may have played an essential part in the gentrification of hacking, having tamed and coerced the practice into compliance with the current status quo. Yet, if we are to take ownership of our living environment and make it more sustainable, we may still use the *Make* motto and apply it to more of the political sorting mechanisms that structure our democracy: 'if you can't open it, you don't own it' (Jalopy, 2005).

References
Adamson. G. (2013) *The Invention of Craft*, London, Bloomsbury
Agamben, G. (2009) *What is an Apparatus? And other essays,* Stanford, Stanford University Press
Avila, M. (2012) *Devices: On Hospitality, Hostility and Design,* Dissertation, University of Gothenburg
Bjögvinsson, E, Ehn P. & Hillgren, P-A (2012) "Design Things and Design Thinking: Contemporary Participatory Design Challenges" *Design Issues*, Summer 2012, Vol. 28, No. 3, pp101-11
Cassirer, E. (1944) *An essay on man: an introduction to a philosophy of human culture*, New Haven, Yale University Press
Chapman, J. (2005) *Emotionally Durable Design: Objects, Experiences & Empathy*, Routledge, UK
Cooke, B. & Khotari, U. (eds) (2001) *Participation: the new tyranny?* London, Zed
Cortright, D. (2009) *Gandhi and Beyond: Nonviolence for a New Political Age,* Boulder, Paradigm
Cramer, F. (2003) "Social Hacking, revisited" at: http://artwarez.org/projects/nagBOOK/texte/florian_eng.html [accessed Sept 15, 2015]
DeLanda, M. (1997) *A Thousand Years of Nonlinear History*, New York, Zone Books
DeLanda, M. (1999) "An Interview with Manuel DeLanda", *Switch Interviews*, available at http://switch.sjsu.edu/web/v5n1/deLanda/ [accessed Sept 15, 2015]
Deleuze, G. & Guattari, F. (2005) *A Thousand Plateaus: Capitalism and Schizophrenia,* Minneapolis, University of Minnesota Press
Deming, B. (1971) *Revolution and Equilibrium,* New York, Grossman
DiSalvo, C. (2012) *Adversarial Design,* Cambridge: MIT Press
Dunne, A. & Raby, F. (2001) *Design noir: the secret life of electronic objects,* Basel, Birkhäuser
Ehn, P. (2008) "Participation in design things" *Proceedings of Participatory Design Conference* (PDC), Bloomington, Indiana, USA, 2008.
Fletcher, K. (2015) "Local Wisdom: An international fashion research project exploring the 'craft of use'", available at http://www.localwisdom.info [accessed Sept 15, 2015]
Flusser, V. (2000) *Towards a philosophy of photography,* London, Reaktion
Freire, P. (1970) *Pedagogy of the Oppressed*, New York, Seabury Press
Fry, T. (1999) *A new design philosophy: an introduction to defuturing*, Sydney: UNSW Press
Genborg, L. (2013) "A completely normal CP beer" in *Göteborg Daily*, April 17, 2013, available at: http://www.goteborgdaily.se/news/a-completely-normal-cp-beer [accessed Sept 15 2015]
Gordon, J. (2006) "Hack Your Hybrid—Activate EV Stealth Mode, Get Rid of the BEEP, and More!", *Treehugger*, January 31 2006, available at: http://www.treehugger.com/cars/hack-your-hybridaactivate-ev-stealth-mode-get-rid-of-the-beep-and-more.html [accessed Sept 15, 2015]
Greer, B. (2014) *Craftivism: the art of craft and activism*, Vancouver, Arsenal Pulp Press
Herzog, D. (2006) *Cunning*, Princeton, Princeton University Press
Hopkins, S. & Harford, B. (1984) *Greenham Common: women at the wire*, London, Women's Press
Hren, S. (2011) *Tales From the Sustainable Underground: A Wild Journey with People Who Care More About the Planet Than the Law*, Gabriola Island, New Society Publishers
Jalopy, M. (2005) "Owner's manifesto" in *Makezine* Vol. 4, or at http://archive.makezine.com/04/ownyourown/ [accessed Sept 15, 2015]
Jargon File (n.d.) "Hacker", available at http://www.catb.org/jargon/html/H/hacker.html [accessed Sept 15, 2015]
Kelty, C. (2008) *Two Bits: The Cultural Significance of Free Software*, Durham, Duke University Press
Larsson, M. (2012) "Some Serious Thought Was Put Into This Retarded Doll", *Vice*, August 24, 2012 available at: http://www.vice.com/en_uk/read/some-serious-thought-was-put-into-this-retarded-doll-0000326-v19n8 [accessed Sept 15, 2015]
Levy, S. (1994) *Hackers: Heroes of the Computer Revolution*, New York, Penguin
Lippert, R. (2005) *Sanctuary, Sovereignty, Sacrifice: Canadian Sanctuary Incidents, Power, and Law*, Vancouver, University of British Columbia
Meadows, D. (1999) *Leverage Points: Places to Intervene in a System*, Hartland, The Sustainability Institute, available at: http://www.donellameadows.org/wp-content/userfiles/Leverage_Points.pdf [accessed Sept 15, 2015]

Meyer, M. (2003) "Gnosticism, gnostics and the gnostic Bible", in *The gnostic bible. Gnostic texts of mystical wisdom from the ancient and medieval worlds*, Barnstone, & Meyer (eds) Boston, New Seeds

Moody, G. (2002) *Rebel Code: the inside story of Linux and the open source revolution,* New York, Basic Books

Norman, D. (1988) *The Psychology of Everyday Things.* New York, Basic Books

O'Donnel, D. (2008) *Social Acupuncture,* Toronto, Coach House Books

Ratto, M. & Bolger, M. (2014) *DIY citizenship: critical making and social media*, Cambridge, MIT Press

Raymond, E. (2001) "how to become a hacker" at: http://www.catb.org/esr/faqs/hacker-howto.html [accessed Sept 15, 2015]

Reynolds, R. (2008) *On Guerrilla Gardening: A handbook for gardening without boundaries*, London, Bloomsbury

Riker, W. (1986) *The art of political manipulation,* New Haven, Yale University Press

Sandel, M. (1998) *Liberalism and the limits of justice,* Cambridge, Cambridge University Press

Scott, B. (2015) "The Hacker Hacked" *Aeon*, available at: http://aeon.co/magazine/technology/how-yuppies-hacked-the-original-hacker-ethos/ [accessed: Sept 15, 2015]

Sjoberg, G., Elizabeth G. & Cain, L. (2003) "Countersystem Analysis and the Construction of Alternative Futures", *Sociological Theory,* Volume 21, Issue 3, pp. 210–235

Smith-Christopher, D. (ed) (2008) *Battleground Religion*, Westport, Greenwood Press

Thomas, D. (2002) *Hacker Culture,* Minneapolis, University of Minnesota Press

Wuthnow, R. & Evans,J.(2002) *The Quiet Hand of God: Faith-based Activism and the Public Role of Mainline Protestantism*, Berkeley, University of California Press