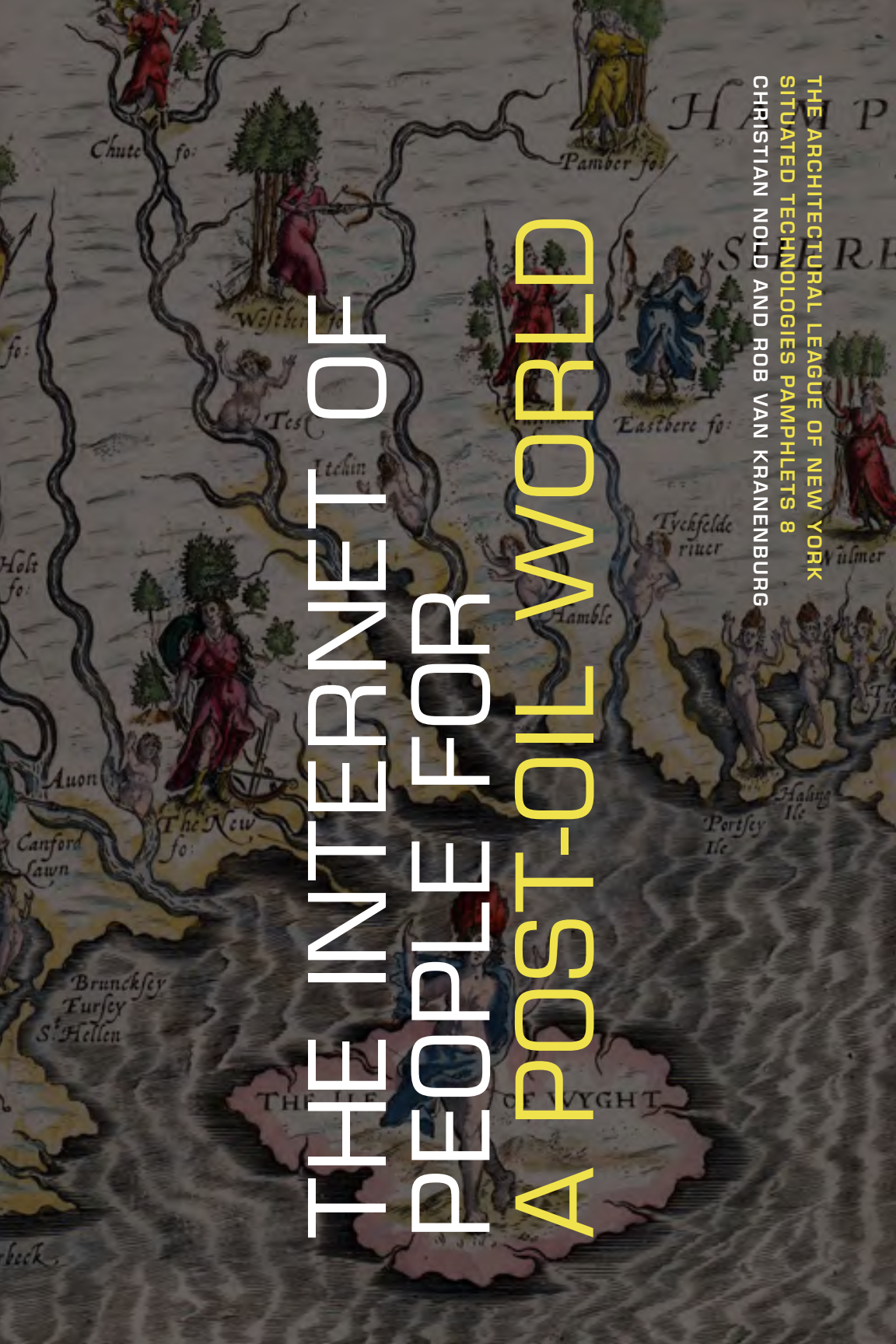


THE ARCHITECTURAL LEAGUE OF NEW YORK
SITUATED TECHNOLOGIES PAMPHLETS 8
CHRISTIAN NOLD AND ROB VAN KRANENBURG

FROM POST-
MODERNISM TO
THE PEOPLE FOR
THE INTERNET



THE INTERNET OF PEOPLE FOR A POST-OIL WORLD

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Situated Technologies Pamphlets 8:

The Internet of People for a Post-Oil World

Christian Nold and Rob van Kranenburg

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Published by: The Architectural League of New York

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ISBN 978-0-9800994-7-8

The Situated Technologies Pamphlet Series extends a discourse initiated in the summer of 2006 by a three-month-long discussion on the Institute for Distributed Creativity (IDC) mailing list that culminated in the Architecture and Situated Technologies symposium at the Urban Center and Eyebeam in New York, co-produced by the Center for Virtual Architecture (CVA), the Architectural League of New York and the IDC. The series explores the implications of ubiquitous computing for architecture and urbanism: how our experience of space and the choices we make within it are affected by a range of mobile, pervasive, embedded, or otherwise “situated” technologies. Published three times a year over three years, the series is structured as a succession of nine “conversations” between researchers, writers, and other practitioners from architecture, art, philosophy of technology, comparative media studies, performance studies, and engineering.

www.situatedtechnologies.net

AN INTERNET OF PEOPLE

A silent transformation in the global organization of the way our cities work is upon us. The world of the Internet of Things is dominated by stories that engage citizens solely as consumers or subjects of control. The ever-growing array of embedded networked systems and practices is a moving target with constantly emerging trends, tools and platforms. Participation is often unnoticeable and membership mandated; effective refusal is impossible. Users become more vulnerable to commercial enticements and marketing approaches.

The authors of this Situated Technologies pamphlet propose an Internet of Things that goes beyond use rights. They call the reader to reclaim a politics of technology that is based on the struggle over the terms of their own participation. Today, informed citizenship demands knowledge about the technical protocols that run our lives.

Capital is drinking the earth dry. The authors are not convinced by the emancipatory possibilities of the existing military enterprise of the Internet of Things. Simply used as intended, these technologies will not solve serious problems like dramatic climate change or peak oil. How can we escape the imperial Ferris Wheel of the corporate capture of value? Where do we search for power and where do we look for change?

This publication initiates a public debate about an Internet of Things (IoT) in the public interest. Nold and Kranenburg propose tangible design interventions that challenge the need for commercial tools. They emphasize that people from all walks of life have to be at the table when we talk about alternate uses of ubiquitous computing.

This discourse is situated in the context of the history of public media. The authors suggest an IoT as a non-commercial refuge, as an umbrella of emerging technologies that do not only serve capital but also facilitate grassroots survival networks in a world faced with ecological and social devastation. Ultimately, Kranenburg and Nold ask us to re-engage the creative capacities of platforms to live and politicize our troubled complicity.

Omar Khan, Trebor Scholz and Mark Shepard

Rob van Kranenburg is a teacher and writer. He wrote *The Internet of Things*, a critique of ambient technology and the all-seeing RFID network. For the past ten years he has been involved in the human and social aspects of ubiquitous computing and “smart cities.” Kranenburg has co-founded Bricolabs to investigate open source hardware and alternative scenarios (www.bricolabs.net). He also founded Council, a think tank for the Internet of Things (www.theinternetofthings.eu). Both projects have led him to believe that we have a huge agency for taking matters into our own hands now.

Christian Nold is an artist, designer and educator working to develop new participatory models and technologies for communal representation. In 2001 he wrote *Mobile Vulgus*,ⁱ which examined the psychosomatic history of the political crowd. Since graduating from the Royal College of Art in 2004, Nold has led many large-scale participatory mapping projects. In particular his Bio Mapping project has been staged in sixteen different countries with more than 1500 workshop participants. In 2009, Nold edited the *Emotional Cartography—Technologies of the Self*.ⁱⁱ For the last six years, Nold has been developing an extensive tool-kit of technologies that blend together human and non-human sensors for local governance. In 2010, Nold launched an experimental currency, the “Bijlmer Euro,” which allows people to follow where their money moves.

CONTENTS

11	Preface
12	Technology and Breakdown
14	Internet of Things Fantasies
19	Breakdown
28	Protocols & Standards
30	How are Standards Made?
40	Qualities of the Post-Oil Internet of People
42	Proximity
46	System Thinking
50	Affect
53	Sociability Standards for the Internet of People
55	References
59	Endnotes
62	Photography Credits
63	Situated Technologies Pamphlets Series
66	About the Architectural League

PREFACE

This pamphlet is intended as a gut instinct census of how techno-social change is driving us to a future in the Internet of Things. We feel that unless we redirect our societal energies, we will be driving ourselves into a concrete wall of ecological, economic and social crisis. We believe that the answer lies in a dual process of horizontally scaling grass roots workshops in conjunction with a social standard for governments and companies to allow cooperation.

We first met in 2001 in the context of the publication of the book *Mobile Vulgus*, which combined our shared interest in tools of political self-identification through embodied action. This Situated Technologies pamphlet continues the dialogue to delineate the foundations of a future manifesto for an Internet of People. The pamphlet was constructed through a real time dialogue over a period of several months using Skype and the collaborative open source text editing tool EtherPad.

WHAT IS THE INTERNET OF THINGS (IOT)?

CN **Christian Nold:** What do people mean when they talk about the Internet of Things (IoT)? What are its aims and limits?

RK **Rob van Kranenburg:** The Internet of Things is a vision to build a world where every object can be approached both through analog and digital methods. Most objects that are sold today have barcodes that identify them in a batch. Over the next few years, we will see a logistic ecology of barcodes: 2- and 3-D barcodes that are readable with mobile phones, Ipv6,^{III} 6Lowpan,^{IV} and radio frequency identification (RFID). The latter are tiny chips that are uniquely identifiable but that do not have batteries. They are activated by radio waves generated by RFID readers that are either mobile or installed in stores or offices. Mobile phones will increasingly include RFID readers. The small antenna of the RFID chip picks up the waves from the reader and sends back its unique number. It says, “Here I am.” Every can of Coke can has its own name. “Why is that necessary?” you may ask. Well, there is such a thing as shelf space management. If a customer picks up a can, an associate in the store receives an alert asking him to replace it. There is a “hit” in a database. Somewhere, a unique number pops up and says “hi there.” And whenever a number appears, a certain value can be attached to that number, a specific action or note can be associated with that number. In this case, the associate may get a message asking him or her to restock the soda. The whole purpose of the system is to script some sense of order into the world.

CN The origin for the Internet of Things (IoT) is a logistics-driven idea where individual consumer items are tracked, which also invites the possibility of tracking people. It seems to be an attempt to create order while having the potential for chaos.

RK Tracking is something that we have to take for granted. The Internet of Things extends a situation that exists already: all of our web activity, phone calls and text messages are being stored for potential future retrieval.

CN I hope the IoT will become something different. For me it’s a hyper-localized articulation of what used to be called pervasive computing. This is not just passive technology but also something that gives people new ways to interact with the world. When technologists,

critics or even pundits discuss the Internet of Things, they tend to conjure up science fiction scenarios. Can we gauge the scope and limits of the Internet of Things?

RK The limit is a situation in which there are only sets of qualities, no more “people,” “places,” “things,” or “situations.” Humans and machines are the same. In each IoT scenario machine-to-machine operations are very important, from basic logistics to anti-theft measures, e-health and energy efficient cities. This is a condition where human agency is no longer “in full control.” We surely know that hurricanes and volcanoes are not controllable but nevertheless, we have this idea of our primacy of agency as givers of meaning in this world.

CN The current military metaphor is that the human is “in-the-loop,” meaning that a human operator is watching the machine going through its autonomous loop. I don’t think class tensions or other power relations will disappear. Power will be felt in very concrete terms in this projected future. In one vision, it will be about high-tech fences and in another about artisan survival tools. It’s important to note that we are not talking about distant science fiction scenarios but the technology of the next twenty years. However, I don’t think we will experience a singularity or a trans-humanist merger of everything. We will have to fight in order to embed the qualities and values that we want to be present in the technologies that surround us.

RK The ultimate limit and scope of the IoT is demonstrated by the Sensing Planet idea. Here, enormous globally distributed sensor grids capture all natural processes and store them in the cloud. The assumption is that we can analyze, predict, act and prevent. Imagine our big Earth ball floating in space, harnessed and being steered in different directions, almost like a space ship. The question is who is in command. Industrial giants such as IBM and Cisco propagate Smart Cities. The Chinese government is proposing a so-called Sensing Planet. In 2006, when I first read their RFID white paper, I was quite surprised to see that fifteen ministries and commissions including the Ministry of Science and Technology had released it¹.

CN I think most of the fantasies for these technologies revolve around making the whole of the human and natural environment legible for computer systems. This is a vision of a totally integrated



¹ <http://www.theinternetofthings.eu/content/chinese-premier-wen-jiaobao-internet-things>

techno-society which aims at “seeing” the state of the world in real-time and creating its own seamless reality. It corresponds with a US military fantasy of Smart Dust, scattered across the world, tracking even the tiniest movements.² Most of my work aims to provide alternative visions and tools to counter this desire for total legibility. Machines and humans have distinctly different competencies that complement but do not substitute each other. In my project Bio Mapping, it is the unlikely combination of a lie detector with GPS that allows new agency to emerge through the seams and gaps of technological and human cognition. We should make sure that a wide variety of qualities is embedded in the IoT, helping us to create a tangible vision that focuses on providing value for people.

RK Unfortunately, the most tangible actualization of current Internet of Things (IoT) metaphors is the exoskeleton system,³ which would “provide soldiers, disaster relief workers, wildfire fighters, and other emergency personnel the ability to carry major loads such as food, rescue equipment, first-aid supplies, communications gear and weaponry with minimal effort.”^v Today, commandos are directed through the battlefield with the help of real time camera feedback. Tomorrow, consumers will be steered through smart shopping malls based on their status updates and spending profiles.

CN These are extreme fantasies but fortunately, they are only bullet points in a PowerPoint presentation. There are good reasons why those scenarios would never become reality.

RK What do you mean by fantasy? Those scenarios, the Sensing Planet and the blending of humans and things, are quite viable.

CN I call them fantasies because they have little meaning unless they reach their ultimate goal. This is different from research or an experimental process that has value whatever its outcome. Imagine that instead of being able to seed the whole planet with sensors they can only cover a university. While that is interesting, it’s a long way from a universal Panopticon. Today’s sensor grids fall far short of these goals, and it would be hard to justify the enormous expenditures, if they did not aim towards a totalizing ideology. There is no doubt that we will get more accurate weather forecasts but nothing close to being able to control the global weather systems, for example.

² <http://www.abovetopsecret.com/forum/thread569305/pg1>

³ http://www.ornl.gov/-webworks/cpr/rpt/108469_.pdf



It's amazing that in 2010 there are only about one hundred real-time, public pollution sensors for all of London, a city of fourteen million people (LondonAir).^{vi} What we need is a better sensor-to-people ratio and a meaningful granularity of sensors that would allow local residents to identify polluting industries. Instead of the hubris of trying to build a Sensing Planet, let's do something as basic and useful for people as creating functioning systems that sense the location of buses to help them run on time.

RK I agree, instead of the Internet of Things let's call it the Internet of People. We are talking about a network of relationships between people. In our vision, people are not just in the loop but its main locus and scale reference. There are very few sensor dashboards that are accessible to us. In the mid-1990's we saw the first attempts to give citizens real-time feedback on public transportation in cities. The European Union had a productive R&D scheme for academics and companies called Intelligent Information Interfaces, which included projects like Ambient Agoras, Interliving and Grocer. All of these initiatives considered the future of the grocery store. Also in 1996, Philips developed a social RFID project called Living Memory (LiMe)⁴ that would "provide members of a local community with a means to capture, share and explore their collective memories" ^{vii} via RFID tokens that interact with screens in bars and bus stop information boards. Hardly any of these projects led to the creation of actual products because companies could not agree on the intellectual property for the things that were developed and the timing for such business models was off.

CN These were the kind of projects that were introduced to us when I was studying Interaction Design in 2004. Despite their progressive aims, they always appeared to result in odd prototypes, photographed in front of blank backgrounds. They were missing the messiness of the world and never seemed real. They lacked the involvement of people who might actually use this stuff. The mid-1990s were a golden moment, however, simply because researchers and companies pursued socially productive instead of military or consumption-oriented scenarios. What went wrong?

RK They did not produce anything but they learned from these projects so that today discussions focus more on co-creation and real people. They are ready for our vision. In 2003, at a time when

⁴ <http://www.idsa.org/content/content1/living-memory-lime-concept>

companies funded pure research projects like LiMe, Steven Kyffin of Philips stated:

USEFUL . . . listening to and developing technology for ordinary people sums up what we might refer to as Co-Creative design. Involving the end user in a core and proactive manner at all stages in the product or system creation process.

RELEVANT . . . listening to and developing technology for ordinary people is so relevant because the “ordinary . . . ness” is the issue.⁶

CN These are important lessons but there is still a long way to go. On the one hand enterprises talk about co-design, on the other they speak about “ordinary people” without unique and specific knowledge. Technology companies don’t yet know how to work with empowered local and issue-based groups that want to drive innovation. It will take the impending crisis of climate change and peak oil to force enterprises to drop their attitudes and collaborate with a large variety of actors. It may take something as dramatic as a climate change induced large-scale natural disaster to get them to truly consider co-design.

BREAKDOWNS

CN I don’t claim any particular knowledge in climate sciences but would like to illustrate the problem with a few quotes. The author Mark Lynas worked his way through thousands of academic, peer-reviewed papers to write the prize-winning book *Six Degrees: Our Future on a Hotter Planet*. He distilled current scientific research on climate change and translated it into a series of global temperature increases:

1° C increase: *Ice-free sea absorbs more heat and accelerates global warming; fresh water lost from a third of the world’s surface; low-lying coastlines flooded.*

2° C increase: *Europeans dying of heatstroke; forests ravaged by fire; stressed plants emitting carbon rather than absorbing it; a third of all species face extinction.*

3° C increase: *Carbon release from vegetation and soils speeds global warming; death of the Amazon rainforest; super-hurricanes hit coastal cities; starvation in Africa.*

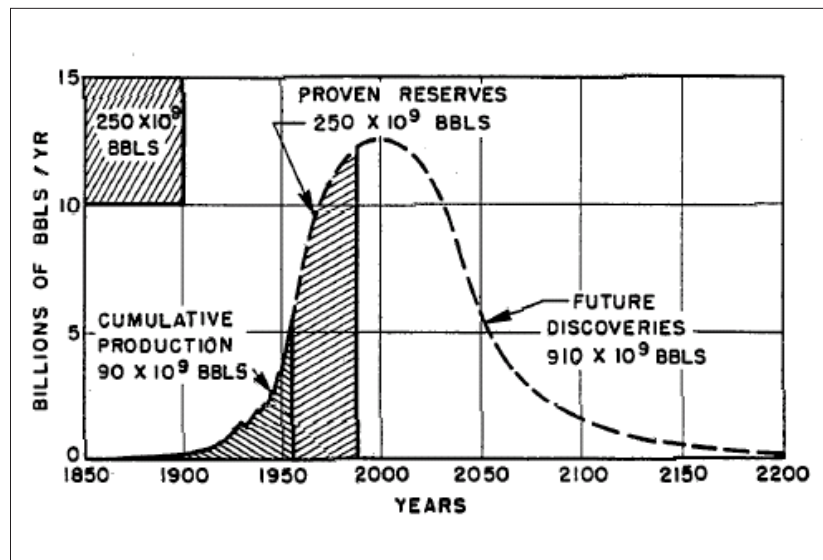
4° C increase: *Runaway thaw of permafrost makes global warming unstoppable; much of Britain made uninhabitable by severe flooding; Mediterranean region abandoned.*

5° C increase: *Methane from ocean floor accelerates global warming; ice gone from both poles; humans migrate in search of food and try vainly to live off the land like animals.*

6° C increase: *Life on earth ends with apocalyptic storms, flash floods, hydrogen sulphide gas and methane fireballs racing across the globe with the power of atomic bombs; only fungi survive.^{1x}*

The question is how far we go on that scale. In 2009, *The Guardian* newspaper conducted a poll that showed that nine out of ten climate scientists say that they do not believe that political efforts to restrict global warming to 2°C will succeed^x and that “an average rise of 4–5 °C by the end of this century is more likely.”

The real kicker is that cheap oil is running out. Most researchers argue that peak oil—the point of maximum petroleum extraction—occurred



at some point between 2000 and 2008. While global demand for oil is still going up, the actual amount we can use is going down. Many of the high-tech solutions that might be imagined for climate change will not be feasible due to lack of raw materials and transportation. Just look at the present scarcity of rare earth metals to understand how vulnerable we are in rich industrialized countries. It may be a shock to many technologists but we will almost certainly see an end to Moore's Law of ever increasing computing speed, for ecological and economic rather than technical reasons. If the scientific consensus can be believed, then most people reading this pamphlet will see dramatic changes within their own lifetime. This gives us a short time frame to build novel types of technology that will support strong local relationships that make areas resilient in the face of impending global failure. Nobody can predict the exact technologies that will make up the Internet of People. It will depend on the speed of climate change and the impact of peak oil. It seems clear that the present centralized system will break down. We will have to build a post-oil network composed of Islands of Things, hopefully not separated by water but made up of local units of organization and production. In the future, we will either have technology designed for a supply chain that does not exist anymore or we will have to build a new set of island technologies.

RK This urgency is key to bridging our scenarios to a wider audience of companies and governments. The arguments are all there but in themselves they will not create societal "change." Locating the arguments and facts is simply not enough. We also need to consider timing, the Zeitgeist. When I grew up it was all about Acid Rain and I would get scared about the leaves on trees turning brown. There are moments when society is ready to act on a specific issue.

CN This is how it looks from the media perspective where certain issues grab the "public" imagination and then subside. Media oligarchy is so powerful that grassroots responses to climate change don't garner much media attention. However, the sort of resilient networks we are talking about can be built by a variety of groups. At some point, people will notice that there is all this useful and flexible public infrastructure and vibrant culture in their local area. Suddenly, it will just start to make sense for people to live, work, eat and produce more locally.

RK Climate change and peak oil are also contributing to social breakdown and we have to deal with that. Over the past eight years I have seen the "New Middle Ages" scenario becoming more and more of a reality. We are witnessing the erosion of the nation state, for example. European countries have dismantled themselves even before a European identity was formed.

The most influential politicians in the 1950s having fought two World Wars on the old continent could not have envisaged TCP/IP^x and the web browser early in the 1990s. They simply launched their three-step program: privatize public instruments, create the Euro and harmonize law. They did not believe in citizens as a potentially strong force. These politicians believed that their systemic approach could dismantle national states while citizens would still keep paying roughly half of their income in taxes, as if they still benefitted from public services, their own currency and their own law (in any given EU country up to 85% of the law follows EU law).^{xii} I argue now as I have argued in the past that citizens equipped with 4G (the fourth generation of cellular wireless standards) and access to their personal sensor networks will start organizing their own social networks. Open services such as Pachube⁵ will help with that. Citizens are disenchanted with EU governance. "But where will they go?" an angry participant at a EU workshop

⁵ <http://www.pachube.com/>

asked me recently. They will stay right there. All over Europe, the jails are full and even if they would be vacant, they could not house even a small percentage of the tens of thousands of people who will refuse to pay taxes in the face of such ineffective models of governance.

CN There is a social media middle class that feels that they can use technology to push reactionary politics. In the UK, the government tried to introduce a policy for checking the financial means of parents before paying child benefits, meaning that the rich would stop being paid money for every child in the family. Immediately, there was an outraged response coordinated through the Mums-net website,⁶ from which a “spokesperson” promptly appeared on TV arguing for universal parental rights. This British web forum with some 25,000 posts a day is so powerful that the last two UK prime ministers have both agreed to give interviews on Mums-net, hoping to recruit the one million women voters who are active on the site. In response to the televised protest, the government immediately retreated. This Mums-net movement is a kind of European libertarianism that is not unlike the calls for “no taxation without representation” by the Republican Tea Party in the United States.



⁶ <http://www.mumsnet.com/>

RK The Tea Party is emblematic of the same selfish middle class that aims to build gated communities, leaving the inner cities and suburbs to struggle on their own. Detroit is a good example. Over the past decade it lost millions of inhabitants due to the crisis in the automobile industry. According to the Census Bureau American Community Survey in 2007, Detroit was the poorest big city in the U.S. “Nearly one in three workers was unemployed. The city’s population has shrunk to a mere 40% of what it once was. Vacant houses and empty lots comprise large portions of Detroit’s land area.” Yet this moment of breakdown has also brought about a new beginning of urban farming collectives. Stacy Mitchell of New Rules Project⁷ writes that homegrown enterprises in Detroit are leading the way “to a promising new economy—one that is locally owned, oriented toward local needs, and capable of cultivating value from resources discarded by corporate America.” She refers to neighborhood shopping, 1,200 urban farms and community gardens. She argues that “it’s all too easy, even for residents, to overlook Detroit’s homegrown businesses, especially its many recent start-ups. Lacking the high-profile and advertising muscle of the chains, they don’t make it onto people’s mental maps of the city.”^{xiii}

I’m encouraged by data from the 2010 US Census, which shows an increase in both the number and revenue of independent greengrocers, bakeries, and other neighborhood food stores. Their employees earned 35% more per year than employees of national chains. University of New Hampshire researchers found that neighborhoods “that are more [open to walking] had higher levels of social capital such as trust among neighbors and participation in community events.” The researchers note “that it also points to the need to incorporate the relatively new concept of ‘resiliency’ in infrastructure design—building systems to survive, adapt, and grow in the face of an uncertain future.”⁸

CN We have identified two models for decentralization. The first one is a selfish social media middle class breaking away from society to form gated settlements, while the second one builds resilient local grassroots communities. These two models are grounded in distinctly different notions of the social.

RK Recently, I was teaching a group of young IT students about mobile phone applications. One student team designed an iPhone game that would alert them if they passed someone on the street who is in

⁷ <http://www.newrules.org/>

⁸ http://www.usnews.com/mobile/articles_mobile/walkable-neighborhoods-rich-in-social-capital



their wider Facebook network. I asked them if they ever approached someone in the street, say for directions? They never did. I promptly asked them to go to the train station and talk to a stranger but they did not do it. They did not dare to. Their teachers told me that students working on a project will not even call their client. They hesitate to use the phone for calls and generally postpone face-to-face contact. For the next year, we devised a GPS game that requires all gamers to have face-to-face contact before they can progress in the game.

CN I am frustrated by this glut of inane mobile games that simulate sociality. Both, the social media and grassroots models will become more polarized as climate change and peak oil intensify. The central question is how we want to live our lives in reaction to these challenges.

An important lesson for the Internet of Things is the Special Period⁹ in Cuba during the early 1990's. The Soviet Union had just imploded and Cuba's supply of cheap imported oil disappeared, which, combined with the US blockade, led to Cuba having to deal with its own "artificial" peak-oil. For Cuba this sudden oil scarcity led to an immediate one-third-GDP (Power of Community)^{xiv} cut as well as food shortages and malnutrition. The body weight of the average Cuban dropped by twenty pounds. The government didn't know how to deal with this challenge. Local city block organizations started to promote locally grown food. Over the last twenty years, this has been so successful that today 85% of food in Cuba is organic and the calorie intake is back to pre-peak oil levels.^{xv} In fact, Cubans became healthier because of the involuntary vegetarian diet and increase in exercise. The American Journal of Epidemiology reported a significant decline in diabetes, coronary heart disease and stroke. Cubans also adapted a range of technologies like the well-known "Camels," flatbed trucks converted into buses that can carry up to three hundred passengers.

Extending this Cuban example, the Russian anarchist Kropotkin offers a powerful vision of production through small-scale physical workshops, which in the Internet of People brings together low and high-tech bike repair and sensor networks.

A reorganized society will have to abandon the fallacy of nations specialized for the production of either agricultural or manufactured produce. It

⁹ <http://www.historyofcuba.com/history/havana/lperez2.htm>

will have to rely on itself for the production of food and many, if not most, of the raw materials; it must find the best means of combining agriculture with manufacture—the work in the field with a decentralized industry; and it will have to provide for “integrated education,” which education alone, by teaching both science and handicraft from earliest childhood, can give to society the men and women it really needs. (Kropotkin)^{xvi}

—Fields Factories and Workshops

This vision of workshops is the conceptual ancestor of today’s Hackspaces, which are loosely organized community workshops where people come together to experiment, build and share skills and ideas. Whenever I visit my local London Hackspace, I am amazed by the variety of activities. People are laser cutting and 3D printing objects from computer games while others learn to lock pick, make cakes or hand carve a new handle for their grandfather’s wood axe. The atmosphere of these workshops is inspiring; people work with an energy that is more intense than what is typical for a hobby and it also does not feel like work.

Whatever the occupation preferred by everyone, everyone will be the more useful in his own branch if he is in possession of a serious scientific knowledge. And, whosoever he might be—scientist or artist, physicist or surgeon, chemist or sociologist, historian or poet—he would be the gainer if he spent a part of his life in the workshop and the farm, if he were in contact with humanity in its daily work, and had the satisfaction of knowing that he himself discharges his duties as an unprivileged producer of wealth.^{xvii}

The second aspect of Kropotkin’s workshops is a very practical vision of the Renaissance woman who combines sciences as well manual and intellectual work. Working locally allows what the American activist Michael Albert, calls balanced job complexes in his vision of Participatory Economics (Parecon):

Parecon’s antidote to corporate divisions of labor imposing class division is that if you work at a particularly unpleasant and disempowering task for some time each day or week, then for some other time you should work at more pleasant and empowering tasks. Overall, people should not do either rote and unpleasant work or conceptual and empowering work all the time. We should each instead have a balanced mix of tasks.^{xviii}

This model of local workshops allows people to do a variety of work, some manual, some intellectual, some exciting and some less so. If we produce things in our local area, we get fulfillment from our multiple roles of manual work as well as empowering brainwork and will not need “hobbies” anymore. The Internet of People enables a vision of globally interconnected workshops that change the type of things we produce, as well as our social and cultural relations in which we do so. We don’t have to wait for major climate disasters to happen before industry will re-orientate itself. Small open source workshops already exist in most towns. The social and technical networking of these workshops will form the global backbone for open collaboration in the future Internet of People. Interconnecting in this way sounds like it might need “standards” or protocols. Who is currently doing the interconnecting and making of these standards?

RK Interconnecting in this way might require “standards” or “protocols.” Who is currently providing these standards?

CN The MIT Fab Lab concept concept¹⁰ is a useful model but we will need a social framework that is less exclusive, allowing a larger variety of people, groups and companies to collaborate. Setting social standards for design will move industry away from thinking of people as undifferentiated global consumers towards becoming equal partners with mutual expertise.

We need to transform the wasteful mass production of mobile devices into the creation of resilient communication devices that enable local networks. Standards will facilitate new business models for co-operation between companies and hackers to create locally meaningful technologies. Government plays a crucial role in this context. It needs to have a vision that looks beyond the immediate horizon and push companies towards collaborating on social standards. Are there any useful precedents in the history of the Internet of Things (IoT)?

RK The barcode is an amazing technical protocol, in commercial use since 1974. Who would have thought barcodes would become so pervasive? It was negotiated by standards organizations that brought thousands of companies together, “forcing” companies not to compete on that particular level. Sony doesn’t stop Philips reading its barcode, for example. To get these corporations to that point is politics.

CN It was the generic container that enabled global supply chains. All trucks and container boats share the same footprint that allows quick transfers and easy stacking of many different goods. Today it is cheaper to transport a package on a container ship from China to the UK, than it is to get the item transported by truck from a given warehouse to my home. When “containerization” was introduced in the early 1900s it had an enormous political cost with large-scale protests from dockworkers that lost their jobs. In fact, globalization and “containerization” changed the social landscape of large parts of Britain where workers are now unemployed and de-skilled. The shipping container is a physical yet publicly invisible protocol that has enormous impact on all of us.

¹⁰ <http://fab.cba.mit.edu/>

While these protocols allow the collaboration of different industries and shift social and economic realities, the benefits for the public are not clear. In Kropotkin’s vision, people see the resources and the waste of production. With these technical protocols we offload the human and ecological impacts to the beginning of the supply chain, while consumers only take notice of cheap end products.

RK The point about technical protocols is that they seem so “objective,” as if they were natural, or “always there.” This is not the case. Interested parties have always made them. The story of the current RFID standard called “EPC Global” is the story of two standard bodies EAN (European Article Number) and UCC (Uniform Code Council) merging in 2005 to become GS1, an international not-for-profit association with member organizations in over 100 countries. In a bold move that no regulator foresaw, they scaled their data unit from being in a batch of 10,000 (the barcode) to that of the uniquely identifiable item, namely the unique identifier that is RFID. Holding your phone to a package of coffee not only gives you information on where it came from, how green it is, but also who, in your social network on LinkedIn or Facebook, is buying it. From a very mundane and “dull” logistics tracker of batches of goods they are now enablers of rich information that can potentially target individual people in their consuming, informational and social habits. GS1 is potentially a media company.

CN You are right, we are only now starting to understand the power of RFID and the amazing mission creep that took place. The RFID standard which was about managing stock levels managed to transform itself into mediating relationships between people. By starting with an upfront awareness of the ways these technical protocols re-write social relationships, we can create more democratic and inclusive standards.

RK The people who make standards are the same people who make the profits from the products and the platforms. It is only because of the recent development of the Internet that we as non-specialists can see and follow precisely what has been going on behind this procedure of making standards. In all other centuries we as a general audience would never have had access to this information. I think we can safely say that this is why standards have been on the side of intellectual property and profit making, not on the side of free flow of information or sharing schemes.

The Internet of Things (IoT) will be the new law. That is why I set up the Council think tank as a loose but growing group of currently seventy-one key experts on hardware, software, platforms and applications. In the coming years, this mix can advise governments and institutions on how to transform into interconnected workshops. I believe that the European Parliament can work perfectly with the EU Commission on a vision of an open IoP—an Internet of People—publicly owned, much like the railways: keep the tracks but rent out the use of it.

CN Kropotkin talks about railways as being constructed piece by piece, the pieces were joined together, and the hundred different companies, to whom these pieces belonged, gradually came to an understanding concerning the arrival and departure of their trains, and the running of carriages on their rails, from all countries, without unloading merchandise as it passes from one network to another. All this was done by free agreement, by exchange of letters and proposals, and by congresses at which delegates met to discuss well specified special points, and to come to an agreement about them, but not to make laws And the most interesting thing in this organization is that there is no European Central Government of Railways! Nothing! No minister of railways, no dictator, not even a continental parliament, not even a directing committee! Everything is done by free agreement.¹¹

RK This sounds utopian, as we have become used to small numbers of people making decisions. Yet if you examine the historical turning point of the beginning of WWII, you'll find authors like Richard Owen who shows in *Countdown to War* (2009) that the decision to go to war was made on both sides in a "growing state of irrationality." Protagonists on either side were dead tired. All we know is that a handful of human beings found themselves in such a mental cul-de-sac that the

¹⁰ http://dwardmac.pitzer.edu/anarchist_archives/kropotkin/Fieldsch1.html

decision came as a huge relief, millions of people died and millions of others lost the chance to lead their lives.

Without input on a policy level from our side the only "players" will be logistics, retail, military, Web 2.0 and 3.0 applications. Designers, artists and philosophers are only asked to comment on infrastructure, not help build it. The IoT in Europe is at a crossroads from a policy perspective. The anti-terror and control paradigm is well funded in terms of EU research programs. In the European Commission FP7 security strand there are about forty-five projects funded with over 1.4 billion Euros^{xix} on item level tracking in cities, smart cameras in public spaces, all fuelled by notions of control, surveillance and a basic distrust in their own citizens.

CN Funding is available, which could be used to set up these new social standards. Reading EU reports on the IoT, the language of the reports sounds hands-off and focused on an amorphous concept of privacy. At present, the EU seems to limit its role to promoting consumer rights, rather than empowering novel actors in the Internet of Things (IoT). I would like the EU to acknowledge and support citizen authored standards. You just have to look at the success of Open Street Map (OSM) which started in 2004, and today has 300,000 citizen cartographers and provides an open source-mapping layer for the whole world. Its map data is better than most proprietary and commercial sets and companies such as Microsoft and AOL are moving over to using the open source alternative. I don't see why the EU could not push OSM as the default geographical layer for the IoT. The support of the EU becomes even more important when you consider the OSM map of Haiti, which was made in response to the earthquakes that struck in 2010. OSM had the most accurate and up-to-date maps of the disaster area and guided the international rescue effort.

RK To bring these issues in at a high level you need some kind of vehicle. The Council think tank¹² is intended for that. Moderating the conference on IoT: Forum Europe^{xx} and giving input for the High Level Expert Group of the European Commission has shown me how closely tied the discourses and mindsets of the main protagonists from industry, government and standards are. They argue from positions that expect relatively minor changes, and are influenced by the timeframes of their projects and research and form a relatively homogeneous

¹² <http://theinternetofthings.eu>

stratum of specialized expertise. When Steve Jobs came back to Apple he closed down the Foresight Group saying research is done in the crucible of development.^{xxi} This resulted in the huge commercial success of the iBook, iPod and iPad. Europe still holds this division in its research domain. With the Future and Emergent Technologies (FET) Research Program it still holds the notion that it is possible to make plans for 2030 without the triple challenge that we have outlined. Maybe it is time to bring those forward-looking scenarios down into the nitty-gritty of everyday life and production. What does research mean in a real-time world anyway? What should it look like? PhD candidates have to rewrite their dissertations as the situation they describe has changed so much that their conclusions are in danger of becoming dated.

The scenarios of the industry and government experts imagine easy transitions towards new infrastructure and business models. Their projects and research time frames have identical start and end dates with every new major program call. They also share the same internal structures, deliverables and milestones. Projects are built in such a way that they cannot “fail” as long as they meet the basic demands of the initial proposal.

CN Yet, there are some positive signs. Ninety percent of smart phone manufacturers have just agreed to create a standard for a common mobile phone charger. “The environmental benefits of harmonizing chargers are expected to be very important: reducing the number of chargers unnecessarily sold will reduce the associated generated electronic waste, which currently amounts to thousands of tons.”^{xxii} This is a technical standard developed by the European Union commission. The proposal is for this to become the prime mobile phone charger within two years. Standardization can be quick but the question remains why this didn’t happen a decade ago.

RK On a public level we cannot rely on hopes that information alone will change behavior. What struck me was an article about Greenpeace subscribers and the fact that they actually felt less empowered to “change” things due to reading so many “negative stories.” What is needed is face-to-face feedback from peers and people you know and respect and some kind of belief, a “bigger” story and that could be nationalism, religion, a “better world,” something that is “bigger” than you: an ideal.

CN I think we are starting to describe the Transition Town movement (transitiontowns.org),^{xxiii} which started around 2005 as an environmental and social movement developed from earlier permaculture movements. They have a localized framework that aims to facilitate the transition from unsustainable models of consumption and production towards a localized and resilient future. Importantly, they have an all-encompassing model and focus on a very broad range of local responses. They organize practical projects such as food growing, re-use and repair as well as long-term processes such as local energy production, zero waste and local currencies. The aim is to provide a practical answer to the big question of “how do we significantly increase resilience (to mitigate the effects of peak oil) and drastically reduce carbon emissions (to mitigate the effects of climate change)?” Uniquely, they offer a community-based vision of a post-oil future, which creates a sense of belonging to a bigger movement for change. For me, they are a key starting point for the Internet of People.

RK Yet I feel the Transition Town movement is made up of Luddites.

CN Transition Town would certainly oppose most of the current commercial visions. I was at a meeting where the only thing that people could imagine as future evening entertainments were barn dancing and bread baking. They are resistant to technology because they don’t feel empowered by current technological trends. They correctly assess that the vast majority of new technology is useless and wasteful, so they retreat back to medieval fantasies. I think that it is our responsibility as an alliance of workshops to demonstrate the value of the Internet of People for community building.

RK The problem is that the public discussions on technology are so poor. Most of the stories we hear about the Internet of Things are simplistic scare stories about tracking and they don’t empower people.

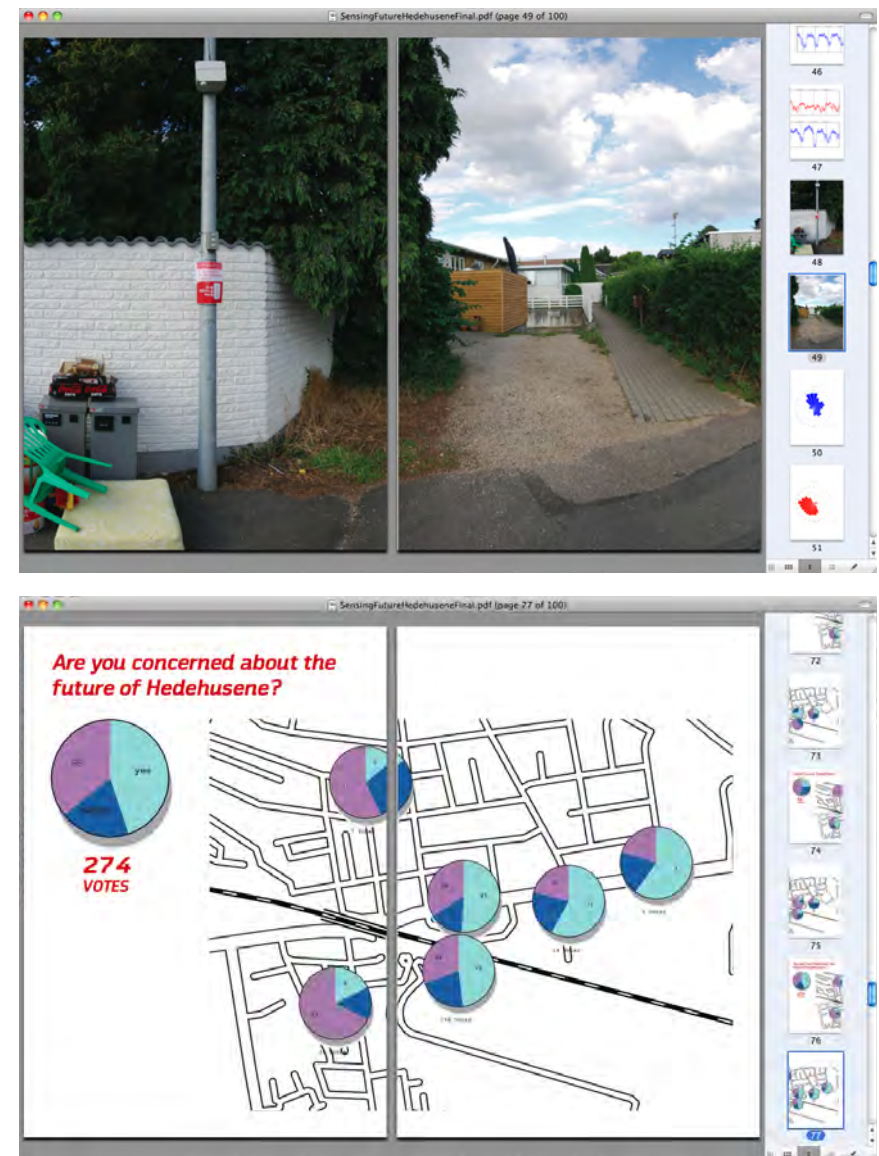
CN It’s hard to imagine the impact of new forms of technology. Consequently, the media resort to metaphors derived from older technologies and relate them to the unknown. Closed Circuit Television (CCTV) has been one of the key technologies used to imagine the future impact of technology. The British government as well as the

national press cites the number of private and public CCTV cameras in the UK to be 4.2 million.^{xxiv} The sad fact is that nobody really knows. The number is based on a 2002 survey by two academics who counted the cameras in two streets in London: Putney High Street and Upper Richmond Road. They found that 41% of enterprises had CCTV cameras with an average of 4.1 cameras per system. They then assumed that this was “broadly representative” of the whole of the UK and multiplied it by the number of businesses to get the figure of 4.2 million cameras. (Channel 4)^{xxv}

The key issue is that this crude estimate was needed because there is hardly any government regulation of CCTV. Any business or private individual can install it where they like. People assume and expect accurate numbers to provide them with an opinion on the subject.^{xxvi} My point is not to criticize the authors of the original report but to point out the lack of information and agency that people have in the process of decision making about these technologies. These shaky numbers have become the foundation for arguments from both sides, on the public acceptability of future technologies. Rather than getting stuck in arguments about numbers, we need to allow people to personally experience and experiment with technologies to gauge their impact and scope. Practical and conceptual workshops with local and specific interest groups like Transition Towns, will be the only way we can make decisions on the appropriate technologies for the Internet of People.

RK Our role is to offer powerful experiential visions and to create realistic scenarios for both the policy makers who scare their population into non-innovation as well as the grassroots Transition Town communities. We need to show that technological agency is possible and that these systems are not monolithic, all powerful and seamless. To me, your Town Toolkit and Bijlmer Euro projects are doing just that.

CN The Town Toolkit is a practical vision of towns as places of future innovation. Towns have a manageable size where fundamental political and structural changes can be implemented. The aim of the toolkit is to enable a kind of experiential-socio-ecological governance. It is designed to bring people, environment and political entities together based on emotions, opinions as well as pollution data. The project has a number of separate levels:



Noise & Arousal Mapping

This level focuses on participatory workshops with local people using two wearable circuits, which measure emotional arousal and noise level. People carrying the devices start to explore their local area anew through guided walks that they later use to create communal emotion maps of their area.

Opinion & Pollution Stations

This involves the installation of nitrogen dioxide and decibel sensors on lampposts throughout the town. Each street lamp also has a voting unit, which allows people to give their opinion on a series of changing questions. The generated data allow a hyper local street-by-street granularity that identifies town-wide variation in people's opinions about their immediate environment.

Visualization, Interpretation, & Discussion

This level brings together all the voting and pollution data displayed through a four-meter ambient balloon projection as well as a local hub for interpretation and discussion.

The key aspect of the project is the combination and continuity of knowledge brought together by the project. It gathers data from small sensors that people wear on their hands, street level voting and pollution sensors and brings it to a large town level display. The Town Toolkit tries to integrate and bridge the conceptual gaps between emotion, opinions, accurate pollution data and public displays.

RK What kinds of social alliances are needed for Town Toolkit?

CN It relies on the support, enthusiasm and participation of local people and groups as well as politicians. Only then can it act as a kind of cybernetic feedback system between all actors. The project aims at a localized rethinking of the Cybersyn system designed for 1970's socialist Chile. Cybersyn used the model of a nervous system to link together workers, workshops, food production and government. The system used telex machines to connect all Chilean factories to a central computer hub to report raw material levels, production output and number of absentees. It also managed the cybernetic feedback between the elements in the system with the goal of allowing each factory to function more autonomously as "decentralizing, worker-participative, and anti-bureaucratic" (Medina).^{xxvii}

The first Town Toolkit was installed in 2009, in a small town in Denmark where it brought together local people and council members in deliberating the future of the small town of Hedehusene, which was projected to double the size of its population in the next 10 years. People were naturally concerned about the human and environmental impact of this population increase. Therefore, the specific local aim of the Toolkit was to facilitate public discussion. Participating in the project, politicians and local people had to wrestle with the technical complexities of pollution data as well as the ambiguities of qualitative opinion data. The final challenge was how to move from this complex assemblage of knowledge toward local change and politics. The project resulted in the creation of a new local community organization that now runs a local farmer's market. The project also led to the proposal to redirect car traffic in the town. As one of the politicians who took part in the debates said, "at first I was suspicious but when I saw this project I was amazed. It is brilliant and will change the way we do things around here."

RK The important part of the Town Tool kit is that it is not about top down methods that involve being nagged about your behavior or being told what to do. We exist in complex relationships with our environment simply by living our everyday lives. If we would get feedback on how we feel and how we might feel better, how our talents could get recognized, how we could relate better to our neighbors, then having sensors and actuators make sense. The Town Toolkit could be part of a generic standard, hooking up thousands of towns, creating an Internet of People. These towns also need new local currencies and means of circulating value. Tell us about the Bijlmer Euro.

CN The Bijlmer Euro (bijlmereuro.net) is a conceptual and technical evolution of the idea of a local currency. The fundamental idea is one of stopping a "leakage" of money out of local areas towards large distant chain stores. By spending money in locally owned shops the money stays within the local network where it benefits the local community in terms of jobs, social contact, and cultural identity. It encourages shorter supply chains. The issue with many local currencies is that they require a strong commitment from the users and do not provide enough visibility of the clear benefits for everyone. The Bijlmer Euro is unique in that it translates the flow of money into a public visual representation.

We are repurposing single-use travel cards that contain Mifare Ultra-light RFIDs by sticking them on top of standard Euro notes, transforming them into Bijlmer Euros. If you pay with a Bijlmer Euro in a local shop, the RFID is scanned and the shop owner will give you a 10% discount on your purchase. This means that a Bijlmer Euro is worth more than a normal Euro because it carries local trust and good will and you can



trace the route that the money is traveling from shop to shop. In a short trial of the system we had 647 transactions at shops and managed to keep 4852 Euros in circulation in the local economy.

RK The activist work on money is growing steadily. DYNDY is an umbrella effort to encourage the design of new currencies and “inform and empower grassroots communities with concepts and tools to overcome scarcity, instruments and reflections for the Exodus from proprietary money.”^{xxviii}

CN I see the Internet of People as based on these trans-local currencies which support both the local networks of where they are physically located as well as a global network of community solidarity. People in any of these “Islands of Things” will be able to share resources and send “money” back and forth to friends, relatives and business associates without using mainstream money transfer services.

CN We have outlined a rough structure and some of the actors of the Internet of People. In addition, we have to identify the core qualities that we want to embed into this technical infrastructure. Our central point of departure is the notion of the social and that means that we should try to define it.

RK Are we talking about sociability or sociality?

CN Most of the definitions of sociality tend to talk about it as the tendency to form social groups.

RK How about this?

An identity escrow scheme allows a member of a group to prove membership in this group without revealing any extra information. At the same time, in case of abuse, his identity can still be discovered. Such a scheme allows the user to only convince an appointed verifier (or several appointed verifiers) of his membership; but no unauthorized verifier can verify a user's group membership even if the user fully cooperates, unless the user is completely under his control.^{xxix}

CN Not really. The whole thing sounds like a paranoid high-tech Freemason Society with secret signs that give you membership benefits.

RK We kind of know what we don't want. The problem is that naive ideas about the group, belonging and freedom are as problematic as naive ideas about building secret groups and notions of hiding or going parallel: "Social capital is one of the new buzz words of the decade. Basically it's a ratio of the size of your network and how much of that network listens to you, trusts you and takes action based on what they've read."^{xxx}

CN Notions of the "social" imagined by social media tend to be reductive. Social relations are envisaged as a currency that you can trade in for money. Other definitions see it simply as a kind of affirmative connectivity. The combination of this kind of positivity combined with career benefits is how social media is sold to people. The American social scientist Michael Woolcock suggests a three-part taxonomy for social capital. He distinguishes between bridging, bond-

ing and linking. Bridging represents the weak ties between individuals which social media enables. Bonding is about strong ties, often between family members, while linking refers connections with dissimilar people or powerful figures.

RK What do these three categories mean in an Internet of People where things are also actors? And secondly, what do they mean when we envisage a breakdown of the seamless connectivity and food, water and sewage systems that we take so much for granted?

CN We don't appreciate how important proximity is right now and its role will increase rather than decrease. In the future Internet of People, we will have to rely much more on our immediate environment for support. We are already linked to our neighbors with power and water but in the future we may have to rely on them for growing food and making things. What we are really talking about is a kind of mutual responsibility that we might call solidarity. In our taxonomy of social relationships, in addition to the intensity of relationships we need to add the axis of time. Solidarity relies on strong ties, which can be just temporary to achieve particular objectives. These ties



are not like your family that you have to deal with all your life. Rather, these are strategic and powerful alliances that are needed to get things done based on consensus. Most activism works this way; groups who disagree on many points still have enough of a shared common goal to work together. You don't necessarily have to like people to be able to work with them.

There is an artistic intervention by Jakob Jakobsen, which illustrates this well. He disconnected a road of forty houses from the street lighting network and installed a large manual switch. This meant that in the evening when it got dark someone had to manually turn on the street lighting and someone else had to turn it off in the morning. In addition, it raised the additional prospect of teenagers messing around with the switch. He basically used the switch to turn a utility that people take for granted into something that made them responsible for the functioning of their street. It required social organization. You could understand this small intervention as training for future solidarity and local awareness.

When I switched the lights off first it became very dark . . . The space had changed and it was, in a concrete way, making me realize how the street-lights influence our perception of space in the city. They light up, yes, but reduce the perspective and the scale of the surrounding space. And the switching off of the lights gave rise to some poetic qualities I hadn't expected: the hills, the sky, the stars. (Jakobsen)^{xxxI}

42

43

RK Is proximity an enabler or prerequisite of solidarity?

CN Right now local communities are being simulated. The right wing government in the UK is trying to create what they call the Big Society. This includes "big society reward points that are redeemable in supermarkets, high street shops and restaurants in return for good deeds . . . Residents would get a loyalty card similar to those available in shops. Points would be added by organizers when card-holders had completed good works such as litter-picking or holding tea parties for isolated pensioners."^{xxxII} This is a managerial fantasy incapable of conceiving social relationships outside of capitalism.

RK In reality proximity allows human feedback on our behavior, which has consequences for our future actions. This kind of

feedback is sometimes critical though and can lead to friction and different kinds of conflict. Today, we tend to see disagreement as negative, yet this was not always the case. Robert Dykstra writes in *The Cattle Towns*: “Social conflict was normal, it was inevitable, and it was a format for community decision making.” Seeing social conflict as a “format” for decision-making implies that it is formed as a “container” over time.

CN We should reclaim disagreement and struggle as a positive “format” which can be facilitated by technology. Right now friction is avoided at all costs within the design of technologies. We will have to learn to design it back in if mediated relationships are to have a part in building solidarity. The sociologist Lewis Coser advises: “Instead of viewing conflict as a disruptive event signifying disorganization, we should appreciate it as a positive process by which members of the community ally with one another, identify common values and interests.”^{xxxiii}

RK In the recent decade we have seen many attempts of community projects and policies to design naive and lazy trust. The tendency to police situations that call for dialogue show that “design for trust” has not led to more trust in local situations because the definition of “trust” was provided from above. Research from Forum, the Dutch institute of multicultural issues, shows that “*allochtone*” youth (of foreign descent) construct their image of the country as a whole solely through daily experiences of the neighborhood in which they grow up. In comparison, Dutch “native” youth can read different layers: street, area, city, and country, Europe. Their image of these layers is therefore more nuanced. If you do not differentiate a “bad” experience on one layer from the rest of the system, then you see yourself as totally alienated. Currently in Rotterdam and Amsterdam a generation of youth is growing up with mosquito devices¹³ and CCTV cameras on the one hand and smart phones and iPads on the other. One technology spies on you, is hugely expensive and shuts you off while the other makes you popular. There is no agency for this generation other than through social networks. Their fathers could still fix their own cars but today these cars are all closed software. I presented a plan to the Amsterdam Art Council to start playing with CCTV cameras and tweaking the frequency of mosquito devices. The argument was that the new generation should be able to design its own daily experience and living environment. They turned it down, arguing that I could not tamper with city furniture.

¹³ <http://www.themosquitodevice.com/>

CN A nuanced and complex view of conflict is central to decision-making and solidarity building. I generally think that technology should not stage, disentangle and structure relationships but bring people to a metaphorical shared table that feels accessible and owned by everybody. We don’t really need technologies that allow us to pick “friends” or “best friends.” We should aim “lower” and be more direct and honest about just connecting people. There will be friction.

RK Our vision of the Internet of People requires a very high level of transparency and open databases. We will need new systems of reputation that address physical proximity. Look at the early days of the Internet. Participants with little prior knowledge of self-organization slowly created reputation systems like Slashdot.org. The Slashdot Karma system is described as “trial and error and progression” with the moderators “constantly tweaking and changing.”^{xxxiv}

CN Online reputation systems are useful to facilitate the weak and temporary ties in that context but they don’t lead to strong ties on which we have to depend for our well being.

RK Mesh networks are the technical analogue side to human trust networks. In our Internet of People we cannot rely on the cloud or global value chain schemes. We are envisaging a Transition Town where things are tagged, and connected to other Transition Towns.

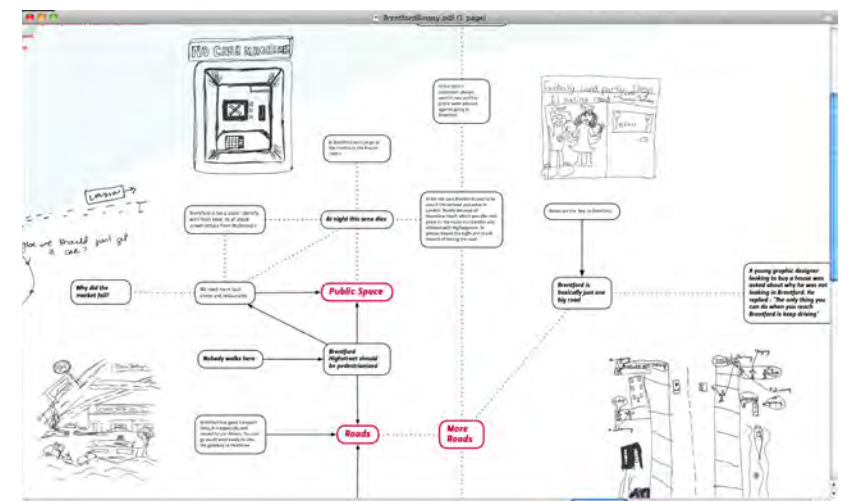
CN Local networks will require new and more solid spaces for conflict staging since the hands-off reputation systems will not be enough to facilitate the division of local resources.

RK In the past seventeen years in the history of the web browser we have seen a trend towards collaboration and sharing. We have gone from text and images towards building new operating systems, open hardware (OpenBTS, OpenBSC, Oswash)^{xxxv} and even an open Global Village Construction Set (fifty tools for building post-scarcity, resilient communities).^{xxxvi} It is hard to find one city that is not involved in open government projects or open data schemes. So far these open projects have required few resources but we are now reaching a point where this technology will be used to transform future cities. IBM's City Forward is a philanthropic donation of services and technology urging citizens to "use data and visualizations to come up with new ideas and share them with others." Eduardo Paes, mayor of Rio de Janeiro, has asked IBM to build a "Single City Operations Center" that would allow him to "monitor, command, and forecast critical events across the city." Guru Banavar of IBM's Smarter Cities group says: "This is a very special thing for IBM, because we're seen as a trusted adviser by the mayor—not a vendor, not even a partner."^{xxxvii} Yet, who elected IBM? And although sharing is promoted, it is not the technology or the services themselves that are shared, only the output. These are the new Facebooks of IoT. The next two years are vital for the choice between Facebook IoT or our Internet of People. Today, you may still be able to delete your Facebook account, but what if it directly manages all your energy, food and water?

CN We need new business models. One of the key things that will enable the Internet of People is the availability of a shared open source layer on which boutique business models will be able to survive. The boutique model as it currently stands is the localization and support of open source software, where the software itself is free, while people pay for local support and adaptation for their needs. To make this layer broadly useful and the backbone for manufacturing, will require many changes. I believe as we start to see the catastrophic effects of climate change and peak oil, governments will make the unprecedented decision to place all intellectual property into the public domain. With all of the world's existing knowledge being in the public domain, collaboration between different sorts of actors will become possible and innovation will be massively aided and streamlined.

RK Placing everything in the public domain is very difficult. However, institutional systems treat trust and transparency as

identical. Citizens are seeing that this is not true. Eradicating taxonomies of formats like data, the document, the passport can only help to bring about transparency, as this is how power recognizes itself. For a sorcerer, a piece of rabbit bone is data, while for institutions pieces of writing are data. These are called "documents," which are then classified into all sorts of things like diplomas, certificates, passports to create a hierarchy of "evidence." This kind of arbitrary hierarchy of data has characterized all forms of government that we have had so far. We argue that these forms are no longer sustainable, and that's why we have to assume that these taxonomies will change as well. This will leave our environment and us with an amorphous mass of data to make sense of. It'll also bring about new identities for things. What are our tools for sense making at the moment? We have crowdsourcing,^{xxxviii} and the wisdom of the crowds, low-tech visualization tools and open source collaborative software, but we are still using these in conjunction with existing systems. We want everybody to be able to draw on the largest and most available amount of data. In a way, current open government and institutional open data projects acknowledge this. Within a few years, these programs will realize that they cannot stop all data from being opened. Opening up all databases will create a huge ruckus, but it will also create new forms of decision making for large groups of people and small communities on the basis of newly available data.



CN Through my work on participatory mapping, I experienced that “public” knowledge is not a public/private flag in a database. Rather, it is an active process of creating visibility through a social process of cognition and sense making. I would argue that solidarity between people results from “mapping” as a broad process of identification of shared feelings and problems. Unfortunately, much of the mental mapping movement that exists from the 1960’s still aims at a rationalizing and universal legibility of space. The kind of maps that I have been building with people over the last years have always been very upfront about offering only partial viewpoints. The total overview is impossible. You can’t see the whole puzzle but only a part of the mechanism. It is the communal and participatory uncovering of the machinery that administers “area construction,” which creates what I call system thinking. System thinking is the personal and communal awareness that all things are connected in multiple networks of agency.

RK It thus creates a space for multiple intelligences to form new kinds of awareness.

CN When designing projects and systems I adapt an educational model called the SOLO taxonomy (Biggs & Collis),^{xxxix} as a way to embed multiple layers of interaction for different people. The model suggests that people learn in different ways:

(1) Pre-structural: here students are simply acquiring bits of unconnected information, which have no organization and make no sense.

(2) Uni-structural: simple and obvious connections are made, but their significance is not grasped.

(3) Multi-structural: a number of connections may be made, but the meta-connections between them are missed, as is their significance for the whole.

(4) Relational level: the student is now able to appreciate the significance of the parts in relation to the whole.

(5) At the Extended Abstract level, the student is making connections not only within the given subject area, but also beyond it, able to generalize and transfer the principles and ideas underlying the specific instance.^{xli}

While this model is hierarchical with the implication of progression, it is useful for recognizing differences in perception while offering methods for teaching people to see themselves in a relational framework.

RK Learning to see oneself in a network means being able to feel at home in all the layers, not necessarily in the established order. The key is not that the Extended Abstract is a higher skill but that you are able to see all skills. It reminds me of your reference to Kropotkin who stated that people are most happy when they have different kinds of jobs requiring both manual and intellectual skills.

CN The point of systemic thinking is that it is crucial for everybody, the farmer and the technologist.

CN Let me tell you the story of “Democracy Village,” an event/place that occurred in 2010, right in front of the UK Parliament. While there had been a small continuous demonstration in front of the parliament for many years, they were suddenly joined by a large number of activists, homeless people and drug users. A split emerged between the people who had been there for many years “legitimately” protesting and these new comers. People had placed hand written, personal slogans such as: “I am hurting” or “After so many years why do we still cry tears?” around the Democracy Village. The mainstream media saw this as inarticulate and a break down of politics. The media and politicians labeled it a “shanty town” full of “loons” and could not comprehend the mix between political and social issues such as homelessness and drug use and forced the clearance of the square.

In contrast, I recently heard the London artist, writer, and social activist Siraj Izhar describe the situation as a “human lab for a new human subject.”^{xli} It was the sharing of these people’s suffering that created a new form of solidarity. As the *New Statesman* says, “the discourse had no invisible boundaries.”^{xlii} This demonstrates the power of affect to break through artificial boundaries.

RK The temporary alliance that you are describing reminds me of the Belgian town of Geel where inmates from the psychiatric asylum are living with families. This is a practice that has a 700-year history. In recent decades, researchers examined this living together of “sane” and “insane” people and found that it was an incredibly successful model for “community recovery” where communities strive to live with, rather than fear, mental illness. It created local solidarity.

CN It is not surprising that most political banners do not create broad solidarity with their language of abstraction and distance. The empathy associated with pain is the universal basis of politics. “Feeling cuts through and against signification.”^{xliii} We need to steer this human directness from the social imaginary to the political imaginary. Unfortunately affect has often been manipulated and managed towards fascism. The key question is how to reclaim affect as a progressive political force. My suggestion would be to combine affect with the systemic network thinking that is so clearly delivered by the Internet and mapping. We require an educational model for the future Internet of People that positions the personal emotion as the connection point



to a wider systemic network of relationships with the environment and others.

RK I’d like to pick up on two points. The first is your point of the power of affect to break through artificial boundaries which foreshadow the new solidarities that we have to feel towards our resources, plants, animals and things in order to treat them as equal entities or processes. The second is the absolute necessity of reclaiming words like love, friendship, and like, as in “liking this.” Love has been sold to washing machine powder merchants who urge me to love their product. I think this has made it easier to frame scenarios based on affect as utopian.

CN Affect cannot exist in isolation. It requires a network to make local areas work. As the American sociologist Robert Putnam argues, “civic virtue is most powerful when embedded in a sense network of reciprocal social relations.” Our aim then should be to develop this mutual recognition that include plants and animals into social relations. Our cat is part of the family but the tree in the garden is not quite part of the social unit. Right now this recognition happens through anthropomorphism, which requires a human-like face. Yet we need to move towards a broader network animism that allows us to recognize

the expressions of the tree. This is where technologically enhanced perception is crucial to hearing the sap rise. I think we will see a critical blending of sense (perception) and sensor (data) networks, which are currently very separate. We need to combine affect and networks to create this new form of solidarity.

RK Network animism is the exact expression that I would have wanted to use when back in 2000, I heard about Internet of Things for the first time. It was in Jonschoping at a conference on Building Tomorrow Today.^{xliv} The first speaker came up and said: In a few years time, you will have a Bluetooth ring. You will walk in the woods. You want to know more about a tree? Like magic, point your ring and a screen will rise up out of the ground and give you information about it. I was shocked. I had no response. I could not believe that people who could imagine new infrastructure, applications and devices could not see that these require new models of interaction and experience.

CN I think recognition of the natural environment is a subtle process. The early stages might involve just noticing differences in the environment—not all trees are the same. Then one might acquire an ambient awareness where one becomes sensitized and starts to notice the sounds of seagulls. Later, one may become actively and practically involved in growing something in the garden. I would suggest that this process of growing involvement is the same for most things that are unfamiliar to us. The vision of the Internet of People that we are proposing requires a rethink of what it means to be human.

CN&RK To finish and to instigate a discussion, we propose a series of indicative standards that test the waters, raise awareness and make visible the gap between where we are now and where have to go. The triple challenges of climate change, peak oil and social breakdown are coming. The question is not if, but when. Our standards are a shock therapy to the current practice of making. The sociability standards are workable and stem directly from the urgencies we have discussed. They will ensure interoperability between all the emerging actors. They require the joining of different actors that so far have not been involved in the making of standards. All technological standards are also social standards.

Proximity

- Systems that are designed by at least twenty people distributed across the world.
- Systems that are built less than 150 miles from where the raw materials are sourced.
- Systems that will not be deployed more than 50 miles from where they are built.
- Systems whose components are modular and backward compatible to allow local repair, upgrade and downgrade.

System Thinking

- Systems that fix end costs as a percentage on top of publicly available production, transportation and disposal costs.
- Systems that communicate the break down of energy costs of production, transport and breakdown of the product.
- Systems that automatically generate a fixed, public discussion URL for each item.

Affect

- Systems that encourage face-to-face contact.
- Systems that build mutual responsibility.
- Systems that encourage conflict.
- Systems that during their lifetime will be used by more than 5 people.
- Systems that enable strong bonds between people and the environment.
- Systems that treat resources as equals.

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- ⁱⁱⁱ As the 4 billion unique IP addresses in this world, IPv4, have run out with the unexpected arrival of so many smartphones, IPv6 is a new addressing scheme.
- ^{iv} 6Lowpan, an acronym of Ipv6 over Low power Wireless Personal Area Networks.
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^{xxi} The late Steve Cislser wrote to RkK on October 18, 2006.” One of my interests I shared when I was in Amsterdam at a nettime conference. I thought it was time to have one which I called Low Tech; Slow Tech; No Tech and I still think it would be good. A couple of years later I proposed a Citizens Electronics Show to counter the company oriented Consumers electronic show which is driven by marketing groups (who have an uneasy relationship with the R&D groups inside their companies. When Steve Jobs came back to Apple he closed down the group I was part of, the so-called Advanced Technology Group. He said, “research is done in the crucible of development” and that was nine years ago. I guess he was not far off. We were dispensible.” This would have been 1997.

^{xxii} “Commission welcomes industry’s commitment to provide a common charger for mobile phones.” *European Commission: Enterprise and Industry*. 29 June 2009. Web. <http://ec.europa.eu/enterprise/newsroom/cf/itemlongdetail.cfm?item_id=3241>.

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^{xxvi} Interestingly, there is another related quote, which tries to get closer to people’s experience. It claims that the “average UK person is filmed 300 times per day.” In fact this is also based on a fictional scenario from the same academics: “Thomas had been filmed by over three hundred cameras on over thirty separate CCTV systems.”

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^{xl} Atherton, James. “SOLO taxonomy.” *Learning and Teaching*. 10 Feb. 2010. Web. <<http://learningandteaching.info/learning/solo.htm>>.

^{xli} Talk at the 2010 This is not a gateway festival

^{xlii} Banville, Alison and Phoenix. “Democracy Village was an embodiment of people power.” *New Statesman*. 21 July 2010. Web. <<http://www.newstatesman.com/blogs/the-staggers/2010/07/democracy-village-idea-power>>.

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page 14: Earth, NASA

page 16: Living Memory, Philips Design, 1996

page 20: Peak Oil Curve, M. King Hubbert, 1956

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Situated Technologies Pamphlets 7:

MoWorking: The Expropriation of Mobile Labor, Play, and Protest

Trebor Scholz and Laura Liu

Trebor Scholz and Laura Y. Liu explore changing notions of labor in a digital economy and the corresponding impact on urban space. Scholz and Liu examine the un-acknowledged labor that goes into the production of public culture on-line—from user-generated videos to fan fiction to Facebook posts and Google searches—and the ways in which the booming data mining industry intensifies hidden commercial and governmental surveillance. They reflect on the relationship between labor and technology in urban space where communication, attention, and physical movement generate financial value for a small number of corporate stakeholders. Online and off, Internet users are increasingly wielded as a resource for economic amelioration, for private capture, and the channels of communication are becoming increasingly inscrutable. How does the intertwining of labor and play complicate our understanding of exploitation?

UPCOMING

Situated Technologies Pamphlets 9:

Modulated Cities: Networked Spaces, Reconstituted Subjects

Helen Nissenbaum and Kazys Varnelis

Fall 2011

The growth of portable networked devices and the maturing of the Web during the last decade have led to renewed debates over changing contours of the public and the private as well as new concerns over the constitution of modern subjectivity. Considering the growth of the nineteenth century metropolis as an analogous moment, the authors examine how the concepts of public and private were shaped at the time by the media, by architecture, and by changing societal conditions. Are we amidst a similar transformation? How much of it is politically motivated or a matter of political context? How much exposes fault lines that were already latent in the concepts of public and private? As our activities are increasingly managed through mobile devices and systems of pervasive sensing, the contrast between online and off, public and private, at least in this regard, diminishes. How are our selves re-constituted by both government and private actors who sew fragments of dispersed activity together and adjust environments accordingly? Is this a case of life imitating artifact, or part of a broader shift from enclosures to modulations in systems of control?

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The Situated Technologies Pamphlets series explores the implications of ubiquitous computing for architecture and urbanism. How is our experience of the city and the choices we make in it affected by mobile communications, pervasive media, ambient informatics and other “situated” technologies? How will the ability to design increasingly responsive environments alter the way architects conceive of space? What do architects need to know about urban computing and what do technologists need to know about cities? Situated Technologies Pamphlets will be published in nine issues and will be edited by a rotating list of leading researchers and practitioners from architecture, art, philosophy of technology, comparative media study, performance studies, and engineering.

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The Architectural League of New York

Situated Technologies Pamphlets 8:

The Internet of People for a Post-Oil World
Christian Nold and Rob van Kranenburg

ISBN 978-0-9800994-7-8

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