On Prototypes: Should We Eat Mao's Pear, Sail Saint-Exupéry's Boat, Drink with Heidegger's Pitcher or Use Nietzsche's Hammer to Respond to the Crisis?
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In 1972 philosophers, sociologists, and architects, such as Jean Baudrillard, Umberto Eco, Octavio Paz, Hannah Arendt, Manuel Castells, and others, gathered at the Museum of Modern Art (MoMA) to discuss "The Universitas Project: Solutions for a Post-Technological Society." Their responses and proposals on how to deal with the environmental, financial and political crises were assembled by Emilio Ambasz, an Argentinian architect, appointed at that time as a curator of Design at MoMA. He defined the goal of the symposium and the whole project as:

> a critical and prospective inquiry into the relation of man to the natural and the sociocultural environment […] specifically planned to explore the possibility of establishing in the United States a *new type of institution cantered around the task of evaluating and designing the man-made milieu.*[i]

The "Universitas Project" presents a blueprint for many later reflections on the role of the university as institution and the humanities education vis-à-vis crises, which were also the topic of Tirana 2013 symposium on the "Pedagogies of Disaster." The lingering disasters described in the project as crisis of elites, loss of legitimacy, but also autonomy of the university to the technocratic rule, initiated a "critical and prospective inquiry," which was also a call for a new type of institution. It embraced practices, which were more involved (politically, socially, architecturally, and technologically) with the world outside of the university walls. The shared sentiment was "to do" something about the crisis rather than only rethink its conditions (that why it was a prospective and not only critical inquiry), which meant giving legitimacy to new, post-1968 movements and groups. It also revealed a deeper, unresolved tension between *epistēmē* and *technē*, theory and practice, *vita activa* and *vita contemplativa*, expressed in various political, but also epistemological and ontological dichotomies, which will be the focus of this paper.

Interpreting and Changing the World

The unresolved tension between *epistēmē* and *technē* haunts the university ever since its beginnings and the scholastic controversies surrounding nominalist and realists discussions on whether it is the Reason or the Will of God, upon which everything exist and should be governed.[ii] In the "Universitas Project" this is reformulated through a Marxist tension between knowing and changing the world, but also in more neutral dichotomies between understanding the old and producing the new, or in Emilio Ambasz's words, between the analytic work of the sciences, which map what there is, and the synthetic and normative work of the engineers and designers, who deal with what ought to exist:

> Natural science deals with an order that can be assumed to exist already in the world, and to be independent of human activity. Its statements are properly declarative and empirical, whereas design statements, being about a man-made order, must also include the normative, and cannot be exclusively empirical and independent of the observer […] The future of the man-made milieu does not merely unfold from the present […] Rather, it *depends on what we think it ought to be and what we do to bring this about.* The *envisioning of alternative futures, which are not contained in the present but which are to be created, purposefully worked toward it they are found to be desirable, is fundamental*

to a design endeavour that is concerned just with designing strategies and producing artefacts to meet a set of requirements, but with the *larger task of synthesis of the man-made milieu, of giving meaning and structure to the productions of man.* [iii]

These responses to the 1968 events and to the emergent ecological, political, and social crises embrace various social and technical interventions in the world as opposed to pure reflection and critical assessment. Ambasz claims that design, art, but also social action will work hand in hand with both natural sciences (analysis and discovery) and with philosophy (larger task of synthesis of the man-made milieu, of giving meaning and structure to the productions of man) to improve the conditions. The participants of the symposium then try hard to convince each other that not only technical sciences, economy, and policy oriented disciplines, but also social action, creativity and the ability to envision "alternative futures" (and the related disciplines of design, art, and humanities) can make a difference.

All these attempts to bridge the gap between action and reflection, analysis and synthesis, had little if any real effects on the actual state of the society and the universities after 1972. The universities continued to embrace non-emancipatory notions of knowledge, which was gradually reduced to descriptive and empirical facts and then to issues of efficiency and performativity serving pre-determined expectations set up by national policies around employment and economic performance.[iv] This leads us to the present situation, where universities are just ancilla, handmaiden of the industry and various corporate interests rather than autonomous institutions with a goal to protect academic freedom or any pursuit of knowledge, as it became clear in the latest MIT saga over Aaron Swartz.[v] Martin Niemöller's speech "First they came…"[vi] summarizes better this whole decline of the academia than any present reflection. The calls for "open science" and more socially involved engineering or even human-centric design, in which I happened to be involved as an academic and advocate, often feel more like the last strophe of Niemöller's speech and poem: "Then they came for me, and there was no one left to speak for me."

In what follows, I would like to rethink the relation between *epistēmē* and *technē* as the core issue in the present crises, and to look into its genealogy and its present form as a constant search for tools and concepts, which can be productive and reflective at the same time. After discussing various attempts to connect the practices of thinking and doing, I will argue for a philosophy based on prototypes rather than concepts as a proper response to the "Pedagogy for Disaster" challenge. Collaborative and artisan prototypes built in the so called hackerspaces and DIYbio labs around the world offer a convergence between philosophy and design and connect the creative practices of thinking and doing. The use of free and open source software (FOSS) and hardware (OSHW) in these projects enables sharing and improving design ideas while sustaining a dialogue on the various appropriations and (mis)uses, which are reflective and creative at the same time.

Prototypes as Material Paradigms and Poetic Exempla

Digital fabrication, 3D printing, together with OSHW prototyping platforms, such as Arduino, and custom made circuit boards support the creation of collaborative and reflective prototypes, which are tools of thinking and doing, reflecting upon the world and changing it. They support the emergence of alternative and independent R&D spaces, the so called hackerspaces, makerspaces, and citizen labs, which enable various communities to adopt, develop and discuss their own technological solutions to local issues. The artisan and collaborative practices around open hardware define prototypes as tools for doing

philosophy and reflecting upon the "man-made order" and milieu. While working on OSHW prototypes we continuously rethink the social and legal contexts and status of our technologies. We engage in an active transformation of our everyday tools while creating a dialogue on the possible futures. Whether it is DIY drones or Bitcoin wallets, the prototypes created in the hackerspaces react to the present technological, social and political challenges and inspire citizens to learn and engage in the development and regulation of these technologies.

Artisan and collaborative prototypes as tools of philosophy and design bring together thinking and doing through material, rather than only discursive practice. They assist various forms of collective actions, negotiations, and deliberation through on-going experiments, which are collectively assessed by people developing the prototypes around the world (for example DIY Geiger counters or various air quality sensor solutions). They literally embody the "artisan's emancipation" described by Rancière as a poetic experience, where the "material activity" merges with communication and discourse and where learning merges with transforming the world:

> The virtue of our intelligence is less in knowing than in doing. "*Knowing is nothing. doing is everything.*" But this doing is fundamentally an act of communication. And, for that, "speaking is the best proof of the capacity to do whatever it is." In the act of speaking man doesn't transmit his knowledge, he makes poetry; he translates and invites others to do the same. *He communicates as an artisan: as a person who handles words like tools.* Man communicates with man through the works of his hands just as through the words of his speech: "When man acts on matter, the body's adventures become the story of the mind's adventures." *And the artisan's emancipation is first the regaining of that story, the consciousness that one's material activity is of the nature of discourse.* He communicates as a poet: as a being who believes his thought communicable, his emotions sharable. *That is why speech and the conception of all works as discourse are, according to universal teaching's logic, a prerequisite to any learning.* The artisan must speak about his works in order to be emancipated; the student must speak about the art he wants to learn.[vii]

While Rancière presses his point that the act of speaking is the ultimate performative act, in which knowing is transformed into doing, and learning into emancipation, we will make a case that prototypes can go a step further. They are tools which enable not only communication and individual empowerment, but also collaboration and transformation of the world through material practices and tinkering as an open and collaborative process.

This view of prototypes is inspired by the emphasis of the "Universitas Project" on design as a normative response to the technocratic rule, which can connect reflection, collaboration, and intervention. It expands Rancière's poetic experience of learning as a relation between performance and discourse in *The Ignorant Schoolmaster* to practices, which are not only linguistic, such as building and making prototypes and tools. It also refers to Giorgio Agamben's use of paradigms in *The Signature of All Things* as a method, through which singular examples and cases can create a new way of understanding and looking at phenomena, new ways of interacting with the world, without reducing this performance and insight into a general rule or law how things should be:

> a paradigm is simply an example, a single case that by its repeatability acquires the capacity to model tacitly the behaviour and research practices of scientists. *The empire of*

the rule, understood as the canon of scientificity, is thus replaced by that of the paradigm; the universal logic of the law is replaced by the specific and singular of the example.[viii]

Prototypes are similar forms of cognitive (and material) performance, through which meaning and use of the objects are constructed and revealed at the same time as **"***neither universal nor particular, neither general nor individual, [but] a singularity which, showing itself as such, produces a new ontological context.***"**[ix] The intelligibility and the insight gained through a paradigm or a prototype is always also an ontological (and even material) event, it is not a representation of anything nor a simple phenomenon or instance of something larger or more general:

> If one asks whether the paradigmatic character lies in things themselves or in the mind of the inquirer, my response must be that the question itself makes no sense. The *intelligibility in question in the paradigm has an ontological character. It refers not to the cognitive relation between subject and object but to being.* There is, then, a paradigmatic ontology.[x]

Rancière's insistence on the importance of improvisation and poetic virtue, which he sees as reflective and performative acts, together with Agamben's paradigms, explains how prototypes can bridge the gap between understanding and changing the world and how they can make this a collective and not only an individual experience. Prototypes just like paradigms can connect the imaginary with the material (real), the individual (needs, requirements) with the collective, the universal with the particular, and the theoretical with the empirical. They are poetic experiments with technologies in various social and cultural contexts, which enable individual learning, but also collective negotiations and democratization of the technologies. Rancière's passionate defense of the poetic "doing," which is always also a communication, opens a possibility of a material and object that "speaks," that is reflective and empowering, such as prototypes, where the human agency merges with that of the material, code, customs etc. Similarly, Agamben's view of exempla and paradigms introduces the moment when "being and seeming are undecidable," when a collectively envisioned and tested objects can transform the context, in which they were created, and when the intelligible is always already ontological event, part of a material intervention.

Maker's and Artisan's Knowledge as the Origin of Prototypes

Prototypes connect reflection and intervention, understanding and doing, theory and application by making tinkering and collaboration more important than some agreement on what is the proper scientific method or demarcation of knowledge. They are close to some premodern concepts of science (mechanical arts, natural philosophy), and they construct their social support and context (like hackerspaces and citizen labs), but also the theory and methodology in parallel with the actual tinkering. They refuse the division between primary and applied knowledge and research, which is responsible for the present disaster by enabling the problematic division between university and industry, science and policy to occur.

The divisions between primary (more theoretical) and applied (practical) research are the unintended consequences of the "Baconian" project of science, which tried to create autonomy for the sciences, while making strict regulations in terms of their methods and institutional support. Bacon's insistence on both autonomy and regulation served an

important function back in the 16th century to protect the emergent science endeavor from scholastic and overly regulated, theoretical and theological discussions of nature, but more importantly it was also a protection against the wild and unregulated powers of mechanical arts and its serendipitous *experimenta fructifera* providing results without any theoretical basis and system.[xi]

Bacon placed his scientific experiments as something that produces knowledge and not only practical effects and called the *experimenta lucifera* as opposite to the tinkering experiments of the mechanical artists (*experimenta fructifera*). He claimed that his well-documented experiments with shareable protocols will bring controllable knowledge and sustainable innovation as means of restoring human power over the creation (instauration) which for him was the goal of both science and religion.[xii] While his inductive reasoning and qualitative methods are often discussed in the history of science, Bacon's ethical, social and religious and the theological project of instauration of the original human condition are rarely mentioned or discussed. Science simply followed the ethical and social aspirations of Bacon's religious project without reflecting upon them and simply translating them into humanist and enlightenment ideals of a rational order in human affairs leading to progress towards an ideal state.[xiii] What remains forgotten are the alternative projects by other mechanical artists and alchemist in Bacon's time on how to bring science and society, technological advancements and social progress together. These projects placed much stronger emphasis on tinkering rather than a system and a method, and which were simply more plural in terms of their values[xiv] and closer to the present functions of the paradigms and to the hackerspaces.

The old discussion of how to bring together scientific truth (protocols), social discourse (customs, idols) and public value (norms, laws) plays an crucial role in our understanding of modern science. While mechanical arts were connecting science protocols with various social, political norms and even mythical motives and aesthetic values in an ad hoc fashion, the Baconian project promised a method that will bring progress to both (science and society). It was this idea of a method that will restore human powers over the creation (nature) and which would automatically lead to the moral improvement (*instauratio*) of humanity, which influenced all our modern ideas of science and society interactions. Bacon's vision of *instauratio*[xv] informs the whole modern project of science as a pursuit for maximum efficiency and performance that will magically resolve all social and human problems. This "modern" implementation of *instauratio* is problematic not because of its insistence on the empirical and experimental sciences and knowledge, but because of these conservative views of moral virtue being something we can simply restore, something non-experimental and given in advance by the supernatural and transcendental authority.

The right (scientific) knowledge was believed to bring moral and other improvements,[xvi] and this theological idea about the human power over the creation given to man by God is still the base of modern ideals of scientific progress and technological improvement. The belief that moral advancement will automatically follow our knowledge about nature and the idea of power over some pre-given creation showed their ugly side in the numerous ecological and economic crises of the recent decades. The idea of technocratic solutions to every problem is a simplified version of this original theological position in Bacon. The whole modern project of science and its institutions strictly separate the domains of knowledge and practice, because it is assumed that one will automatically lead to the improvement of the other. Bacon's *instauratio* states that resolving uncertainty in our knowledge about nature will automatically create a moral certainty together with social and political stability.

In the Renaissance period this was not a unique position, but there were also other projects and possibilities, how to connect the new science, the technological tools and emergent social structures. Alchemists and tinkerers such as Johann Becher[xvii] or Cornelis Drebbel offered a more balance and more importantly, a plural view of these interactions between society and science, facts and norms. Their views were based on an alchemist ideal of the "inner," personal work and experiments being as important as the experiments in the laboratory. They refused to divide theory from practice and knowledge from tinkering and even personal growth, and their whole emphasis was always more on the process rather than the outcome, which was the mystical and unachievable "gold." For the alchemist every scientific fact has its social and political reality which is experimental rather than final, everything is open to contingencies and practices.[xviii] Maker's knowledge works with "scientific" facts that are embedded in a very rich and plural system of symbolic, ethical, theological, and even personal implications and meanings. It uses iconography with paradoxical and often provocative imagery addressing small groups of "adepts" and individuals rather than the larger society.

Mechanical arts based on tinkering and their rich web of aesthetic, theological, political, and other references, metaphors and iconography connect the scholarly, artisanal, and entrepreneurial forms of knowledge and offer an alternative perspective on what is the ideal science and society interaction:

> As the issue of practice increasingly has come to the fore, alchemy now appears to be a fitting emblem for studies that aim to incorporate a broad array of practitioners and forms of natural knowledge into narratives about the emergence of the "new science" in the early modern period. *Simultaneously bookish, experiential, and experimental, alchemy stubbornly resists any attempt to separate out the histories of reading, writing, making, and doing.* In fact, *it demands that these various engagements with nature, the relationships among them, and the people of all social strata who created them all be kept in play in any account of its history.* In this sense, alchemy offers a model for thinking about early modern science more generally, particularly in light of recent work that has explored the intersection of scholarly, artisanal, and entrepreneurial forms of knowledge. [xix]

As these recent studies of alchemy show,[xx] tinkering and entrepreneurial knowledge was deeply embedded into the artisanal and commercial culture of the Renaissance period and served various visions of society. The present insistence on design and entrepreneurship in various fields revives these complex interactions between science, community, business and even arts and entertainment. The "Universitas project" calls for connecting design and science, as well as the emergence of collaborative and artisanal prototype cultures in the hackerspaces, embody the "premodern" aspirations and they revive the ability of science to bring forth creative and imaginative convergences. Tinkering and opening both science and society to more pluralistic views of the future means experimenting and collaborating. The unique interactions and convergences between scientific practice and community creation based on the revival of tinkering offer a more resilient, democratic but also experimental model for acting and decision making. These experimental collectives testing various relations to emergent technologies probe the relation between policy and design envisioned earlier in the concept of cosmopolitics.[xxi] Rather than a separation of powers and domains of knowledge and acting, policy and research, ethics and science, the public forms of participation in the sciences, like in DIYbio, or in the alternative R&D culture of the

hackerspaces, inspire us to rethink the function of similar separations in our political, social and scientific lives.

Artisanal and Philosophical Prototypes for the Disasters

The "Pedagogies of Disaster" are just like the "Universitas project" attempts to rethink the modern university and its division of disciplines in order to make them more relevant, but also reflective, critical and "prospective" for the society. In this sense, we never lost the continuity with the past and we are just rephrasing an old dichotomy between *epistēmē* and *technē*, contemplation and action, theoretical and practical reason. Rather than searching and claiming autonomy of the sciences or the humanities, we could try to remind ourselves of these complex genealogies going back to the issue of tinkering and mechanical arts and maybe even earlier. Before the Royal Academy of Arts was established as a model for all future science and society interactions, and connected with the university, mechanical arts and natural philosophy were experimenting with various forms of connecting the emergent science with what was called the "court" (politics, society). The genealogy of these plural interactions between science, university, and society can give us a valuable perspective on the present situation as an opportunity rather than accepting the demise of ontological, social, and ethical values and aspirations in favor of performance indicators. These premodern interactions can help us understand the present hackerspaces and their culture of prototypes as attempts to create more resilient communities facing various crises (such as radiation, food safety, surveillance etc.). I use such prototypes and models in my own work as an educator and tinkerer, because they support active engagement with the technologies as a form of *elenchos* against the passive acceptance and consumerism. These prototypes are artisanal, they always bear a unique story of an individual or group that created them and offered them as a kit for other tinkerers to join and contribute. I call them philosophical, because they enable everyone to witness and experience the production of knowledge around these tools and to reflect upon them.

The example, which demonstrate this "pedagogy" could be the "NeuroNetworking Workshop" in Prague in April 2012,[xxii] which used prototypes as forms of technological *elenchos* involving "strangers" in a discussion and design reflecting neuroethical issues. The two days workshop brought together graduate students and academics interested in issues of Science Communication, Policy, Design, but also Science, Technology, and Society studies (Charles University, National University of Singapore), members of the Hackerspace in Prague (Brmlab.cz) involved in building neuromodulators affecting cognitive functions, and also artists and designers from CIANT, Prague (Center for Art and New Technologies), who work with brain data. The work was also consulted with neuroscientists, policy and industry experts from UK, US, and Singapore, and partially documented in a form of a wiki, which is supporting the ongoing projects. Together we created a design fiction on neuromodulators "Citizen Oxygen Monitoring Agency (COMA)," which revamped Foucault's biopolitics, but also a proposal for brain data market and a DIY (Do-It-Yourself) kit for sharing EEG/EMG/ECG data (MindSpy.org). The prototypes were material (mock-ups and existing neuromodulators), but also conceptual (design fiction), and our reflection and experience with them was happening in parallel, and some of the research is still ongoing both in Prague and Singapore.

Conclusion

Agamben described paradigms as an attitude rather than a methodology, which brings together reflection and practice into a hermeneutic circle or a "form of life" (*forma vitae*). They inspire everyone to perform them, rethink them, test them, and in similar manner, people also build and test prototype kits. To perform an insight or experience with building a tool is more than to accept something as a given representation, which just needs to repeated, or to buy a products and simply use based on the manual. Building a tool from a kit or using a paradigm is a performance that emphasizes its own singularity rather than its perfection and it also makes you a part of a community:

> [A]t least until Saint Benedict, the *rule does not indicate a general norm but the living community (koinos bios, cenobio) that results from an example and in which the life of each monk tends at the limit to become paradigmatic – that is, constitute itself as forma vitae* […] paradigm entails a movement that goes from singularity to singularity and, without ever leaving singularity, transforms every singular case into an exemplar of a general rule that can never be stated a priori.[xxiii]

The prototypes, as I understand them and follow them around the world since 2010, form such living and global communities around the hackerspaces and through the various uses of wikis and other social media. They are learning and research tools, with serve both individual and collective goals and needs. They are like probes into possible futures, which we need to negotiate and decide upon by actively tinkering and following their production. They are not just tools, which designer use to gather user requirements, test ideas of future products or improve present tools, but more like tools of imagining, negotiating and empowering. Furthermore, they are used not only by designers and engineers, but also by geeks, science amateurs, various dreamers and tinkerers around the world. They can break idols like Nietzsche's "hammer," but they can also restore a sense of connection with the world of man made objects like Heidegger's pitcher. They often express and "do" what philosophers hoped to achieve with various other "metaphorical" objects in their writings. They can be like Mao's pears, which we need to taste and consume in order to transform the world and understand how our thinking and action form history:

> Whoever wants to know a thing has no way of doing so except by coming into contact with it, that is, by living (practicing) in its environment. […] *If you want knowledge, you must take part in the practice of changing reality. If you want to know the taste of a pear, you must change the pear by eating it yourself* […]. If you want to know the theory and methods of revolution, you must take part in revolution. All genuine knowledge originates in direct experience.[xxiv]

They are also like Saint-Exupéry's "boats," which enable us to long for the "endless immensity of the sea," to dream and create visions of a future, which is maybe not achivable in the present, but inspire us to take immense challenges: "If you want to build a ship, don't drum up people to collect wood and don't assign them tasks and work, but rather teach them to long for the endless immensity of the sea." That is why our response to the crises and a proposal for "pedagogy" is to build prototypes, individually and collectively, and to engage with all forms of present materiality with its complex legal, economic and social contexts. Eat Mao's pears, drink with Heidegger's pitcher, break idols with Nietzsche's hammer and sail with Saint-Exupéry's boats, but do not only read about them!

[i] Emilio Ambasz and N.Y. York. *The Universitas Project: Solutions for a Post-Technological Society* (New York: The Museum Of Modern Art, 2006), 299. My emphasis.

[ii] See Lloyd L. Weinreb, *Natural Law and Justice* (Cambridge: Harvard University Press, 1987).

[iii] Ambasz and York, *The Universitas Project,* 31. My emphasis.

[iv] See Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge* (Minneapolis: University of Minnesota Press, 1984).

[v] Kevin Poulsen, "MIT Moves to Intervene in Release of Aaron Swartz's Secret Service File," *Wired* (July 18, 2013, accessed July 20, 2013): http://www.wired.com/threatlevel/2013/07/mit-swartz-intervene.

[v] United States Holocaust Memorial Museum. "Martin Niemöller: First they came for the Socialists…," (accessed July 20, 2013): http://www.ushmm.org/wlc/en/article.php?ModuleId=10007392

[v] Jacques Rancière, *The Ignorant Schoolmaster: Five Lessons in Intellectual Emancipation.* (Stanford: Stanford University Press, 1991), 64-65. My emphasis.

[vi] Giorgio Agamben, *The Signature of All Things: On Method,* trans. Kevin Attell (New York: Zone Books, 2009), 11-12. My emphasis

[vii] "Giorgio Agamben - What is a Paradigm - 2002." The European Graduate School - Media and Communication - Graduate & Postgraduate Studies Program (accessed July 22, 2013): http://www.egs.edu/faculty/giorgio-agamben/articles/what-is-a-paradigm/. My emphasis.

[vii] Agamben, *The Signature of Things,* 32. My emphasis.

[viii] See Lisa Jardine, *Francis Bacon: Discovery and the Art of Discourse* (London: Cambridge University Press, 1974) and Glen R. Driscoll, Paolo Rossi, and Sacha Rabinovitch. "Francis Bacon: From Magic To Science." *The American Historical Review* 74.3 (1969): 979.

[ix] See Antonio Pérez-Ramos, "Francis Bacon And The Disputations Of The Learned." T*he British Journal for the Philosophy of Science* 42.4 (1991): 577-88.

[x] See Larry Stewart, Robert K. Faulkner, and John E. Leary. "Francis Bacon And The Project Of Progress," *The American Historical Review* 100.4 (1995): 1245.

[xi] See Tara Nummedal, "Words and Works in the History of Alchemy." *Isis,* 102, no. 2 (2011): 330-7 and William Royall Newman, *Promethean Ambitions: Alchemy and the Quest to Perfect Nature* (Chicago: University of Chicago Press, 2004).

[xii] See Pérez-Ramos, "Francis Bacon."

[xiii] Ibid.

[xiv] See Pamela H. Smith, *The Business of Alchemy: Science and Culture in the Holy Roman Empire.* (Princeton: Princeton University Press, 1994).

[xv] See Newman, *Promethean Ambitions.*

[xvi] Nummedal, "Words and Works in the History of Alchemy," 331.

[xvii] See Nummedal, "Words and Works in the History of Alchemy" and Newman, *Promethean Ambitions.*

[xviii] See Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge: Harvard University Press, 2004).

[xix] "NeuroNetworking - Hackteria." Design for NeuroNetwoking: How to Interact over Brain Data?" | 27 – 30 April 2012, Prague. http://hackteria.org/wiki/index.php/NeuroNetworking (accessed July 22, 2013). [xix] Agamben, *The Signature of Things,* 21-2. My emphasis.

[xx] http://www.marxists.org/reference/archive/mao/works/red-book/ch22.htm. My emphasis.