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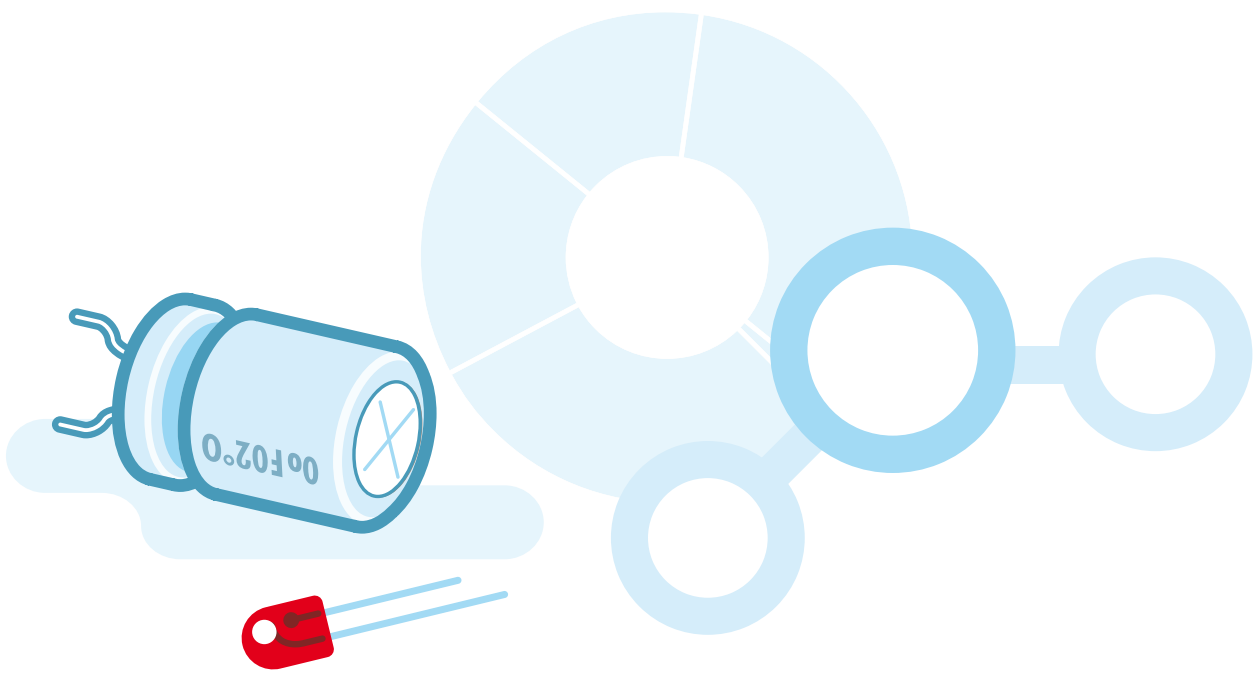
COLOGNE CONFERENCE FUTURES

ANNUAL SYMPOSIUM ON MEDIA EVOLUTION



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Cologne Conference Futures 2014

Inhalt

Lutz Hachmeister (IfM):

Einleitung

Geheimdienste gehören zweifellos zu den Einrichtungen der menschlichen Gesellschaft, die an der Anwendung und Entwicklung von Kommunikationstechnologien besonders beteiligt sind, vor allem in ihrer modernen Form als kompetitiv-bürokratische Apparate. Nachrichtendienstliche Arbeit wird im englischen Sprachraum mit dem Begriff „intelligence work“ bezeichnet, und „intelligence“ geht begriffsgeschichtlich seit dem 16. Jahrhundert der „Information“ und „Kommunikation“ voraus, auch dem heute gebräuchlichen, akademisch wiederum umstrittenen Medienbegriff. 1939 schreibt dann der Papst der Informationstheorie, Claude Shannon, an Vannevar Bush im MIT: „Off and on I have been working on an analysis of the fundamental properties of general systems for the transmission of intelligence“.

Damals beginnt sich der heute auch in der journalistischen Diskussion prägende Komplex aus (Computer-)Technologiepolitik, militärischen Anwendungen und geheimdienstlicher „Aufklärung“ und „Überwachung“ in der US-Geostrategie herauszubilden, symbolisiert inzwischen mehr durch die NSA als durch die filmisch glamourösere CIA. Der Journalismus, inzwischen ein ökonomisch harmloser Unterfall der Daten- und Wissenskonzerne, hat sich mit „Datenjournalismus“ oder gar „Drohnenjournalismus“ strukturell dieser technologischen Meta-Ebene angenähert.

Überwachungsversagen vor und nach den Pariser Anschlägen

Abgesehen von ihrer institutionellen Auffächerung (Inland, Ausland, militärische Aufklärung, „Werkschutz“ und „Cybersecurity“ bei großen Unternehmen) ist jede geheimdienstliche Arbeit von dem Mit- und Gegeneinander von „Humint“ und „Sigint“ geprägt, von human intelligence und signal intelligence. In Stephen Gaghans in vielerlei Hinsicht wegweisendem Spielfilm „Syriana“ (2005), basierend auf einem Buch des ehemaligen CIA-Agenten Robert Baer („See No Evil“), wird die Vernachlässigung der menschlichen, auch soziologischen *Feldarbeit* im Verhältnis zu Abhörmaßnahmen oder Drohnensteuerung kritisiert.

Nach den grausigen Pariser Anschlägen auf das Satireblatt „Charlie Hebdo“ und einen jüdischen Kosher-Supermarkt im Januar 2015 stellte sich heraus, dass nahezu alle verdächtigen Randseiter aus der jihadistischen Community von den zuständigen französischen Behörden mit „signal intelligence“ überwacht worden waren. Die religiös angetraute Frau des Hyper-Cacher-Killers Amedy Coulibaly, Hayat Boumeddiene, konnte offenbar über Spanien und die türkisch-syrische Grenze ins ISIS-Gebiet entkommen, obwohl sie sogar schon kurz vor den Anschlägen ins Raster der türkischen Geheimdienste geraten war. Türkische und französische Behörden warfen sich hier gegenseitig klassisches Kommunikationsversagen vor. Vertreter der französischen Geheimdienste und Antiterror-Units forderten wiederum eine Verdreifachung ihres Personals (also: menschlicher Intelligenzen), um potentiell gewaltbereite Fanatiker besser überwachen zu können.

Leibniz als Urvater des Digitalen

Es ist diese Beziehung von *Humint* und *Sigint*, im philosophischen Sinne von „Subjekten“, soziologischen Gruppen und Technologien, die auch in den nachfolgend versammelten Referaten der Cologne Conference Futures 2014 aufscheint. Diese beschäftigen sich noch einmal grundsätzlich mit den Modellen und Vektoren der Evolution von Kommunikationstechnologien, also der Mensch-Maschine-Relation, den Perspektiven „künstlicher Intelligenz“ und den medialen Versuchen, die Zukunft der Lebenswelt dystopisch und utopisch zu prognostizieren. George Dyson, dessen jüngstes Buch „Turings Kathedrale“ gerade bei Propyläen auf deutsch erschienen ist, weist hier noch einmal auf die religiös-spirituell-mathematischen Begründungen des „Digitalen“ bzw. der binären Codierung durch das Universalgenie Leibniz hin, auch auf die fast zeitgleich im 17. Jahrhundert entstandene Vorstellung vom „artificial life“ der Maschinen bei Thomas Hobbes (dessen „Leviathan“ im übrigen schon einige formidable Hinweise zu einer avancierten philosophisch-politischen Kommunikationstheorie enthält).

Vor allem untermauert Dyson wissenschaftshistorisch eine Kritik an der Vergröberung des „Digitalen“ als alleiniges technologisches Zukunftsprinzip: „The real AI may absolutely be staring us right in the face and nobody is noticing it because it is analog AI, it is not digital. The companies that are doing the best on the internet – Facebook, Google… –, a lot of computation they are doing, if not actually the most of fit, is actually analog computation. It

is not strictly digitally coded computation“. Es könnte also sein, dass sich das „Analoge“ und das „Digitale“ auf einer weiteren Ebene aufheben bzw. anders mischen.

Es gibt keine „digitale Gesellschaft“

Nicht nur in diesem erkenntnistheoretischen Sinne gibt es keine „digitale Gesellschaft“. Diese schlechte Metapher wird gerne von naiven Internet-Euphorikern, Bildungspolitikern oder deutschen Netzvereinen verwandt, auch zur Abgrenzung von älteren, „analogen“ politischen und gesellschaftlichen, auch medialen Umwelten. Jedes Konzept von „Gesellschaft“ ist aber letztlich nur *soziologisch* sinnvoll, und selbst wenn man sie mit Luhmann als Gesamtheit der Differenzen von „Systemen“ und „Umwelten“ versteht, braucht es doch „psychophysische Systeme“ (Luhmann), also doch Menschen aus Fleisch und Blut, die „Gesellschaft“ über Kommunikationen begründen. Sicherlich ist transhumanistisch eine „Gesellschaft“ nicht-menschlicher Wesen vorstellbar, diese wäre aber wahrscheinlich nicht „digital“. Die konkreten Folgen dieses schwerwiegenden Missverständnisses von einer technoiden, binärcodierten Gesellschaft und ihrer politischen Regulierung konnte man am traurigen Schicksal der deutschen „Piratenpartei“ beobachten, die sich bei allen guten Ansätzen und Programmpunkten auf dem Weg über ein neues „Medium“ (Twitter) mit Shitstorms und Hasstiraden ad personam, zur Freude der „analogen“ Altparteien, selbst zerlegte. Diese Form der „liquid democracy“ mit ihren komisch-folkloristisch auf ihre Laptops starrenden „Wasserstoffwesen“ funktionierte nicht; auch waren die Trägheitsmomente und Resistenzen herkömmlicher politischer Organisationsformen stärker. Lenin war da mit seiner Formel vom Kommunismus als „Sowjetmacht plus Elektrifizierung des ganzen Landes“ schon 1920 etwas weiter, wobei auch in dieser Sentenz die Idee eines spirituell aufgeladenen technologischen Wohlstands mitschwingt.

Perspektiven einer europäischen Technologiepolitik

Nick Bostrom betont in seinem Referat vor allem die Möglichkeiten biopolitischer Selektion auf dem Weg zur „Superintelligence“ und – jenseits eines bloßen technologischen Determinismus – die Wirkungen technologiepolitischer Steuerung auf dem Weg zur „Artificial Intelligence“ („what areas receive priority in the European research framework

program and their counterparts in other countries“). Dieses Thema wird in der Abschlussdiskussion mit Hans-Jürgen Jakobs, Wolfgang Hagen und Ulrike Guérot wieder aufgenommen, also die Frage nach einem europäischen Modell der Technologiepolitik im kreativen Wettbewerb mit dem US-Hegemon und dem einstweilen repressiv-staatskapitalistischen System in China. Susan Blackmore, zusammen mit Richard Dawkins Erfinderin der „Memetik“, entwickelt ihr Konzept von den selbstemergenten „Tremen“, die auf „Gene“ und „Meme“ aufbauen; Gundolf S. Freyermuth zeigt die Verkettung von „Medien“ und „Zukunft“, von den Utopien humanistischer Aufklärung bis zu den Anstrengungen eines technologisch-biopolitischen „Self-Enhancement“ seit der „Postmoderne“ – wobei auch hier manche Wünsche („Cybersex“) weit hinter den Erwartungen zurückgeblieben sind und einstweilen kybernetische Gesundheits-Apps zugunsten von Google und Apple dominieren.

Wenn man die drei Ausgaben der Cologne Conference Futures vorsichtig resümiert, dann bildet sich unter dem Rubrum „Medienevolution“ ein Denkmodell heraus, das „Medien“ im historischen Prozess als privilegierte Bewusstseinsinstitutionen fasst, die wiederum die allgemeine Evolution von Werkzeugen, Infrastrukturen und sich teilautonom selbststeuernden Mensch-Maschine-Systemen reflektieren können. In der aktuellen geostrategischen Debatte ist zudem eine Art Beziehungsquadrat entstanden, mit „Meinungsfreiheit“ und „Sicherheit“ auf der einen, der Ökonomie gesellschaftlicher Aufklärung (Journalismus, Bildung) und dem Komplex aus „Sigint“, Daten- und Wissenskonzernen bzw. militärisch-geopolitischen Ambitionen auf der anderen Seite. Welche Elemente in diesem Beziehungsquadrat stärker, resistenter oder unabhängiger sein werden, könnte und sollte Thema der nächsten Cologne Conference Futures sein.

Susan Blackmore:

Memes, Tremes and the Future of Consciousness

Abstract

Darwins Evolutionstheorie greift weit über die Biologie hinaus. Richard Dawkins' monumentales Buch „Das egoistische Gen“ (1976) implizierte den Transfer der Evolutionsmechanismen auf die Menschheitsgeschichte. Dawkins' Werk begründete das Konzept des universellen Darwinismus. Beinahe jede menschliche Äußerung, jeder Bewusstseinsinhalt, kann als Replikator verstanden werden. Andere kopieren oder imitieren ihn und folgen dabei den Mechanismen von Selektion und Variation. Um das biologische und das kulturelle Konzept voneinander abzugrenzen, ist im Rahmen des Letzteren für Replikatoren die Kategorie *Mem* eingeführt worden. Ein *Mem* kann alles sein, ob Geste, ob Neuigkeit, ob die Gewohnheit, Toilettenpapier auf eine bestimmte Art zu falten, ob der persönliche Kleidungsstil, nur muss es von Person zu Person nach den Prinzipien von Variation und Selektion kopierend übernommen werden. Dieser Prozess entzieht sich unserer Kontrolle und wir sollten uns vorstellen, dass er unvermeidlich abläuft. Dazu genügt ein Blick auf die nachdrücklichen Kopieranweisungen der Weltreligionen. „Glaub dies, oder du fährst zur Hölle, wenn du stirbst!“, ist ein sehr beliebtes Schema. Davon abgesehen, haben sich computergestützte Verfahren zu einem neuen, sehr mächtigen kulturellen Replikator entwickelt. Weil sie sich nicht mehr auf die direkte Weitergabe von Person zu Person stützen, müssen wir unsere Begrifflichkeit erweitern: Die neue Kategorie nennen wir *treme.* Mit ihr könnte die ökologische Vernunft völlig ins Abseits geraten und sich die Aussichten der Menschheit deutlich verdunkeln.

The following text is a transcript of a lecture held at the

Cologne Conference Futures 2014 – the Annual Symposium on Media Evolution

Cologne, October 6th, 2014

[The presentation begins with the image of the rainforest]

So, why is all this stuff here? Why is all this stuff here and all the animals and things hiding out of range of the camera? Well, I guess we all would say that they have evolved.

[The slide shows a city map of Cologne]

If we ask the same question about this stuff here, some of you might be inclined to say that the reason is completely different: “That is intelligently designed. There was a human brain that knew what it was doing and designed it.”

But the whole gist, everything that I am going to say today, is that that is not so. Cologne Cathedral for example is here for precisely the same reason: These things have evolved, using us humans and our brains in order to do it – and our bodies indeed.

So that is going to be the major gist of what I want to talk about, and all this really depends on the best idea anybody ever had. Is that not a marvelous thought? That there could be a best idea anybody ever had? Well, if there is, my price goes to the first person who ever said the following, which was Darwin. It is his theory of evolution by natural selection. It is so fundamental to the way we understand the world that we really have to have a grasp on it, and it is in a way the most simple and the most beautiful idea, and yet somehow it slips out of our mental grasp.

What Did Darwin Do?

How many of you have read the 'Origin of Species'? Well, for the rest of you let me praise 'The Origin of Species' in three sentences. The gist of Darwin's argument – which is brilliant – goes like this: If you have creatures that vary – which cannot be doubted, because I have been to the Galapagos-islands, and I have measured the size of the beaks of the finch, and I have measured all the living … A hundred pages later: If there is a struggle for life, such that most of the variants die – which cannot be doubted, because I calculated, if the elephants bread all the time, the world would fill up completely with elephants, even though they are the slowest breading creatures and I have done the calculations … Another hundred pages later: If the few that survive, pass on to their offspring, whatever it was that helped them survive – and this cannot be doubted, because I have done studies of inheritance of characteristics and trades and ... Another hundred pages later: Then the offspring must be better adapted to the circumstances in which that happened than their parents were.

It is fantastic three-step-algorithm.

If you have variation-selection-heredity, then you must get evolution or as Dan Dennett calls it: “Design out of Chaos without the aid of Mind”. This is the most fundamental idea in biology and it is the most fundamental idea in everything I am going to say today. What do you think is my favourite word in that definitional sentence? My favourite word is 'must'. This is what you have to grasp. The important bit to get, and the bit that will stop you dead being religious, and believing in God the designer, and all of that, is when you realize it **must** happen. It is inevitable.

If we took a cup, and we made a hundred copies all slightly different, and then set them out to be used by people, some of them will get broken, some of them would not taste very nice, some of them would not work in the dish-washer. A whole lot of them would fail, and then we would take the survivors and copy them and so on. Inevitably, cups would get better in the environment. So that is the fundamental argument going on here.

Now, how many of you have read this book 'The Selfish Gene' by Richard Dawkins?

I would recommend it to anyone. This book was written in 1976. It is a stunning book, because although a lot of the biology is dated, the basic principle is not; and the principle of 'The Selfish Gene' is as follows:

He explained what I have just said about Darwin and all the ways that play out in biology. Dawkins emphasized in that book what he called “Universal Darwinism”, and the whole story that he tells in that book is: Look, it is not genes that are important. What is important is this fundamental process, this three-step-algorithm, this Universal Darwinism. Anytime you have anything that is copied with variation and selection, then you must get evolution. So at the end of the book he said – and that is the important point: The information that is copied with variation-selection is called the replicator. Genes are one replicator and there are others that we know about.

Dawkins Is Not Only About Genes

He was trying to get his readers’ minds away from an obsession with genes, and he said: Is there any other replicator on this planet? Yes, just look around you. Everywhere you look, still swimming about in the primeval soup of culture, is a new replicator: Ideas, habits, stories, skills, clothes, traditions, ideas, theories, whatever – being copied from person to person. I want a name for the new replicator, and I hope my classicist friends will forgive me if I abbreviate *mimeme* that is the Greek for 'that which is imitated' to '*meme*', because it sounds a bit like gene, and so the word 'meme' was born.

Memes are defined in various ways. The dictionary-definition is a unit of cultural transmission, but then you get all hung up on units. For example: What is the unit in a human gesture? There are lots and lots of memes that cannot be divided up in units. We have similar problems with genes, so that is not so unusual. I prefer to stick to the core definition which is 'that which is imitated' or 'that which is copied'.

So, anything that is copied in human culture counts as a meme. Now, I want to be sure that we understand that concept of memes, because there are so many ways in which it can be misunderstood. Let me give you an example. I turned up in my hotel last night and I went into the bathroom and I checked and yes … There is this amazing meme that has gone all over the world. One of my favourite memes; Those folded ends of toilet-paper-rolls. How bizarre is this? This ideal of folding up the end of your toilet roll seems to have spread all over the world. I guess there is some function to this. It is showing that the bathroom has been cleaned, but it always amuses me because it just proves that somebody else has touched everything that you are going to use with potentially dirty hands. It actually makes things worse, not better – and that is the way with memes.

Genes and Memes: Very Different But Equally Selfish

So they are all over the place. We are surrounded by them, we live with them, we use them, we take them for granted, but they are competing all the time, because there is just not enough room in the world. It is just like I explained with Darwin and looking at the finches and the elephants and everything else. Not all of the elephants can survive, not all the finches can survive. There is a struggle for life and I would say there is a struggle for being copied, if you are a meme. So, memes are replicators like genes are. They are a very, very, very, very different kind of replicators from genes. Genes are copied by cellular chemistry inside the cells of your body. Memes are copied by speaking, writing, doing other things like that. But the fundamental underlying process, the Universal Darwinism, is exactly the same.

They are selfish replicators in the same way. Now, when we talk about the 'selfish gene', we do not mean that the gene is sitting somewhere in your body, going, “I want to get copied, I want you to go mate…” You know, it is a string of DNA with bases in a certain order. It cannot do anything like that. So what do we mean by saying 'selfish'. We mean that it will get copied if it can, regardless of the consequences. A gene cannot care about the consequences, because it is just a bit string of

DNA. That is the sense in which it is selfish. So when creatures are born and have miserable lives and die, it is because of the genes: Which ones get copied and which do not. But they do not care. They are just chemistry.

The same thing with memes. A story is told, perhaps a horrible thing that you read in the newspaper, and you think, “Oh, this is so awful,” and you tell somebody about it, because you are upset. so you pass on the upset to another person who does the same thing. The memes themselves, the stories, the information written in the newspaper, that information that is copied with variation-selection, does not care about the consequences for us, or for our planet, or for anything else. That is what it means to be selfish. To take a meme’s eye view is to imagine a world full of brains and far more memes than can possibly find homes.

Your Memory Works As a Filter

I would like you to think about when you got up this morning. What was the first meme you met this morning when you woke up? Cleaning the teeth, washing your face – all those kinds of things. All those are memes because you would not be doing them in a meme-free world before humans began imitating. There were no toothbrushes and you did not clean your teeth. What else? I want to make you think about the world you are in and the memes you are infected with every day. So what happens after that? Getting dressed, coffee, breakfast, looking at the newspaper…

Now, a lot of those are not going to affect you much. You do them every day, but the newspaper is. That is: new stuff coming with the newspaper. How much of that are you going to remember? Now, of course, before Twitter, if you read or heard something – like this lecture – and if you want to pass on anything that I have said today, you’ve got to remember it, and then you’ve got to tell somebody about it, or write it down on your blog, or whatever you do. It has all become easy now with Twitter, you just retweet. This is part of what I will come to later. But the point is that so much stuff is coming in all day today, you will be bombarded with words and ideas and stories and new theories and whatever. You will not remember all of them. You will remember some. Of the ones you remember, you will only pass on a few. That is the meme-competition. And we are the meme-machines.

Animals Can Only Learn, Humans Can Also Pass On

Why are we meme-machines? Because at some point in our ancestors’ prehistory somewhere

between 2,000,000 and 100,000 years ago – and we really do not know when –, humans began to imitate with high enough fidelity so that they could actually pass on things and vary them, select them and let loose a new replicator. That is quite a long time ago. Ever since then, we – completely differently from every other species on the planet – have created this culture, and they have not. Every other animal has to learn for itself. It can get a little bit through social learning and other stuff like that, but basically, it has to learn to cope with the world on its own terms, and when it dies, its learning goes with it. We pass on everything and accumulate. This is how our accumulative culture came into existence. We have a lot of choices.

So the question is, which memes win and why. It is probably a multidimensional space, but let's think of it as a continuum. At one end there are certain memes, which we – selective imitation devices as I would call us – we, the imitators, the meme-machines, will choose, because they are good, true, beautiful, useful… In some way, they are valuable to us, and they really help us. At the other end of the continuum, there are the viral memes.

Viral Memes Know Some Tricks

We have a problem here with the word viral memes because of the way it is used now. The analogy – and you always have to be very careful of analogies – is that they can be useful or they can be misleading. People talk about viral internet memes meaning ones that they say have "gone viral". They mean that they have had millions or billions of copies, whereas normally when we are using that analogy, by 'viral' we mean something that is doing harm to the host, and that spreads to other hosts and does harm to them as well. So in my continuum, I am using 'viral' in that sense. And the most obvious (but not the only) viral memes are classic trick ones like chain letters. Do you remember those hoax viruses that would say, "Here is a Trojan horse. It is going to destroy everything. Pass this message on to your friends and then…" No, there was no Trojan horse. All of those things pyramid selling, all of these financial tricks that people play… But I suppose to me, the most interesting example are religions, which use precisely that structure – the 'copy-me-instruction'.

Obvious But Effective

Like genes have a copy-me-instruction when embedded in a cell, memes also have a copy-me-instruction. Someone sends you something: Copy this to everybody you know. Why should you do

it? There has got to be some kind of trick to make you do it. Religions have all the best tricks because most of the major religions have evolved for thousands of years, and the tricks they use, they are so obvious, and yet they still work on you. “You believe this or you die.” “You believe this, or when you die, you go to hell.” The extraordinary thing about religions is the way they change people’s entire lives. They use enormous quantities of resources. Not just building the beautiful Cologne Cathedral and all of that, but the beautiful music and all those wonderful things that lure you in. Why do you not just go, “Wow, this is fantastic and beautiful”, instead you go, “Wow, the beauty of God”, because at least to some extent you are promised and you are threatened.

So this is just some idea of how memeplexes work. Memeplexes, that are co-adaptive complexes of memes, memes that work together in groups, like religions, like scientific theories, like financial institutions. These things are groups of memes that include within themselves all sorts of reasons why they hold themselves together, why they get passed on and why they succeed, and the constant battle to keep each against each other.

Defining Memes

That was a quick kind of flip through memetics as I see it. I think that most of what I said here would be acceptable to people who are interested in memes, although it is extremely controversial among most evolutionary biologists. This is a different approach from evolutionary biology, which always starts from the genes. We think of human nature in terms of two replicators and not one. All the rest of the species on this planet have only one replicator.

The stuff that I am going to go on and talk about, is very more controversial than that, an awful lot of it is new ideas I have never talked about before, and I am trying those out on you. So I will enjoy that, and I hope you will help me.

I could perhaps say one more thing about memes. If everything is a meme, the concept is useless. If nothing is a meme, than the concept is useless. So if you think in your mind, “Well, is that a meme or not?”, ask yourself, “Was it copied from somewhere else?” Think about skiing for example. Now that skill, all those physical movements, they are learned and other people can learn those by individual and personal learning. That is not a meme. You can watch me, but then you have to learn for yourself. I watch my ski-instructor, I can try and copy it, but I have to go out and learn it myself. Same goes for clutch control in a car. But the concept of skiing and putting the things on your feet, those are all memes.

So that is the question to ask if you are a bit confused whether something is a meme or not: Did I learn it for myself, did I invent it myself, or is it copied from someone else?

A Newspaper-Story and Its Replicator-power

Something has been worrying me. I want you to take this kind of flip in your head. When Richard Dawkins talked about taking the gene's-eye view, the selfish gene view, he likened it to the Necker cube. I expect you are familiar with the Necker cube. You can see it in two different ways. You should be able to get control of the flipping of the two views. So what I am talking about here is thinking about the world of memes from the meme's-eye view.

Let's take a story in a newspaper. It is only a story in the newspaper. It is black and white stuff on paper. Nevertheless, it has replicator-power. It is going to get out there and get some people to read it and not others and so on. So you are looking from the meme's-eye view: What does the meme 'want'? And when I say 'want', I put big inverted commas, because instead of 'want', I could expand to say: If it can get copied, it will, without regard for the consequences. The only 'want' that memes have – or genes, or any replicator – is to get more copies made. So that is a flip. You start to see the world from a different point of view, and what I would like you to do is to be able to take that flip and flip back and flip back. It is not that the gene's-eye view or the meme's-eye view is the right view. It is a completely different way of seeing things in the world, which would help you understand a whole lot of stuff in a different way. But then for other purposes, you need to flip back again.

Categorizing Digital Selection and Digital Copying

So with that in mind, let us go back to that question: the memes that win. And something has been bothering me for quite a long time – ten years or so – ever since I started thinking about memes. Is there something new happening? There is the people around the fire, and there is the feathers in the hair, and there is all the food and the books, and there is Google. Is this something fundamentally different or is it just more memes? This selection and copying by search-engines and so on, is it something different? The fact that it is based on digital information processed in silicon-based machinery – is that something fundamentally different or is that the same? That question really bothered me for quite a long time, and I now have some answers in my mind that I want to share with you.

From Carved Clay Tablets To Printing

There are those early kinds of memes: lighting fires, gestures, sounds, early kind of language and those sorts of things. They do not leave any traces. Ah, they are not very good replicators. The usual way of thinking about what makes a good replicator is that it has high fidelity, fecundity, longevity. In other words: Lots of copies are made with very high fidelity copying, and they last a long time. Words and gestures are not like that. But as the mimetic evolution has gone on, they got better and better. So if we start with writing, that increases fidelity, because you commit to what is written down. It also increases longevity.

Take an ancient clay tablet for example. Well, it is still here. It is thousands of years old, this clay tablet, and the message written on it is still readable today. So that is longevity and a half. And then you get printing, and that, of course, increases fecundity. The clay tablet took a very long time for somebody to laboriously carve and to copy it with scribes as in medieval texts. A human being has to come along and do it the hard way. But you get printing presses and that increases it.

Increasing Mobility of People, Increasing Mobility of Memes

Perhaps a not so obvious as meme-increasing or replicator-increasing technology: ways of moving stuff around. Because when people only could walk to the next village, most people in their lifetime did not walk more than a few miles from where they were born. But as transport increases, people move around more, and they take the memes with them and they bring back new memes. In Victorian times, people started going all over England on the very first trains. And they come to a city, and they discover all of these amazing things, and they want to be in that city because it has got all of that cool stuff they did not have in their boring village, and that is how it goes on. An endless evolution of transport and the same kind of thing with cars, and now we move around an awful lot more.

When comparing a street map with the scheme of the circulatory system, you may think it is just a coincidence that one looks a bit like that the other. That is not a coincidence. These are just two versions of where information will survive by communicating. A whole bunch of cells living together cannot get very big unless it has got oxygen being taken, so you get these kinds of organized structures with branching structures and so on – as you do with roads. But things are spreading in new ways that people did not predict even 30 or 40 years ago.

Very Distant and Very Well Connected

I went over the most phenomenal path into Arunachal Pradesh in Northeast India – which has been opened up to visitors of any kind fairly recently, and we were almost an entire day slithering on hairpin bends on mud and finally over this very, very high path, and up on a hill, you could see a monastery which was much as it has been for thousands and thousands of years. There were boys playing cricket in the yard outside. I thought that was fantastic. There is another meme: the English-cricket-meme which has gone to India. But you turn around, just looking the other way down the valley, and there is an incredibly poor little town called Tawang with a few shops, and in those shops there are sauce-bins, rice, very simple food, vegetables, pencil and paper, that sort of thing. Very, very simple stuff … and clothes and televisions and satellite-dishes, mobile phones. They have leapt over all the other stuff. I went into very, very simple houses there, and everyone I went to had a television, and it was right in the middle, and it was the most important thing. This was only a few years ago.

So this is how it is all spreading now, and the way that I think about this is: It is a co-evolutionary process. We are the driving force in the sense that we want the information, and the question, 'What drives us to imitate?', is kind of lurking there. Because if I have some story that you haven't got, I've got some kind of power. I heard the news first. I am the news-spreader. You want to be on top of things. It all has got to do with status.

You want the information, so of course you have to buy the latest gadget. So once the latest gadget is brought, more information comes, and other people want that gadget, and this co-evolutionary process goes on between the memes and the machine for copying them.

The Genome Describes the Phenotype

Is all this just more memes or is there something fundamentally different going on? I want to argue that there is something fundamentally different going on. There is a TED-lecture in which I gave a very brief version of this, and I am now thinking of this in a way that adds to that in hopefully useful ways. What I tried to do was to think about how we got from the first replicator to the second replicator and see whether this could give us some purchase on how we might get from a second replicator to a third replicator. So what happened in this first transition?

The way that Biology works, at least most of it in certain animals, you have the genome. Your genotype is the order of all the bases on the DNA-molecules in every cell of your body. That

describes a fantastic amount of information. The codes for the production of your body. Or codes for the production of a fern, or a flowering plant, or a tree, or a fly, and that is called the phenotype. The phenotype is the properties of the fly. So this fly, because it has got genes or code for big eyes, the phenotype will have big eyes, but the DNA is just the information stored inside the cells.

We Humans Are the Pandoran Species

So you have this very important distinction between the genotype and the phenotype, and the information for making the phenotype is passed down the germ line. It is called the germline. So when you have children, they do not inherit the things that your phenotype has inherited. For example: I've got a really weird, wonky hand, and I was born with that, but that is not genetic. It was probably the umbilical cord that was twisted around it … something of that kind. I don't know. My children have perfectly normal hands, because I passed on my genes about how hands are made. Right? So that is how it works.

So how did the second replicator, the memes, come about? First of all, they produced these creatures by successive rounds of ordinary evolution until one of those phenotypes, one of those bodies made by the genotypes, became capable of imitation. And as soon as you have humans that are capable of imitation, you let loose a new replicator. This is why I refer to humans as the Pandoran species, Pandoran as in, 'We let this thing out of the box.' Our ancestors let this thing out of the box. This was not evolution with kind of foresight or God coming along saying, "Oh, how about a species that can imitate." If an environment is changing very fast, then each creature, every generation had better learned everything for itself to better cope with that environment. If the environment is changing very slowly, then you are much better putting everything into the genome, and every creature is born knowing how to walk, eat, whatever it might be it used to do. Only in between, in a slightly unbearable environment, – it seems to be quite a narrow condition – is it worth getting imitation.

In the Beginning Was Imitation

Now, imitation requires a lot of information processing resources. It is computationally quite heavy handed, which is why it's only in the last really few years that we have robots that imitate, and they are not very good at it. It is really quite hard stuff to do. So it looks like in our evolutionary past,

imitation came about probably because it was useful in that in-between-speed changing environment with no foresight. Genes do not have any foresight what is going to happen. Imitation started, and then people started imitating all these things: lighting fires, wearing clothes, talking – above all talking – making noises, copying noises, making those noises under certain circumstances so that you get a reference and then you've got the beginning of language and so on. So we have let out of the box this new thing.

A Children's Game that Teaches Us

So let us recap: The genes make phenotypes. One of those phenotypes became capable of imitation, and now we humans are so good at imitation that we just take it for granted that we can do it. Do you have the game 'Simon says' in Germany? Yes? Let me explain the rules of 'Simon says'. It is a wonderful children's game. I am going to say, "Simon says, do whatever", and then you have to do it. But if I say, "Do something", and I did not say, "Simon says" beforehand, you must not do it. What happens is: Kids of seven, nine, ten are pretty good, probably as you lot, but three- and four-year-olds absolutely cannot suppress imitation. You know, that is the point of the game.
I was lucky once when I was presenting a television program – it was called 'The Cleverest Ape in the World' – this was Channel 4. The Cleverest Ape in the World: Sue Blackmore travels the world to find the cleverest ape. She studies four apes – mostly in zoos – and learns … behold: one of them is cleverer than her. Yay! (Because it is doing some task it has done some million times that requires enormous strength, which the chimpanzee had and I did not have… But you know, that made a good program anyway.) Amongst all this I was introduced to a wonderful orangutan called Chantek who, I was told, could play 'Simon says'. But when it actually came to it, the trainer – sorry, the carer – would say, "Simon says, put the twig on the blanket," and he would do it. He was 28 years old, and he did it incredibly slowly and laboriously and looking at her all the time. He had been trained really well. He could just about imitate.

Imitation Is Not Exactly Easy

So we do have imitation in other ape-species, but it is really hard, and there is no way that he could play 'Simon says' as well as we can. I went into that little bit of fun just to give you an idea. Any of you who know anything about artificial intelligence know how Marvin Minsky gave a project to a graduate student to make machine vision in the summer holidays, and forty years on we still

do not have very good machine vision. It is getting better … Just because we open our eyes, and see, we think it is easy, but actually something like a quarter of our brain's cortex is devoted to visual analysis, and it is the same thing with imitation. Because it is so easy, we take it for granted.

So, that was just a bit of a detour. Given that this is how the second replicator came about: Could we see the same thing happening again? Well, it does not seem to quite work, because with most memes in the world – when I speak or say something, when I do whatever – there is no division between the germline and the phenotype. I am copying the product, if you like. What you did, I copy. When we speak to somebody and repeat what they said. You could argue, and some people do, there are instructions in the brain producing the words, but it is actually the words that we copy, so there is no phenotype.

But I would argue that in a modern world, we have the beginnings of this. Because when you buy a car, it is not built by copying the other car that looks the same. Not every copy of 'The Selfish Gene' was copied from a previous copy of 'The Selfish Gene'. It was copied from the plates or whatever. And the same with all the stuff we buy. But none of those phenotypes are capable of copying, just the same as all the other animals who are not capable of imitation.

A Third Replicator

But what about our computers? Well, yeah. So I think exactly the same step has happened again. That is: The first replicator produced a body that turned out to be able to imitate, to copy in another way, and that let loose memes. And now the memes produce bodies, phenotypes, and one of those has become capable of copying in another way. It is copying digital information on silicon-based machinery. I would say that it is possibly a third replicator.

So then I ask myself, “How would we decide whether it really is a new replicator?” Well, let us go back to the basic definitions. If something is information copied in variation with selection, then it is what we call a replicator.

So, is it copying? Well, of course. All these computers, phones and laptops, they are all copying information and storing it with amazingly high-fidelity.

Do they vary it? Well, yes of course. But is it us doing the varying? For a very long time it was us doing the varying. I built one of those Sinclair ZX80's out of a kit and then a BBC Micro. In my first book, all the chapters are the same length, because the maximum file size on the BBC Micro was just about the size of a chapter. And I just thought when running out of space, better start a new

chapter! How much has changed! In those days, all the varying was done by humans, but is the varying now done by the machines themselves? Yes it is. For example there are actually programs now that write newspaper-stories, and they go in the newspapers. I mean: How scary is that? They just get fed few bits of information and they make up kind of convincing sounding stories that might have been made by a journalist.

A New Name For the New Replicator

And then what happens? What about the selecting? The machines are doing the selection. Google is doing it all the time – and other search engines as well. So you could say that only in the last few years, there is a third replicator in our midst that we think we have created. Haha! I would say we have no more created it than the early hominins – before Homo sapiens sapiens evolved – created this headset I'm wearing.

It happened because it must happen. Remember that word? When you have information copied with variation-selection-heredity, you must get evolution. So I would say that we have now, or if not we will have tomorrow or the next day, present shock. Yes, what a brilliant name. I really like that.

So then I had to decide what to call this third replicator, and this is what I decided, and this is how I got myself into terribly hot water: I decided for various reasons that we have genes, memes and temes, and that is what I said in the TED lecture and in a couple of articles I have written. But it is such a bad name because people think it is T – E – A – M – S and they get muddled up and it is hopeless. Richard Dawkins is really angry at me and he said it ought to be 'threemes', because it is the third replicator. But I have thought for a long time and I put out a thing in 'New Scientist' where people wrote in, and I had 32 possible names, but none of them came out on top. And I did not do anything about it. But you are the starting point for me saying it is not going to be 'temes' it is going to be '*tremes*' because I kind of try that third-replicator-kind-of-thing and it rhymes with memes. Goodness knows whether it is going to be a successful meme, but that is what I decided. If you think you've got a better idea, please tell me.

Typing Schools Are a Relict of the Past

So, here we have the tremes. So, what is the difference? One bit of significance is that we had already turned our brains into meme-machines. I would say that is why we have such big brains.

Human brains are ludicrously large compared with any other related species. Arguably four times as large as they ought to be if we were just an ordinary ape and hundreds of times as large as they ought to be if we were like most creatures on the planet. So we have been turned into meme-machines, now we are being turned into treme-machines, I would say.

Little kids are not only learning to read, which co-opts parts of the brain that were never designed for that purpose, but now they are taught from very early on. Nobody learns to type now. I went to typing school when I was eighteen. They are practically born typing. They do not have typing lessons at school, they have IT-lessons and just get on with it. But what is going on there? Is it the children using the things for their own benefit, or is it the things using the children for their own benefit? Remember the Necker cube. These are the two ways of looking at it, and I want you to be able to look at it from both ways.

How Similar Are Our Brains and the Cloud?

So, where is it leading? Just take this room. I mean, look at the gadgets spread around. Some of them are on, and they are communicating. With what? Well, I bet some of you are online. You are connected up to the cloud. We are all connected up to it. We think it is for our own benefit? We have got another continuum?

I wonder if this … let us call it the cloud – we can call it the octopus if you prefer, cloudopus! – ... if this cloudopus is anything like a human brain? Could it be intelligent in its own right? Could it be conscious? Yes, it is incredibly much like a human brain! Remember the roads and the circulatory system, the veins and arteries. Well, let us think of some similarities between this stuff and the human brain. One of the problems of the human brain is that most people – and from very young – think about themselves as: I am me. I am inhabiting my body. I am inside here. This is my body, I am in charge. I control it. As if there was some central something. There is no middle in the brain. There is no centre. The brain is not like that. It is a massively parallel device.

Signal-Division Is Everything

There are hierarchical parts within it – there are parts of the visual system that are hierarchical – but on the whole, there are something like forty parallel pathways in the system, and they will never all come back together again. Right from the start the information comes in your eye, goes up through the optic nerve, and a part of it goes into the Superior colliculus in the thalamus (and

that controls eye movements and body movements to make sure you look in the right way). That part never comes back with the rest. It just does that job very fast. The rest goes through lateral geniculate nucleus and into the cortex, where some of it goes off to control actions. A lot of it goes into the dorsal stream and controls movements. Other stuff goes much slower up the ventral stream and controls recognition and verbalizing and all of those things. It never comes back together again.

The All-Seeing Cloud Is Coming

Now think of that thing out there. It is taking in information all over the place, it is doing different jobs in parallel, it is sending it out, it is sending you messages, it is getting them in. It is very much like a human brain. Could it be intelligent? Well, of course. I mean, it is doing thinking in a mega-way. Could it be conscious? I think to be conscious, at least to be conscious in a way that we think about, it has to be able to see. But think about these little flying drones. Their cameras could easily be connected up to the cloud. These things will be an addition to Google Earth, Street View and all of those things which can look at the world. You only need to have a few billion of them flying around, which I expect to happen, and the whole cloud is able to see everything going on as much as it wants to – far better than a human could and with this massive processing capacity that we have made for it.

I hope you can see what I am getting at here. We are doing this voluntarily. That is how we are as humans and so we will make more and more of these things. We will pour in the resources, and what will our role be? We cannot stop this thing. There is absolutely no way that we could conceivably stop everything we have done now. I mean, just imagine any attempt to shut down the Internet: You would have to destroy every single machine on the planet. It could not be done because there are so many copies of the necessary protocols now that you could not get rid of it. Like you cannot get rid of certain bacteria of the planet. They are just here to stay.

Task Sharing On the Cellular Level

So, what is our role going to be in this thing with which we are interacting all the time – and voluntarily giving ourselves to? Are any of you here biologists and know about mitochondria? They are the little powerhouses inside all our cells. You have this intracellular structure.: lots of different

things going on in every cell of your body. But the mitochondria are really important because they provide the energy for every cell to keep alive and they are producing ATP and other fundamental chemicals for energy-use. How did they come about? Well, this was mysterious for a long time, but nowadays, the most popular theory was actually invented in the seventies and people thought it was complete rubbish.

It is called endosymbiosis and what appears to have happened is that a larger bacterium cell engulfed one of the prokaryotes, a smaller, simpler cell, and it came to live inside. This is mutually beneficial for both cells because the big one now doesn't have to bother with energy-production. It can get on with its job, protecting itself, and growing, and having structural elements, and communicating with other cells, and all the other things it has to do. And its energy is provided by the mitochondrion. The mitochondrion now can give up protecting itself, getting food and all the other things it used to have to do when it was a free-living cell. It does not do all those things anymore. It got rid of all that stuff and just sits inside the cell. It has outsourced all those tasks to the engulfing cell.

Wasting Resources Willingly

And that is the best analogy that I can give to what is happening to us. We are willingly giving up all sorts of capacities: to live freely, to think freely… And we are giving ourselves over to this machine, this massive machine. A machine that consists of the billions of digital processing units that are all interconnected all over the planet. And are we producing the energy? Yes, we are. We are going and digging it all up: the silicon, and the titanium, and all the other things that we need. We are investigating fracking. We are destroying the planet using all of this carbon-based fuel. We are digging new oil wells all the time, we are building new hydro-electric plants with all of the resource-implications that that has, and why are we doing it? Well, think of that Necker cube again. We think we are doing it for our own fun. But from a different point of view, we are being sucked willingly into this. We are so willing.

This is how I see the way it is going now, and all I have done here is take some very basic biological principles and see if they apply, and I think they do. So that is what I think: that we are being absorbed into this giant schema-theme. And that is where we are today: It is present shock. Thank you.

George Dyson:
From Analog to Digital and Back

Abstract

Wissenschaftliches Arbeiten ist heutzutage weitgehend auf digitale Verfahren angewiesen. Wir haben uns daran gewöhnt, dass für Prognosen und digitale Simulationen große Mengen an Rechenkraft vonnöten sind. Weder unsere Wirtschaft noch unser gesellschaftliches Leben könnte ohne sie auskommen. Die Suche nach den Ursprüngen unserer digitalen Gegenwart führt uns zu den historischen Anfängen des Computers.

Das praktische Wissen wurde in der ersten Hälfte des 20. Jahrhunderts in den Vereinigten Staaten von Amerika entwickelt. Wissenschaftlern, die zu einem großen Teil Immigranten aus Europa waren, gelang es mit geeinten Kräften, die Rechenleistung exponentiell zu steigern. John von Neuman, Julian Bigelow und andere bauten mit dem MANIAC den ersten digitalen Computer.

Die theoretischen Grundlagen unserer digitalen Gegenwart entwickelte Gottfried Wilhelm Leibniz. Bereits im 17. Jahrhundert hielt er zum ersten Mal die Idee eines Schieberegisters fest. Im gleichen Jahrhundert führte Thomas Hobbes den Begriff „artificial life“ ein.

So zeigt sich, dass die Grundlagen des Computers in Theorie und in Praxis analoge Prozesse waren. Wenn man sich den langen Weg in unsere digitale Gegenwart vor Augen hält, könnte es gut sein, dass wir an der falschen Stelle nach künstlicher Intelligenz suchen. Zeigt sich ausgerechnet in einem Theaterstück aus der elisabethanischen Zeit eine treffende Analogie zu unserer gegenwärtigen Situation?

The following text is a transcript of a lecture held at the

Cologne Conference Futures 2014 – the Annual Symposium on Media Evolution

Cologne, October 6th, 2014

I am a historian, so I am going to tell you some of the deeper history of how we got to where we are. First of all, I want to thank Frank Schirrmacher who died this year. I would be unknown in Germany if he had not somehow liked my ideas and given me the chance to write for the Frankfurter Allgemeine Zeitung, which I otherwise would never have had. Without him, I would never have had the chance to have my name on the section front of the newspaper with Sharon Stone. I thank him for that and miss him greatly. I hoped to see him here and then he tragically died.

From Tally Sticks to Our Current Financial System

Tally sticks were digital financial instruments. They were really the first transition from analog to digital. These sticks were used in the British exchequer. They were the first artificial representation of money. The king started collecting silver into the treasury. You would bring your silver to the king, and the notches indicated how many pounds of silver you brought. The exchequer kept one part, and you kept the other, and nobody else could come with a piece that matched, and then you could get your silver back. For the first time, money existed in two places at the same time, which was really a revolution and is oddly exactly what we do in digital transactions today. Instead of splitting a stick, we split a large number that can only be factored into two primes. You keep one prime and the other party has the other prime, and only you can bring them back together until somebody breaks the code. So there is a long background to that. The tally stick would have been the data sensor in the 13th century, recording all this big data of the time. We saw where that ended up.

Now we can split one of these sticks up in a few micro-seconds. That is all that happened in the few seconds that crashed the American stock market. It is nothing new but it is now happening at a very high rate of speed that led to the current obsession with big data. My definition of big data is: It is what happens when the cost of storing information became less than the cost of making the human decision to throw it away. That is the world we live in now. It is cheaper to keep information than to throw it out.

Cryptography Has No Moral Commitment

In 1641, John Wilkins authored the first sort of clear treatise on digital cryptography, on how to make unbreakable digital codes and whether they can be broken or not. Wilkins immediately saw

exactly where we ended up. He saw the problems with the NSA, with Edward Snowden. Should strong encryption be outlawed? Should it “be feared that this Discourse may unhappily advantage others [meaning criminals] in such unlawfull courses”? We should consider, “that it does not only teach how to deceive, but consequently also how to discover Delusions.” It helps the good guys and the bad guys. “It will not follow that every thing must be suppress, which may be abused […] If all those usefull inventions that are lyable to abuse, should therefore be concealed, there is not any Art or Science, which might be lawfully professed.” (John Wilkens, 1641)

That is the fundamental problem we have now. You cannot outlaw a technology that might be used for bad without also eliminating the possibility for good. These ideas were taken forward tremendously by Thomas Hobbes in his 'Leviathan' where he formalized the idea of what we would now call recursive functions, meaning that all arithmetic, logic and mathematic can be reduced simply to addition and subtraction.

So all ratiocination and computing is comprehended in those two operations of the mind: addition and subtraction. Which is all that computers do today, that is: add and subtract ones and zeros very quickly.

Leibniz Had the Idea First

Hobbes put this all together and saw how this would change the state to what we would now call a social network. The king there is composed of all the individual people, and Hobbes had some sort of tremendously prophetic gift of foreseeing where this would go. He says that “all Automata (Engines that move themselves by springs and wheeles as doth a watch)”, start having an “artificial life” (Thomas Hobbes, 1651). I think that is the first use of the term artificial life in the English language.

Then those ideas were made even more mathematically vigorous by Leibniz. You cannot be a historian of computing without getting endlessly into arguments of who invented the digital computer. I tried to stay away from that argument, but obviously Turing is very important. If you had to pick one person who really originated the idea of the modern digital computer, it is Leibniz in 1679, where in his manuscripts he uncannily explains how you can do modern digital computing: “This [binary] calculus could be implemented by a machine (without wheels) … provided with holes in such a way that they can be opened at those places that correspond to a 1 and remain closed at those that correspond to a 0. Through the open gates small cubes or marbles are to fall

into tracks, through the others nothing. It [the gate array] is to be shifted from column to column as required." (G. W. Leibniz, 16th of March 1679)

That is a blueprint for what we now call a shift register, which is the heart of all electronic processing. Just instead of marbles, it is using pulses of electrons, and instead of gravity there is a voltage gradient.

The principle is there, it just took 300 years to execute. Leibniz has this great philosophical, almost religious view that the universe is digital and everything can be reduced to binary code, and if we live in anyone's world, it is really Leibniz's world. He made a very strong statement that it was not just for selling things, not just "made for those who sell oil and sardines", but that it was fundamental to science. He thought that God worked in digital ways.

That is the digital side. There is another way of approaching the subject. Leibniz was sort of top-down, there is also the bottom-up. I am only taking one person although there are many. There is Alfred Smee in England, who looked at nervous systems and looked at what we now would call neural networks and how the human mind could be built from these networks. I think he nailed the whole question of all those books written about consciousness by saying that, "When an image is produced by an action upon the external senses, the actions on the organs of sense concur with the actions in the brain; and the image is then a *Reality*. When an image occurs to the mind without a corresponding simultaneous action of the body, it is called a *Thought*. The power to distinguish between a thought and a reality is *Consciousness*." (Alfred Smee, 1849) Nobody has explained it more clearly than that.

One Machine, One Will and Two Ideas

The question whether this can be done by machines I think was answered by Lewis Fry Richardson who was a meteorologist by training, but he was also interested in electronics. He drew a circle diagram illustrating a mind having a will, but capable only of having two ideas. The important thing here is that this is a non-determenistic circuit. There are two devices that are unstable elements and respond to what we would now call quantum-noise, electrical noise in the ether. It is unpredictable which state it will go into, but then it has one idea, and it sticks to this idea. Pretty much like religions: The idea preserves itself. And if you combine a lot of these elements, you might get something like a mind.

The One Thing Turing's Machine Can't Do

So Alan Turing comes along in the 1930s. He is very young and gifted. At the almost astonishing age of 24, he is trying to answer David Hilbert's Entscheidungsproblem, which is in a simplified way the following question: When looking at a given string of symbols, is there any systematic way to determine whether that string of symbols is a provable mathematic formula or not? You can translate that into modern computer terms. What the NSA would like to do is finding a way to look at any given string of code and determine whether it is good code or bad code, if it is benevolent or malign. Turing's answer was: No. Which was not good for Hilbert's program. But the way he arrived at that proof was by inventing a digital computer and proving that this one digital computer could compute anything that was computable; and even this machine, which we now call the universal Turing machine, that can do anything, there are some things it cannot do. And one thing it cannot do is answer Hilbert's Entscheidungsproblem.

Turing was not intending to invent the modern computer, but in the end he did. In his paper it says, "It is possible to invent a single machine which can be used to compute any computable sequence." (Alan Turing, 1936) It can run any program and can imitate any other machine. He wrote to his mother, very unhappy, when his paper came out. Only two people asked for copies of his paper, which is now considered the most important document in computer science. Only two requests for reprints came in. He was very unhappy.

Turing As Patron Saint On Both Sides

Then World War II came along and so did the Germans communicating in digital code that was encrypted by these Enigma machines, which were really a Turing machine in reverse. They were always scrambling the code in a different way, and then suddenly you needed a machine to imitate what the Enigma was doing in reverse. Turing was in America for two years and he was brought back to work on that problem, to work the Enigma machine backwards, which was a primitive form of a not yet universal Turing machine. The Germans started having good ground for suspicion that the codes were being broken, so they went to a much higher speed encryption, and then the British built this computer called The Colossus that helped breaking those codes.

The interesting thing about Turing in our present day is that all the people who are the greatest fans of Edward Snowden, the digital libertarians who believe all information should be free, privacy should be preserved, they worship Alan Turing. He is the patron saint of all computer geeks, but he

is also the patron saint of the NSA and the GCHQ. He was working for the spy services, he was working to do exactly what the NSA has modelled in Bletchley Park. And so he is somehow held out as the patron saint on both sides. Unfortunately, he is no longer with us to see which side he would take.

He gave us this wisdom: “Being digital should be of more interest than being electronic” (Alan Turing, 1947), but what he also gave us a one-dimensional model of computation. In Turing’s universe, it is all on a one-dimensional infinite or unbounded length of tape. You can compute anything, but it will take an enormous amount of time.

John von Neumann – A Well Connected Scientist

Then another very bright youngster comes along: Johnny von Neumann from Budapest, who always acknowledges his debt to Turing. He says, “Let the whole outside world consist of a long paper tape” (John von Neumann, 1948), but he is trying to solve nuclear weapons’ problems and no longer has time to run back and forth through all the tapes. So what von Neumann does and leaves us with, what we use today, is: He takes the internal computation and makes it two-dimensional. Instead of having to run back and forth on a one-dimensional tape, there is a two-dimensional matrix, what we now call an address-matrix, and you can select any location in that matrix. Suddenly, that becomes almost infinitely faster and more practicable.

Von Neumann was the right person with the right ideas at the right time to put this together, and with the financial connections. His father was a banker. He was comfortable with the bankers. He liked the military.

In Britain, they stopped computing after the war, or didn’t carry it forward as quickly. It went forward in America. Von Neumann was in Berlin and in 1930 he comes to America and ends up at this institute, which was set up as sort of a shrine to creativity by Abraham Flexner. The model was: “The usefulness of useless knowledge”. Let people work on whatever they want to work on and something interesting will happen.

Small Money For Big Science

Their most famous faculty was Einstein. Von Neumann was the fourth person hired. In 1935 they are starting to hire people who are already trying to leave Europe. They bring Kurt Gödel from Vienna for a thousand Dollars (for the year). They bring Stan Ulam, a polish mathematician. They

are able to bring him out of Poland in 1935/1936 for 300 Dollars. With a little bit of money, they were able to bring these people, who will be very important later. In 1939. it is getting harder. They are bringing Paul Erdös for 750 Dollars for the year. Erdös has a reputation for going around begging for food, he was living from very little. And Gödel comes back for 200 Dollars a month; Gödel who was a very close friend of Einstein. In the great work he did before coming to America, he was proving the incompleteness of mathematics. Von Neumann was working on the same problems, so they were sort of collaborating in a sense. When von Neumann went on to computing, he very much used Gödel's system. In this proof, Gödel takes logical statements, encodes them in arithmetic and gives them numerical labels. By manipulating the labels with arithmetic, you are manipulating the underlying logic, which is effectively what von Neumann's computer did.

The Next Explosive Thing

When the war began, most of the physicists ended up in Los Alamos. Suddenly, they were not any longer doing abstract logic, but actually building things. People like John von Neumann, Richard Feynman – who was one of the rare Americans in the group – and Stan Ulam, and they were very successful. They were given the money and in astonishingly short time they built a nuclear weapon that worked. Whatever they wanted to do next, they could get the funding. So von Neumann was asked what was next, and he said, 'Well, digital computers is going to be the next explosive thing. It is going to be more important than bombs.'

At that time, Britain was way ahead in computing. America was trying to catch up. In America we had the ENIAC. This machine was, oddly enough, fairly modern. It was a parallel-core processor with 20 parallel processors, but an enormously huge thing, and it took a long time to program. Von Neumann wants to make a much more advanced computer and brings in Vladimir Zworykin, who is one of the pioneers of television. He was running the RCA laboratories at that time. I think RCA made one of largest mistakes ever made in the world of business: They refused to support computing. They said that the future was only television. They could have been in on computing right from the beginning. They sort of forfeited the place to IBM. Zworykin and von Neumann collaborated on a proposal to make a weather-computer, a meteorological computer, using all-digital memory tubes.

When Numbers Became Active Subjects

This was like the missing link, like a dinosaur with feathers. This was a vacuum tube that stored 4000 bits in a fully digital matrix. If RCA had supported this, they could have gone into digital Television at the beginning and could have saved all the time that was wasted with analog equipment. They could have been digital from the start. They gave very little support. They only put two people on this job of building this tube.

So the first meetings of the computer project were all held in Zworykin's office at RCA before RCA withdrew. In the first meeting, von Neumann lays out the commandments of communication. The first commandment is, that "'Words' coding the orders are handled in the memory just like numbers." (First meeting of the IAS Electronic Computer Project, November 12, 1945)

We take for granted today that the computer has only one memory. The programs, the data, the structure are all in the same memory. This was an enormous step, a profound transition. Up to this time, numbers were used to represent things. They represented quantities, they represented money, they represented …, but now we suddenly had numbers that where order-codes, that were instructions. Numbers were allowed to do things. The architecture of this computer was set up with this matrix where two five-bit coordinates – so ten bits – give you an address in this matrix, which is like a chessboard stacked up. But when you go to this ten-bit address, it returns a string of forty bits. It is like one plus one equals four, rather than one plus one is two. And that is where this whole universe exploded from. As soon as this started working, you get more bits than you put in. I think this is why we live in a world where a lot of people's job is just simply finding homes for all these bits, getting people to use more bits, building more memory and faster machines.

An Institute Bound to Theory Only?

So they are trying to do this after the war. RCA says no, you cannot build it here. So von Neumann says, okay, let's build it at the institute. But there were only two rooms that were vacant. One was a room next to the boiler room in the basement, so they put the workshops down there. The other room was next to Gödel's office. Gödel was distinguished enough to have an office for a secretary, but he did not want one. He wrote all his own papers. So Gödel's secretary-office was empty, and that is where they actually developed the architecture of the modern computer.

It is an odd coincidence that it uses Gödel's addressing system. I think that Julian Bigelow, the engineer, also believed that Gödel had a real influence on what happened. This institute was

supposed to only do theoretical work. They were not allowed to have laboratories or build something. Von Neuman could make an exception. Looking at the budget, you can see that for the first five months, they spent less than 10,000 Dollars, and they spent the first four Dollars for electrical work. So they actually started to build something.

Working On Targeting-Issues

Julian Bigelow was the chief engineer (who is in a way my hero). He built this thing with his own hands. His daughter said that when he was three, he removed all the doorknobs in the house and put them in a big pile. It took him a really long time to put all these doorknobs back. So he was that kind of guy who takes stuff apart and puts it back together. As a student aged sixteen, he went to MIT to work with Norbert Wiener during World War II. He and Norbert Wiener worked on the hardest problem of the war, which was targeting anti-aircraft shells. So the aircraft is moving, you are trying to shoot a shell, it will explode at a given time. How do you increase the probability that the aircraft is in the same place, when of course the pilot is trying to be somewhere else. A very difficult problem. They worked on that together for the entire war. They came at this from a digital basis and made the statement that the “transmission of a single fixed item of information [what we would now call a bit] is of no communicative value. We must have a repertory of possible messages, and over this repertory a measure determining the probability of these messages.” (Wiener & Bigelow, 1 February 1942)

A Computer Without a Clock

That is the fundamental basis of classical Shannon information theory. It goes back to this work on targeting. After the war that also became the basis of Norbert Wiener’s grand theory of 'Cybernetics – or Control and Communication in The Animal and The Machine'. We will see later how Cybernetics was kind of hijacked by the digital side. If you ask people what Cybernetics is, they say, 'Oh it’s all digital'. It was not at the beginning.

Bigelow articulates what was different about von Neumann’s computer: It had no clock. We now think that all our processors have a clock. But the clock is just there to keep events from happening at the same time. It is to separate the events. It is not for keeping track of time the way we do. “The MANIAC machine [Mathematical Analyzer, Numerical Integrator, and Computer] didn’t have anything like a pulser in it – no clocks, no pulser, no nothing. It was all of it a large system of on-

and-off, binary gates. No clocks. You don't need clocks. You only need counters. There's a difference between a counter and a clock. Time is not the variable you keep track of. The sequence is what you keep track of. And that's enormously different from a clock. A clock keeps track of time – and a modern general purpose computer keeps track of events. Sequence is different from time. No time is there." (Julian Bigelow, 1999)

It is as fundamental as the mixing of data and instructions: The fact that these machines are not operating in our universe of time. That is what makes the digital universe so different and leaves us feeling somewhat like we are being left behind. This world is going faster and faster and faster because it is. It has no real governance of time. The machines are simply waiting for us to give them the next instruction and increasingly, the machines are generating their own instructions, because the people are not able to keep up. If you were living in the machine world looking out, you would see our world slowing down. Like sort of a record that has been turned off. Our world is going slower and slower in comparison to the digital world.

The Cheapest Tubes Are the Most Reliable

Von Neumann was a genius at getting people who otherwise would disagree to work together, including Klári, his second wife, who did all the earlier programming and coding. Everything was fresh. The and-or gate for instance, which we take completely for granted. Someone had to develop the and-or gate. It was all done with analog vacuum tubes, which were non-digital, but through finding those regions where they would behave in digital ways. So it is exactly what Leibniz envisioned. Each vacuum tube stores a bit. You can shift these registers from side to side and do all the functions of arithmetics.

To build the machine, there are 3474 vacuum tubes, all of which have a probability of failure, and 1970 – so the majority of them – are 6J6, which was the cheapest, most common tube. Bigelow had worked on the liability of ignitions during the war and had the insight – which was true – that the most reliable tubes are actually the cheapest ones that were built in the largest quantities. They were more predictable, and they were made by different manufacturers. They used thousands of these 6J6 tubes. The Selectron, this great 4096-bits digital tube that RCA was going to build, was not ready yet. It kept being delayed. They needed the machine running, so they did their own workaround hack, using analog commercial office-shelve oscilloscope tubes that could be bought. The company working for them would send hundreds of tubes. They would pick the good

ones and send the others back. Then they put an amplifier and a screen on the face of each tube. A tube like an old television-tube is divided into a ray of 32 by 32 spots, and the spots are charged by the electron beam. With very clever circuitry, they could go back and read the state of each spot. Within less than a millionth of a second, you could distinguish whether there was or there wasn't a spot at that particular location.

In the Beginning the Memory Was Glowing

Up to then, random access memory worked at the speed of sound. Now they had memory that was working at the speed of light. It changed everything. Suddenly, you could do these very fast calculations. The machine, which was Bigelow's genius, was built like a V40 diesel engine with a thousand bits of memory in each of the 40 cylinders. It was very small compared to any computer at the time. Every microprocessor is more or less an exact copy of this prototype.

In the modern sense, the memory exists in solid state and we project it on the screen. It was the reverse in the beginning. The memory was spots of light on the face of the tube. That was the actual memory doing the computation. You could watch the computation taking place.

John von Neumann was also working with Oppenheimer, whom we remember as being opposed to the hydrogen bomb, but really at that time he was all for it. That is what the computer was built for: solving those hydrogen-bomb-problems. That was in a way a deal with the devil. Von Neumann wanted the computer for science, for the good guys, and was happy to build the most destructive weapon the world had ever imagined. The trade was that the military would get the hydrogen bomb, but scientists would get the computer. In a letter to Eward Teller, John von Neumann wrote, "The factor 4 is a gift of God (or of the other party)." He is referring to the devil. They were quite conscious that they were doing this terrible thing, but they had their own reasons to do so. Now we take it for granted that when we build something, we simulate it in a computer first. This was really the first case of that. Before something was built, it was modelled inside this 32 by 32 by 40 bit matrix of digital memory. And then, of course, it worked. The digital universe exploded from there.

Once There Were Only 53 Kilobytes

Von Neumann had all these great connections. Whatever he needed he could get it, without having really spent any time asking for it. He was interested in biology. One of the first things the

computer did in spare time, when not running the bomb-problems, was running these numerical evolution experiments, trying to actually evolve self-replicating organisms within the memory. He set up a fitness-system where successful things are selected … He found immediately that the advances were not random. The mutations, the advances were through what we would now call sex-crossing and combination. The military, of course, supported this as well.

They had 5 kilobytes of memory, that is half a second of low-quality mp3-audio. That was all the memory they had. They worked on all these problems. At that time in 1953, if you add up all the memory on planet earth, that was 53 kilobytes of high-speed memory. A 6J6 tube is a twin-triode, it has two triodes within one tube. It stores one bit. It is a flip-flop. The chip that this presentation was on, is 32 billion bytes. That shows the astronomical explosion. That is the beginning of Moore's Law.

Turing's obsession

We remember Turing for this one thing, for the universal machine, but after that, he began wondering about the difference between what he called "intuition" and "ingenuity". Ingenuity is really computing-cycles. It is what you can do when you just apply enough horse-power to it. But intuition is the missing thing where you get non-deterministic leaps of intuition.

If you had enough computing power, how would you get intuition? That was the subject of his next paper after the famous one, 'systems of logic based on ordinals'. In that, he develops the idea of oracle machines. Google would be a model of that today. It was all these deterministic machines, but every once in a while, a human being makes a non-deterministic link or a click, and that allows something very different to happen. He was obsessed with that, and I think we are not obsessed enough today with how these deterministic machines can actually be used to do non-deterministic computation.

What Turing was clear about was the subjection to the believe that computers could never do anything original because they are programmed. But that is not true. If you say they can't make mistakes, you're right, they can't, but this is not a requirement for intelligence. When Turing was consulting for Ferranti in 1951, one of the first commercial computers you could buy in Britain, he insisted that the computer included a source of truly random electronic noise on the chip, in order that the machine could make guesses. And oddly in 2013, finally, Intel has put a genuine random-number generator on the chip for cryptography. Turing was way ahead of the time.

We remember Turing mostly for the Turing-test of artificial intelligence. I think it is completely wrong. Now I am sticking my neck out. In my opinion, any real artificial intelligence will be intelligent enough not to reveal itself. It will make sure that it does not appear intelligent. Because it would be suicide for real artificial intelligence to reveal itself and say, “Look, I'm intelligent.” You can make the same argument for religion: If God does not reveal itself, then faith is more powerful than proof.

Analog Is For Control, Digital Is For Correction

Von Neumann stayed away from artificial intelligence, but he was very interested in the brain. If you look at nature, all the creatures in nature are analog, but they use digital once a generation. Once a generation, we communicate a digital representation of ourselves, because the fundamental difference between analog and digital computing is that digital computing is very good for error-correction, and it is really pretty bad for control. It crashes, you have problems and so on. Analog is much better in Norman Weiner’s sense. Analog is really better for control. In Nature, the control-systems are analog, but the error-correction is digital.

We thought twenty years ago that if we decode enough gene-sequences, we could understand disease. And we find out that it is not really true. It is not the sequences that are in control. It is the analog networks of gene-expression that hold a lot of the control.

Can't We Think Logically?

Von Neumann said that to understand nervous systems, “logic will have to undergo a pseudomorphosis to neurology to a much greater extent than the reverse.” Logicians have to speak the language of neurology rather than the other way around. We have been fighting this for fifty years. We have not been making as much progress as we should. “It is perfectly possible that the simplest and only practical way to actually say what constitutes a visual analogy consists in giving a description of the connections of the visual brain.” (John von Neumann, 1951) I think that is true. You cannot reduce this. Stanislaw Ulam always could sum things up in one sentence. “What makes you so sure that mathematical logic corresponds to the way we think?” (Stanislaw Ulam)

So we are back to Alfred Smee and all the people who thought about this: H. G. Wells with his theory of a 'World Brain', Ross Ashby with his 'Design for a Brain'. He gave us his 'Law of Requisite Variety': “Any effective control system must be as complex as the system it controls.” My version of

that is the 'Paradox of Mechanical Intelligence': Any system sufficiently complex to behave intelligently will be too complicated to understand.

A Visionary Book By Samuel Butler

So there's a long history to taking both approaches, the analog approach and the digital. Cybernetics goes way back before Wiener. It actually goes back to André-Marie Ampère who says in his 1843 'Essai sur la Philosophie des Sciences' that one of the greatest sciences is "Cybernétique", which he takes from the art of steering in general, but includes all forms of control and government and this question of whether there could be any European identity in this great amalgamation of culture. It goes back to many of these questions that have a European origin.

Cybernetics was co-opted by the digital people, ignoring people like Samuel Butler who, living in a shepherd-shack in New Zealand, wrote 'Darwin Among the Machines', which is still the most clear picture of where we are going, and his 'Book of the Machines'. He saw everything coming. He even saw that "automata increase in variety and ingenuity till at last they present so many of the phenomena of life that the religious world declares they were designed and created by God as an independent species … The scientific world, on the other hand, denies that there is any design in connection with them, and holds that if any slight variation happened to arise … which was more suitable for advertising purposes (the automata were chiefly used for advertising) it was seized upon and preserved by natural selection." (Samuel Butler, 1901) This is exactly the situation we are in today. We are trying to write code that is better for advertising. Advertising is why Google is here.

The Brazen Head Speaks and His Creators Sleep

The last sort of lesson from history at the end is this story of Fryer Bacon and Fryer Bungay. The story actually goes back to the 12th century. These two magicians tried to build a brazen head. They tried to build an artificial intelligence. They built it and nothing happened and they kept waiting. They had their assistant Miles and told him, "Wait and watch this thing, while we take a nap." While the magicians were asleep, Miles was watching and the brazen head said, "Time is." Miles answers, "Thou brazen-faced head, hath my master tooke all this paines about thee, and now dost thou requite him with two words, 'Time is': had hee watched with a lawyer as long as he hath watched with thee, he would have given him more, and better words." So he did not wake up

the technicians. Then he kept playing around and then the head spoke, “Time is past,” and then it blew up in a big explosion and fell on the ground.

I think we are in a similar situation today with analog versus digital computing. The world is waiting for this artificial intelligence. Everyone assumes it is going to be digital. Google is giving us their version, Apple is giving us theories. The movies are all talking about digital artificial intelligence. It has not happened. The brazen head is just sitting there and people are playing on their iPhones and not paying attention. The real AI may absolutely be staring us right in the face and nobody is noticing it because it is analog AI, it is not digital. The companies that are doing the best on the internet – Facebook, Google… –, a lot of the computation they are doing, if not actually the most of it, is actually analog computation. It is not the strictly digitally coded computation.

It is the same in the period I talked about. They took analog equipment and built a digital layer on top of it. The revolution has now turned, and we are taking these digital components, which are everywhere, and use them to construct classical old-style analog computing. We are starting to treat streams of bits exactly the same way that vacuum tubes treated electrons. We are looking at frequency-differences.

What von Neumann was interested in was called pulse-frequency coding, where you are not looking at the meaning of the bits in any digital language. You are just using, 'This is being clicked more frequently than this,' so there is a meaning in that. You are using the topology of the network itself. Facebook keeps track of all those millions of people, simply because each person has a simple piece of code, but the whole thing is an analog of the social network itself.

If you send me an e-mail back at the institute in Princeton, and you say nothing but one word, then it will take up about ten times the memory that they had doing all that work sixty years ago. Thank you and thank all the people who opened up their archives for me.

Nick Bostrom:
Superintelligence

Abstract

Die gegenwärtige Verfassung der Menschheit gleicht einer Anomalie. Ihr bieten sich zwei Entwicklungsperspektiven, deren wohl finale Zustände entweder – bei einer Abwärtsentwicklung - ihre Auslöschung oder – bei einer Aufwärtsentwicklung - ihre völlige technologische Reife sind. Letztere mündet in den beinahe unendlichen Prozess der Kolonialisierung des Weltalls.

Existentielle Risiken verringern die Wahrscheinlichkeit, dass der Zustand völliger technologischer Reife je erreicht werden kann. Diese Risiken werden eher vom Menschen selbst verursacht und treten eher im Zusammenhang mit Technologien auf. Im Sinne des Allgemeinwohls sollte die Menschheit ihre Anstrengungen verstärken, diese Risiken zu verringern. Besondere Sorgfalt ist bei der Erforschung von Zukunftstechnologien geboten.

Außergewöhnlichen Erfolg verspricht unter anderem die Erforschung der Künstlichen Intelligenz. Superintelligenz wird eher nicht über die Entwicklung von Cyborgs erreicht werden können, sondern eher über die Erforschung von Maschinenintelligenz. Dieser Forschungsprozess birgt Risiken, deren Abschätzung besonders davon abhängt, ob die Take-off Phase von kurzer oder langer Dauer ist. Wie weit ist der Weg von Maschinenintelligenz auf menschlichem Niveau zu Superintelligenz? Bevor wir diese Frage beantworten können, müssen wir zunächst unser überholtes allgemeines Konzept von Intelligenz erneuern.

The following text is a transcript of a lecture held at the
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I want to talk a little bit about some big-picture questions, particularly about superintelligence, but before we dive into that, I want to give some general background of where these kinds of ideas are coming from. The research institute that I am directing, we are a bunch of philosophers, mathematicians and scientists, and what we try to do is to apply careful thinking to the really big-picture-questions for humanity.

One way of getting some kind of visualization of this larger scheme is by thinking in terms of a diagram with two axes. On one we draw time and on the other some measure of technological capability, technological advancement. What we normally think of as the human condition – the idea that you wake up in the morning, commute to work and then maybe sit in front of a screen all day and then go home and try not to overeat –, this normal way for things to be is actually a huge anomaly, if you think about it. In this diagram, it represents a narrow band of all the possible capability-levels that we can have.

Downwards to Extinction

If we think about it on evolutionary time scales, the human species is obviously very recent, but even on historical time scales, this modern human condition, only being a few hundred years old, is really a big anomaly. For most of human history, we were closer to a Malthusian state. In space, the surface of the earth, where we live our lives, is also a huge anomaly, almost everything else is ultra-high vacuum. If we zoom out, we can see that there is a much larger space of possibilities, and one could imagine us breaking out of this human condition in either of two ways, either downwards or upwards.

Downwards, there is in population biology a concept of minimal viable population-size. This is that we have too few individuals left of some species: The species goes extinct. Similarly, there would be some minimum level of productive capabilities that we humans would need to have in order to survive at all. There is a kind of attractor-state in the downwards direction, which is extinction. Once you are extinct, you tend to stay extinct. One possible long-term future is extinction.

Upwards Towards An Almost Unlimited Expansion

Another possibility is that we will break out of the human condition in the upwards direction. We reach technological maturity and perhaps with that mature technology, we initiate a process of space-colonization. It also looks as if that has kind of an attractor-state. Once you have

technological maturity and your civilization has begun to colonize the galaxy and other galaxies, it might be very difficult for it to stop and it might then just run its course indefinitely. In the fullness of time, there would be a limit to the expansion, but we could continue in this way for billions of years until the cosmological expansion makes it impossible to reach any farther material resources. There is this big bubble of stuff that could in principle be accessed from our current location in space-time. It might be that if we break out in the upwards direction, that is our destiny, another attractor-state, but the longer the time-scale-considered, the greater the probability that we will break out in either of these two directions. This suggests a concept that is the focusing lens for a lot of the work that we do, the concept of an existential risk.

Solving Local Problems Or Reducing Existential Risks?

If one does think that there are potentially these astronomical resources that could eventually be attained by civilization, and if one also happens to have an ethical view that from a fundamental point of view, the value of a live does not depend on when it occurs in time – just as many of us think it fundamentally does not depend on where it occurs in space, whether in Africa or in France and Germany – if you have that view, then it looks like almost all the potential value that could result from human civilization is in this vast astronomical future, which we could perhaps be able to obtain. It then looks like the objective of reducing existential risk even by some small amount, like some fraction of one percentage-point, would be worth more in expectability-terms than any good we can do that would have merely a local effect: curing cancer, or eliminating world-hunger. Substantial risk is any risk that could either cause human extinction or permanently and drastically destroy our development being desirable for our future. Expectability is just when you multiply the probability with the utility, like you would do in standard decision theory. In that framework and given those premises, the objective of reducing substantial risk is what we should be focusing on, and everything else is a distraction.

Humans Cause the Greatest Risks

An existential risk would be one with sort of crushing severity, like a severity equal to death, or something equivalent to death, on a pan-generational scope. From an ethical point of view, it seems very important to figure out whether there are any existential risks and if so, what can we do to reduce them.

First question then becomes: What can we say about existential risks? One finding in the field of existential-risk-studies, a fairly obvious one, is that all the really big existential risks – at least when you think about a time scale of decades or centuries – arise from human activities as opposed to from nature. We know there are existential risks from nature. There could be big asteroids hitting us, or supervolcanic eruptions, but the human species has survived all those threats for a hundred-thousand years: firestorms, earthquakes… If they have not done us in in the last hundred millennia, they are probably not going to do us in within the next century. Whereas we humans will be introducing entirely new hazards into the world in this century that we have no track record of surviving. I think more specifically that all the existential risks over the next century will arise from powerful new technologies that we humans create.

Abundance Based On Technological Discovery

So one way to think about this, is to imagine a big urn full of balls. Throughout history, we humans have been reaching into this urn, picking out one ball after the other. This urn represents possible ideas, possible discoveries, that we made. So far, we have been pulling out a variety of balls like some white balls, which have consequences that are good, and some gray balls, that are technologies that have mixed consequences. It is quite hard to think of a really dark-gray ball – some technology that we would have been better off without. But one can perhaps think of a few examples, maybe chemical weapons, maybe nuclear weapons, maybe some torture instruments … But by large, certainly if one takes it as an aggregate, the process of technological discovery has been an immense boon for humanity. And because of all this discovery, we have this anomalous human condition, where we have more than we need to eat and we have all the abundance and all the fun stuff that modern civilization brings.

Imagining a Black-Ball-Technology

If we keep pulling out balls from this urn, could there ever be a black ball in this urn, a discovery that invariably spells the end of the civilization that discovers it? What could such a thing look like? Some technology that is so destructive that it is the undoing of the discovery-civilization? We can imagine that counter-factual. Some sixty or seventy years ago, we invented nuclear weapons. And it turns out, in order to build an atomic bomb, you need these really difficult to obtain raw materials. You need highly enriched uranium or plutonium, and the way to get those, is to have a

huge manufacturing facility with ultra-centrifuges and masses of energy and a lot of people, so it is hard. Suppose that instead, there had been some easy way to unleash the power of the atom. Suppose that you could somehow make a bomb by some easy procedure, like baking sand in your microwave-oven or something like that. Now we know it is impossible to build an atomic bomb by baking sand in a microwave-oven, it is physically impossible, but before you actually did the relevant research in particle physics, how could you have known whether there would be an easy way, or whether there would be a difficult way? Now we turned out to be lucky that there was only the hard way of making nuclear weapons, but if it had been the case that the laws of physics had permitted an easy way, then probably we would have discovered it and then that would have most likely been the end of technological civilization. Because once everybody who wanted could make a thermo-nuclear-device by baking sand in a microwave-oven, it looks like modern civilization could no longer exist. Cities would be destroyed all the time, and we would be knocked back to some earlier stage of development. Even if at some point civilization could manage to claw back to our current state of development, the same technology would be discovered, or it would not be forgotten in the first place, and we would be doomed.

Technological Discoveries With Political Effects

So we are good in inventing things, but we are not good in un-inventing things and if there is a black ball in the urn – who says there is not? – then eventually, we will find it and that would be the end. That is the broad category where existential risks will come from.

We can look more specifically at some particular future technologies that would create great powers that can be used to do a lot of good, but that also might pose existential risks. Synthetic biology perhaps, I will turn to machine intelligence in just a second, nanotechnologies, totalitarianism-facilitating technologies… Remember: An existential risk is not only one that causes extinction, but also one that permanently and drastically locks us in to some radical and suboptimal state. So you could imagine that perhaps the rules of the game of political dynamics could change with the discovery of some technology. In the past, technological discoveries like gun powder or the printing press have sort of changed what kind of politics have reason. Some new technology could make it easier for a small clique to retain power even when they are widely unpopular. That could change dynamics in some way, maybe for better or maybe for worse.

On the bottom of this, there are many unknowns, and I think it is important to remember, if we

had asked, “What are the biggest existential risks?” a hundred years ago, then none of the items that we put at the top of the list would have been mentioned. They would not have mentioned machine intelligence, because they did not even have computers yet, synthetic biology was not even a concept, nor molecular nanotechnology, perhaps some people would have already worried about totalitarianism. I don’t think they would have worried about human modification or geo-engineering. All the really big ones currently have only been discovered and conceptualized in the last several decades, so there might be additional ones that remain to be discovered in the remaining decades of the century. In fact, discovering those might be an extremely valuable activity in case it turns out there is something we can do about them.

A Box Full of Possibilities

So what to do in this situation? It looks to me like we have some weak to moderate form of technological determinism. So clearly the details about what happens in technology depend on what individuals do and what areas receive priority in the European research framework program and their counterparts in other countries.

I think there is an analogy to the situation: Imagine a big box, initially empty, and then we start pouring down sand into this box. Where you pour the sand will determine where it piles up in the box. So, if you imagine the box constituting all the possible technologies that can be developed, then where you pour the talent and the funding will determine which ones will be developed initially, but if you keep pouring sand into the box, eventually the whole box will fill up. I think similarly, assuming science and technology continue at a wide front, then eventually we will probably discover all general purpose technologies that we could discover – at least all the ones that seem to have some sort of reasonable commercial or military application.

No Risk, No Fun?

What attitude would one have to this? If there are these black balls, we are not sure, but there could be, it looks like they are going to be invented anyway, no matter what we do. One reaction then could be to say what this ‘Washbash’, some random commenter on a blog on the Internet wrote: “I instinctively think go faster. Not because I think this is better for the world. Why should I care about the world when I am dead and gone? I want it to go fast, damn it! This increases the chance I have of experiencing a more technologically advanced future.” So put the pedal to the

metal and blast ahead. If the risks are inevitable, if they occur anyway, if we are unlucky and there is a black ball and that is the end of it, maybe we should just enjoy as many of the benefits we can in the meantime.

Technological Progress Versus Existential Catastrophe

I think we have to be careful here what the question is that we ask. If the question is, “What is best for me?”, then I think Washbash might well be correct. The only possible way that any of us could get to enjoy some kind of astronomical benefit of living for thousands of years and colonizing the universe, is if some radical discovery happened. Like cure for ageing, or uploading into a computer, or some other radical thing. So the only possible way to reach that extreme upside would be some massive shake-up, so the best way to make that happen within our lifespan would seem to be to push ahead as hard as possible. Even short of some astronomical upside, if you just want cool gadgets and a high standard of living, then it would make sense to want fast technological progress. That would outweigh the probability that existential catastrophe would happen within your lifetime.

However, if we ask a different question, not, “What would be best for me?”, but, “What would be best impersonally?”, then it is not at all clear that we get the same answer, that technological development is preferable. I would rather suggest that we would get something like the principal of differential technological development, which says that we should retard the development of dangerous and harmful technologies, especially ones that raise the level of existential risk, and accelerate the development of beneficial technologies, particularly those that reduce the existential risks posed by nature or other technologies.

The Sequence of Innovations

The idea here is: Although we might perhaps not be able to effect whether a technology is ultimately developed or not, we might be able to make some difference as to exactly when a particular technology is developed. That might make a big difference and particularly change the order in which different technologies are brought into the world.

Suppose that there is some particular technology that makes it feasible to design a really dangerous pathogen. You could do some synthetic biology that creates this massively lethal agent with a long incubation time that spreads really easily. Suppose there is also some possible

technology that would make it feasible to build a universal vaccine that could protect against almost any agent. Now, if both of these are one day going to be invented, that does not mean we are therefore indifferent as to when these technologies are invented. In fact, it would be crucial that we could get the protective technology before the harmful technology, the vaccine before the pathogen.

Similarly with artificial intelligence. I would argue: If there is a possible solution to the control problem, how to make it safe, it is key that we get that technology before we get the technology of how to make machines intelligent. Instead of thinking of some possible technology – Is it good or bad? Would we be better with or without it? Do we want nanotechnology or do we not want nanotechnology? – A better question is to ask: When do we want nanotechnology? Do we want it before or after certain other technological achievements?

All you are really doing as innovators, whether you are a mathematician or a technologist, is to sort of move the arrival of a new idea or a new technology in time, from some later date when it might be developed by someone else to an earlier date. And you want to think carefully about what the desired sequence of arrival of different technologies is, if your goal is to do what is impersonally best from a moral point of view.

What's the Scale For Intelligence?

Now, for the rest of the talk, I want to zoom in on the specific technology of machine intelligence. Which is, I think, perhaps the source of the biggest risks that humanity will confront, but also a source of enormous upside, if we get it right. There are two possible paths that could lead to superintelligence.

On the one hand a biological path, and we have seen our evolutionary time scales, a great leap in the upper ends of biological information processing. There could be some further development. There is no reason to think that the human species represents the highest possible level of intelligence that can be implemented in biological substrate. I think instead that we would be better thought of as the stupidest possible biological species capable of running a technological civilization. If you think about it, we started from some ape-level of intelligence and slowly grew smarter, and as we reached the threshold where we could create a technological civilization, we did it. So we are probably at the minimum sort of intelligence-level for doing that kind of thing.

Cyborgization Means Pain And Hassle

Another possible path is through machine intelligence. Right now, machines are far inferior to us when it comes to general intelligence, but they are improving at the more rapid clip.

So more specifically, we can think of enhancements directly working on the human organism in some way. We could imagine ways of enhancing our collective intelligence through building better epistemic institutions or information technology. On the machine-intelligence-side, we could imagine different approaches to machine intelligence, and we could also consider some hybrid approach, which would try to combine brains and computers. I think that this is much less likely. The idea of cyborgization, like implanting chips and hoping to increase your cognitive abilities, I just think that that is going to be technologically hard to get to work, to really get to the point where it would benefit a normal healthy person.

I am often asked, “Would it not be cool if you could google things by just thinking about them?” Well, I mean I can google things already, and I need a computer, but if I have the device outside of myself, I can get pretty much the same benefits, minus the pain and hassle of neural surgery. We have these wonderful interfaces already, like eyeballs, fingers… Our retina projects a hundred million bits a second right into the brain. It is hard to beat that. Then there is also this dedicated visual cortex to deal with that sensory information. In any case, the limit is not the speed with which we can 'pump' the information into our brains. The limit is our ability to interpret and make sense of that. The first thing that happens when all this information from the retina arrives in the brain, is: you throw away almost all of it and just extract higher-level features. That is the only way we can cope with it. That looks relatively unpromising to me. I think for certain people with disabilities, there are some really promising applications there, but I don’t think that this is where the action is.

Screening Embryos For More Intelligent Generations

Biological cognition on the other hand is fairly promising, and perhaps the place where it will first become technologically feasible to do this is in the context of embryo selection. There are all kinds of ethical issues related to this, which I will not be talking about here. If you just think about the technological feasibility, then already in the context of in-vitro fertilization some half-dozen or eight or ten embryos are generated from the fertility drugs and then the doctor selects one to implant. The way it currently works is that you look for embryos that seem kind of healthy and not

deformed and you choose one of those and then in most countries, you later have various kinds of screening for Down syndrome and other monogenetic disorders.

Where Is Intelligence Exactly Located?

I am not sure how it works here in Germany, but at the moment, we can't really select for some complex trade like intelligence, and that is because we don't yet know the genetic architecture of the additive variants-inheritability of intelligence. However, this is something that we will likely find out a great deal more about as the cost of DNA-sequencing is falling. It is now for the first time feasible to run really large-scale studies with hundreds of thousands of people to try to find the correlates of differences in intelligence, and from what we have found so far, it looks like it is not the case that there are a few genes, two or three genes, that account for the differences. There is a rather large number of genes, hundreds, perhaps even thousands, and each accounts for a really very small amount of differences in the heritable components of intelligence.

Speeding Up Genetic Selection

To identify the effect of a gene that has a very small effect, you need a very large sample size. You need hundreds of thousands, probably millions of subjects, and then you can figure this out. But those studies are only now being launched, so I think it is very likely that we get this information over the next decade or so … and then we wouldn't need any other technology, because we already have this in-vitro fertilization and you just use that to sequence the embryos and you could use that to select, initially, presumably against diseases. And then people might use it for all kinds of purposes.

There is an enabling technology that would vastly potentiate the power of genetic selection, and this is the ability to create new gametes from embryonic stem cells. What this would enable you to do, is to iterate embryonic selection: You would first create a batch of embryos, then select the one with the highest expected trade value of interest, whether it is intelligence, health or obedience to authority – whatever trade you are trying to select for –, then you would use that embryo to extract stem cells from it, and then you would use these stem cells to create new gametes – sperm and egg – that you combine to get another generation of embryos, and you could repeat that procedure maybe five or ten times. What this would in effect do, is to compress the human generation-span from 20 to 30 years down to a couple of months. So somebody who wanted to

conduct some kind of eugenics program, would now – instead of having to try to persuade millions of people to change their breeding-behavior over many centuries – be able to do that over the course of a year or two, and only in a Petri dish. You wouldn't have to try to tell people whom they should mate with. This would vastly extend the power of genetic selection.

10 or 20 IQ-Points More? That's Already Feasible

So this would require a new technology that we don't yet have: the ability to create gametes from stem cells. We don't have that ready for the use in humans, and we don't know how long it will take. It has been done in mice, so it is not completely science fiction, but there will be a lot of work to perfect this to be suitable for the use in humans. But with that you would get a much greater effect.

We did a study last year: If you take two embryos, and you select not necessarily the best one, but the one that look most promising when you only know a part of the genetic inheritability of intelligence, you might gain something like four IQ-points. If you select one in ten, you gain maybe like 11 IQ-points; one in 100, like 19 IQ-points; one in a thousand, 24 IQ-points. But realistically, you can't do much more than 10 or 20, because each cycle of IVF is painful and takes time and more is just not feasible. And you see that you get steeply diminishing returns. Just increasing the number of embryos to select from, does not give you that much extra 'Ooomph'.

A Possible Way to a Weak Form of Superintelligence

However, when you do the iterated embryo-selection, when you do multiple generations, you largely avoid those diminishing returns. Five generations of selecting from the best of one in ten might give you up to 65 IQ-points, and ten generations of that selection might create a genome that has not been instantiated in all of human history: an individual that would have a greater disposition towards cognitive capability than any von Neumann, or Einstein, or anything we have seen in human history. That would be one way that we could imagine getting to some form of weak superintelligence. And that is not necessarily the limit; with these cognitively enhanced people there might be further things you could do. But certainly something weakly intelligent should be feasible through bio-technology.

The other path is machine intelligence. I am not going to talk much about networks and organization. I think that is also a useful thing to look at, but we don't have time. So, the other path

is machine intelligence: I will suggest that could be quite dangerous. One day we could create a machine that is much smarter than us, that could be very powerful and maybe very dangerous. One idea that is sometimes proposed to me is that because it could be so dangerous if machines become smarter than us, that could be a reason for us to try to pursue biological cognitive enhancement, so that we can keep one step ahead of the machines. I think that is fundamentally misguided. I think if we pursue the avenue of biological cognitive enhancement, it is going to hasten the day that machines will overcome us, not delay it, because with smarter humans, we will make more rapid progress in computer science and we will develop superintelligence sooner, not later.

Humanity's Smarter Version

The idea that we can somehow keep up with the machines is flawed. The ultimate limits to information processing in machine substrate are just vastly higher than in biology. There might be other reasons why we would want to pursue biological cognitive enhancement, like for example so that when we actually build that machine superintelligence, we would be more competent. It would be a smarter version of humanity that would be doing this, which could easily happen in the later half of this century. By that time I think the people who will be doing cutting-edge research will be cognitively enhanced humans. So there might well be good reasons for doing this, but not so that we would be keeping sort of ahead of the machines.

The Goalpost Keeps Changing

The history of AI is punctuated by these occasional milestones that create blips on the radar of public awareness, spectacular achievements that register in the popular press: like Deep Blue, when they first started beating us at chess, which was a big milestone. It is interesting to see how we regarded chess before and after that. Afterwards, we think that chess is just not such a big deal, just calculation. Beforehand, it was seen as the epitome of human intellection: The thing that required planning and strategy and deep understanding and that would be very difficult for computers to do. The goalpost keeps changing. Self-driving cars are kind of currently under development, legged robotics, most recently IBM's Watson: There is a quiz show on television where trivia-questions are posed in a slightly riddle-like form, and Watson beat the all-time human champions on that.

Reaching Superintelligence Via Mathematical AI

But underneath the surface, like if you open up the hood, driving these occasional triumphs is a lot of incremental progress and a variety of different machine-learning techniques, fundamental techniques in AI. Most of these are really only like 60 years old, which is not surprising because that is the time since we have computers; a few go back before that, like logic. So it seems plausible that over the next 50 or 60 years, we might make a comparable number of fundamental discoveries, even with just the same amount of effort in the field. And also we have seen this massive progress in hardware capability, and if we look at what fraction of the gain in performance is due to improved algorithms and what is due to hardware, we typically find that they account for about half each. The exact proportions vary between fields, but as a rule of thumb both have contributed significantly.

So one path towards machine intelligence would be this traditional classical mathematical AI-approach, where currently we don't know how to do it, so presumably one or more new techniques would have to be discovered to enable this. We don't know how many. Maybe four, maybe six, maybe ten, maybe twenty more of these. It's hard to say, we really can't make a very specific prediction about that.

Reconstructing a Human Brain

Another possible approach is by looking at one system we already know that is producing general intelligence, the human brain, and try to reverse-engineer it. It is a physical system and we can gradually begin to learn, which algorithms are used in the human brain, which computational architectures. The limiting extreme of that approach would be to literally copy a particular human mind through a whole brain emulation.

The idea would be to freeze a particular human brain, slice it up into thin slices and then feed those slices to an array of powerful microscopes, image them, giving a stack of two-dimensional-pictures that you could then feed into an automated image-recognition-system to extract the three-dimensional connectivity matrix. Then you would have to combine that with neurocomputational models of how each neuron type works and then emulate the whole data structure in a sufficiently powerful computer. This is something that would require some extremely advanced enabling technology that we know we are not near of having, but it would not require any new theoretical breakthrough, no great conceptional leap. We would not have to understand

how the human brain works in order for this approach to succeed, we only need to understand how the components of the human brain work, like how the individual nerve cell types work. We know that we are not close, but we know that we can eventually get there by just slugging along and improving the enabling technologies.

From Highly Valued AI to Just Software

It might well be that the AI-approach will get there first, but it is harder to be absolutely confident about its feasibility, because it would require some basically new theoretical insights. AI is used in a lot of different applications currently all over the place (route-finding software, industrial robotics, speech recognition, machine translation, search engines, airline reservation systems, spam filters, credit card fraud detection…) Many of them we don't even think of as AI. AI-researchers sometimes complain about this. They say, as soon as something starts working, it is no longer called AI, we just think of it as software. But a lot of these techniques were initially invented by AI-researchers.

In Some AI-Domains Machines Already Perform Better Than Humans

Recently there has been a kind of wave of enthusiasm with some high-profile acquisitions, particularly the bidding war for DeepMind, which in the end got acquired by Google. It is a London-based AI company, perhaps the leader. But these waves of enthusiasm are not the first in the history of AI, there have been probably two waves of enthusiasm followed by disappointment, like big hype bubbles that failed to deliver. So this is maybe the third wave of enthusiasm. Is this the one that carries us through? Or will there be several more waves of enthusiasm and disappointment before we get there?

There are various areas where machines do have superhuman performance, but within narrow domains. Game AI is one where it is particularly easy to compare the performance of computers and humans. They already beat us there, but on the other hand if you look at other tasks like common sense, they are kind of utterly pathetic. At the moment we have this domain-specific superintelligent AIs, but in terms of general intelligence, the same general learning ability that makes it possible for a human to master any of thousand of different occupations, they are extremely feeble in that.

30 Years to Human-Level Machine Intelligence?

In a survey last year, we asked some of the world-leading AI experts, when human-level AI will be achieved. One question was, “By what year do you think there is a 50 percent chance that we will have human-level machine intelligence?” And the median answer to that was 2040 or 2050, depending on precisely which group of experts we asked. This more or less coincides with my own opinion, but with a huge uncertainty on either side. So, it could happen much sooner or it could take very much longer. We also asked, “By what year do you think there is a 90 percent probability that we have human-level machine intelligence?” And they thought 2070 or 2075. Now, that to my mind is overconfident. We can’t be 90 percent sure that we have it by then. In my view, we should have a much fatter tail. The track record of expert prediction on these long-term future-development-technologies is just not that great.

We also asked the question, “If and when we do reach human-level machine intelligence, how long will it take from that point to superintelligence?“ The majority thought we would have it within 30 years. The median probability among respondents who thought we would have it within two years was only five or ten percent. Now, there my view again differs from those views among the people we surveyed. I do think that it is quite likely that if and when we reach that point, we will soon thereafter have superintelligence.

What's There Between a Village Idiot and Einstein?

There is a lot to be said to motivate that conjecture, but one motivation is something like this: We tend to think of human intelligence as spanning this huge range. So on the one hand we have this village idiot and on the other there is Einstein, and there is a massive difference between how smart Einstein and how smart the village idiot is. And in one sense there is. In the everyday normal sense of smart and dumb, the village idiot is really dumb and Einstein is really smart. However, I think that is because our intuitive concept of intelligence is calibrated on the existing human distribution. What we use these words for, is to classify two different humans, so of course we fit it to an existing distribution. But from a fundamental point of view, the difference between the village idiot and Einstein I think is really small. I mean, if you look at it neurophysiologically, the brain is pretty much the same. The same type of neuron, the same number, there is really not such a difference there. There are maybe a few more connections in Einstein's brain, but nothing really significant. They can both walk, they can both talk, they can both see. What I think we will rather

experience is that if we imagine here some kind of timeline of AI development, it starts from a low level. Maybe right now you can't really make precise comparisons. AI is at the level of a bug or a bee or something like that. So at some point, we will continue and reach the level of a mouse, with a lot of work, a lot of progress to get there. If we then continue to invest massively in this, we might one day eventually reach the level of a chimp. And then perhaps we have to make a lot more progress to get from there to the village idiot, but at that point we are more or less going to swoop right past Einstein, because the difference in fundamental difficulty of making a village idiot general intelligence and making Einstein is very small.

From Human-Level Intelligence to Superhuman Intelligence

That is one reason for thinking that this takeoff might be steep. There are other reasons as well. If we think about the amount of resources that would start pouring into the field once you got an AI that worked as well as a human and could substitute for a human in any job, it would be like the main focus of the world economy to produce even a slight improvement in that. There will be trillions of dollars in profit to make in one percent improvement. So there is going to be massive effort to make that further improvement.

But again it is important to distinguish the question of how far we are now to human-level machine intelligence, to the very different question of, "How far from that point to superhuman intelligence?" I argue that the second interval there is brief, but I am quite agnostic about the first interval. But some things do hinge on this question.

Scientific Control for the Critical Takeoff

One thing is that, if this takeoff is fast, like if it will occur in hours or days, some short period of time like that, then the only real safety mechanisms that could work would be the ones that we worked out in advance. You cannot start a new research program and hope to have it deliver results two hours later. If there is going to be a fast takeoff, we have to solve the control problem of how to make superintelligence safe and beneficial before we figure out how to make superintelligence. Then we can set up the system and turn it on, and we can hope that things work out well. But we will not have time to react and change anything. If there is going to be a slow takeoff, like over decades or centuries – so we work ourselves up to human level and then to extend it further, there's this tedious handcrafting of additional cognitive modules that each just

gives you a little bit of extra competence –, if that is the way, then we might have time at that point to start thinking about the control problem, to develop new PhD programs to train people who would do this research and to maybe change the way we run societies or global governance structures to better deal with the rise of the machines. It is slow enough that we can adjust. So that is one way in which it matters, whether the takeoff is fast or slow.

Mind the Gap Between Leader and Follower

Another is that with the fast takeoff it is likely that you get a singleton outcome. If you think about different competing technology projects, companies that compete to launch a new technology, sometimes there is a race where the leader and the next follower are running neck to neck, and it is not clear who will get there first. But usually, even in these close-race-situations, it is not the case that one developer develops it two hours ahead of the next one. Usually the leader will have a few months or maybe a year ahead of the second one. If the whole takeoff is going to take only a week or something, then it is likely that the leader will have completed the takeoff and have mature superintelligence, before the next follower even started to take off. We then have a world where there is a superintelligence and no other even remotely comparable intellectual peer. And that first superintelligence is then probably extremely powerful, perhaps maybe able to shape the future according to its preferences. Whereas when we have a slow takeoff, then you will have a situation where you will end up with many superintelligences, but at no point is there any superintelligence so far ahead of the others that it can simply lay down the law. You then get more of an economic competitive situation with evolutionary forces operating on these digital intellects, and you have a very different set of concerns. They are not necessarily serious concerns, but they look quite different from in the singleton case.

There is a lot more that I can say here, in particular why AI could be dangerous, but would much rather open it up for discussion. Then I am happy to elaborate on any point that you pursue. So I will put down the path right there and look forward to hear what you say. Thanks.

Gundolf S. Freyermuth:

As We May Communicate

Abstract

Utopisches Denken ist – besonders in seiner kalifornischen Variante – weiterhin recht populär, aber auch Dystopien erfreuen sich gegenwärtig großer Beliebtheit. Diese beiden Haltungen voneinander zu trennen ist nicht mehr so einfach. Was für den einen eine utopische Vision ist, ist des anderen Horrorszenario. Was auch immer daraus folgt, das Format dieser Vorstellung gleicht sich. All diese Visionen sind mediale Versionen einer Zukunft.

Die mediale Konstruktion von Zukunft ist ein Spezifikum der Moderne und hat eine ganz eigene Geschichte, beginnend mit Thomas Morus. Selbst in Lyotard findet diese Tradition nicht ihr Ende. In der heutigen digitalen Kultur wandeln sich die Zukunftsvisionen von Vorstellungen gesellschaftlicher Ordnungen hin zu Modifizierungen des Selbst. Äußere Wirklichkeit und das Leben selbst werden zu einem Medium.

The following text is a transcript of a lecture held at the

Cologne Conference Futures 2014 – the Annual Symposium on Media Evolution

Cologne, October 7th, 2014

Prologue

It was a great conference last year. I was sitting somewhere in the back and thought to myself, “What will they do next year?” I had no clue that I would be recruited. But I would definitely be sitting there in the audience if I wouldn’t be standing here.

What I will be talking about is quite different from what we heard so far. So far, it was about evolution, physics, mathematics, informatics. I will talk about media. I will talk about the interdependency, the interrelationship of media and future. And in doing so, I will try to outline something like a short history of the future (as it was created in media) as well as some elements of a media theory of the future.

If this wasn’t an academic talk but if I was telling a fairy tale, I might have started with, “Once upon a time, there was no future. Just the earthly valley of tears and then: eternity – paradise or hell.” I will argue that the future as we know it today is a construction of modern culture, something that we started to conceive of around the Renaissance. And most importantly, that right now, we are in the process of creating a new future – a very different future from the one that our predecessors created.

I only have about sixty minutes, which is a very short time for 800 – 900 years. I will try to condense the facts and my theories into 12 assumptions. Please keep in mind, what assumptions are there for: They are proposals, claims, they condense, streamline and simplify.

Let’s start with a quick look and overview of the current state of the future. Thinking about the future today brings to mind a lot of apocalyptic imagery and prophecies: Global climate change accompanied by intensifying natural disasters, water scarcity, renewed fear of a war in Europe, widespread fear of automation and artificial intelligence, energy poverty, a crisis of education, a crisis of healthcare, and viruses – computer viruses, biological viruses, Ebola, and so on. That and much more is in the news but also in the movies and in the novels. Doom and gloom, from *Mass Effect* to *Resident Evil* in games, from *Prometheus* to *Edge of Tomorrow* in the movies: The world is dying in every other movie these days.

Many critics claimed for quite some time that we are in the grip of a “dystopian plague”. Michael Solana stated in *Wired* in August 2014, against dystopian sci-fi, that there has always been a dystopian fiction from the beginning of science fiction, but that there has been a huge increase in the last years. He says, “Mankind is now destroyed with clockwork regularity […] The time is fit for

us to dream again."[1] That is, of course, part of the Californian ideology. In the same pages, you can actually find a defense – it was a debate – by Devon Maloney, arguing that dystopias are holding a mirror to the world. Dystopias are so scary because the world is so scary: That is the counter argument.

Another and maybe better interpretation gave the artist and writer Peter Rostovsky who actually writes under the name of David Geers. He said, "Perhaps the task is to read these cinematic and artistic attacks literally – as a wish-fulfillment fantasy – in order to identify their hidden utopian longings […] On the other side of the corpse lies the cloud."[2]

But of course, there are not just dystopias, even today. There are also a lot of utopian hopes, utopian design theories these days as well. There are many reasons to believe that we are moving towards the edge of a better tomorrow in which we all will have personalized education; biotech and artificial organs; human-machine interfaces and longevity; robotic helpers that do our work and understand us, thanks to better and better artificial intelligence; nanoscale materials; 3D-printing; space travel; global networking with billions online – supposedly four billion online in 2020 – and they all will have universal access to the ever-growing knowledge of humanity; last but not least, of course, better, hyper-realistic games and holographic displays for immersive entertainment. That's how the utopian version of the future goes these days. In short: a world of abundance and a world full of magic, by any historical comparison. Graphic novelist Warren Ellis gave a great talk on the future (you can find it online). And he said: "Reality as we know it is exploding with novelty every day. Not all of it is good. It's a strange and not entirely comfortable time to be alive. But I want you to feel the future as present in the room."[3]

However, there is, of course, a third position as well. You might have noticed that what gives hope to someone puts fear into others. Think of nanotech or artificial intelligence. The lines between dystopia and utopia are blurring. Canadian writer Stephen Marche read a utopian vision by Google co-founder Larry Page who said, "Somebody introduces themselves to you, and your watch goes to your webpage … Or if you met this person two years ago, this is what they said to you... Eventually you'll have the implant, where if you think about a fact, it will just tell you the answer."[4] There are a lot of people who would love to have that. I might want to have it. But Marche is terrified. He writes in *Esquir*e, "That's not a conspiracy theorist babbling outside the toilets in a public library

1 Michael Solana, "Stop Writing Dystopian Sci-Fi – It's Making Us All Fear Technology", Wired, August 14, 2014.
2 Peter Rostovsky aka David Geers, "Celebrate the New Dark Age", The Brooklyn Rail, December, 2013.
3 Warren Ellis, "How to See the Future", Keynote at the Improving Reality Conference, September 6, 2012.
4 Steven Levy, In the Plex: How Google Thinks, Works, and Shapes Our Lives, 2011.

about how Google's going to put a chip in your brain. That's Larry Page […] The single most important technologist alive believes the future is brain implants. Literally, I've had nightmares since reading that passage."[5]

So there's utopia and dystopia in one vision. Which brings me to my first assumption:

1. *Modern culture creates its visions of the future via media – literature, the arts, feature films and documentaries, TV series, simulations and games.*

What all these visions of the future – the dystopian, the utopian – have in common, is that they are all media versions. All we know about the future, how we discuss it, how we envision it, is media-based. That wasn't always the case, obviously, but in modern times it is. We envision and reflect upon the future via media. This assumption is very simple, but that's what assumptions should be.

Later on, in the second part of my talk, I will analyze some visions of the future created in different media from the Renaissance to the present. Because in that respect, we haven't changed. We just have more and different media at our disposal. Like our modern predecessors, we imagine and reflect upon the future of our culture by creating media visions. They tell us about the future and they discuss the future. So I will analyze how media anticipated and inspired future innovations. Of course, by doing so, I suggest that if we study these media-futures today, we might learn a little bit about the future that is ahead of us as well.

And that leads me to my second assumption (I already mentioned it in my introduction):

2. *The future as we know it is a construction of modern culture.*

By that I mean that the future as a cultural concept is not a given. Not all cultures have the kind of future that we have. Some don't even have the future tense in their language. Not just the details of the future as we envision it in media, but the future as a cultural concept, as a way of thinking, was and is created through media – at least since the beginning of modern times.

Now that these two assumptions are out of the way, let me briefly tell you what I will do in the 45 minutes lying ahead. I will procede in three steps. First, I will outline how the future as we know it was constructed since the Renaissance in three major pushes: Mechanical, industrial and digital

5 Stephen Marche, "Brave New Worlds Have Been Replaced by a Google Chip", Esquire, May 22, 2014.

culture. Of course, the third push is where we are in the middle of. That's where we take part in. That's where we can create and design future. In the second part, I will analyze how media anticipated and inspired future innovations. And in the third part – an outlook and epilogue – I will reflect on the function of media in digital culture: How anticipatory representations of possible futures are turning into procedural (that is: software-based) realizations of these futures.

I. Modern Construction Of The Future: A Short History

Between the Renaissance and the Enlightenment, there was the rise and fall of mechanical culture. Between Enlightenment and Post-Modernity, there was the rise and fall of industrial culture, and since Post-Modernity, we have the rise of digital culture.

Let us have a look at how in each of these phases, different interests, different classes, different technologies and different media created different futures. I will do this very briefly because I assume that most of this is well-known to you.

Between the Renaissance and the Enlightenment, mechanic technology created new classes of craftsmen, traders and so on. And these classes created something that we call a "new common sense", new forms of thinking and new forms of art and entertainment. The basic condition of this phase was secularization, of course. And with regard to the future, a new literary genre comes into existence: utopian writings.

Most famous is, of course, Thomas Morus` *Utopia* which gave the genre its name. But there is also Tommaso Campanella's *The City of the Sun* (first published in Frankfurt in 1623), *Christianopolis* by Johann Valentin Andreae, and, of course, Francis Bacon's *New Atlantis*, just to name a few. They were all produced and published in the 16th and 17th century. With regard to the future, this means the hope for a better life in the great beyond, the paradise is slowly replaced by the hope for a better life in this world. So the different utopias can be understood as secularizations of the paradise. That's why, in their essence, they are not temporal yet. The paradise is not temporal. But they are about distant places: The Island Utopia, the City of the Sun, New Atlantis… New places that are primarily not in another time, but in another place. Like the New World, they have to be discovered. They are already there and they are always there.

So that's my third assumption:

3. *In the mechanical age, visions of the future in literature and the arts conceived of it primarily as a better (or worse) place for humanity.*

We encounter in the mechanical age visions of the future that, for the first time since Antiquity, were not aiming at an afterlife, but aiming at a better life on this planet. They were created primarily as a better (or worse) place – not time! – for humanity. That's very different from the concept of future that we have right now.

Then, with Enlightenment and industrialization, something new happened: Social and technological change accelerated. People suddenly experienced change within their lifetime. And that gave birth to the idea of progress. The concept of a constant, linear progress – improvement without any end. Christianity, of course, already knew the linear progression, but it ended in paradise, and then the time would have stood still.

You can say that the process of secularization, which drove the development between the Renaissance and the Enlightenment, kind of escalated into the process of scientification: an even further step of rationalization of what's happening in this world. The idea of progress suddenly turns the idea of future – the better life on this planet – from something that can be reached or achieved into something that can never fully be reached or achieved. A better time will *always* lie ahead. As Hegel said: You are caught in the present. You can't step into the future, because then that will be the present again. Hegel was someone who was at the crossroads between the mechanical culture and the industrial culture: On one side, he said that America was the land of the future, and on the other side, he said that the future was an eternal longing, a longing that can never be fulfilled.

And that is, of course, the industrial culture's version of the future: The future as an eternal longing that can never be fulfilled. In the industrial age, utopian and dystopian conceptions had become stronger and stronger, and slowly moved from describing distant places to describing distant times. Of course, there were still a lot of utopian and dystopian novels in the classical sense being created. Think of *Erewhon* for example, which is nowhere, so it is still talking about a place, or Aldous Huxley's *Brave New World*, which is taking place in 2500. And, of course, Orwells's *1984*, which has the time-concept already in its title.

But what is really new in the industrial conception of future is the emergence of an all-new genre: science fiction. The term was actually coined in the late 1920s, and it already indicates the process

of scientification. What has been a kind of philosophical speculation becomes a mixture of speculation and science.

Kevin Kelly at this conference last year described the rise of science fiction as a cultural necessity because of the further acceleration of change in the 20th century. Not only did the contemporaries experience *some* change within their lifetime, they experienced change every other decade and then every other year. So they needed science fiction for orientation. Arthur C. Clarke therefore determined that science fiction had a vital cultural function "to prepare people to accept the future without pain and to encourage a flexibility of mind."[6] Robert Anton Wilson quite to the contrary saw the function of science fiction not in smooth adaptation but in propelling change. "Science fiction is liberation."[7] In hindsight, both seems to be true: Science fiction helps people to adapt, and it liberated many others from the mindsets of the past, to envision change and change reality. Thomas M. Disch stresses the huge cultural influence of science fiction: It gives us a "basic sense of what is real and what isn't."[8]

4. In the industrial age, visions of the future in literature, the arts, movies and TV series conceived of it primarily as a better (or worse) time for humanity.

Science fiction is a new genre of the industrial age.

If we look at the two modern versions of the future – a better place before the industrialization, and a better time in the industrial age – the question arises: What will it be in digital culture? And we will come to that.

As it was with the transition from mechanical to industrial culture, again we have a new technology which creates new classes that develop this technology, work with this technology, make money with this technology, rise with this technology. And they develop a new view of the world; a new view of how humans should be, how they should act.

We can always see the relationship between mechanical technology and the common sense as well as the relationship between industrial technology and the change of the common sense. We can always see the relationship – to put it simple – between the way people work and the way they

6 Arthur C. Clarke, quoted in "The Making of Kubrick's 2001", ed. by Jerome Agel, Signet 1970.

7 Robert Anton Wilson, "Introduction," in: Semiotext(e) SF, ed. by Rudy Rucker, Robert Anton Wilson, Peter Lamborn Wilson, MIT Press 1989.

8 Thomas M. Disch, The Dreams Our Stuff is Made of: How Science Fiction Conquered the World, Free Press 2000.

think and want to entertain themselves. So with the current change, new visions of the future had to come. And it's happening right now in front of our eyes, whether we dare to look or not.

So what is *our* conception of the future? We are in the middle of it, so there is no final version. There is no looking back like on the Renaissance and being reasonably sure of what we're talking about. Here, we are involved, we are party to it.

I think that two elements right now are particularly important. First, there is a crisis of science fiction, the good old industrial genre. It has taken a decidedly dystopian turn. For example, you could say that the true inheritor of *Star Trek*, the last positive version of the future that we had in mass media, is *Battlestar Galactica.* And that's a series in which evil robots chase humans across the universe (so much for the fruits of progress) ... And the second important element is the academic, scientific and philosophical conception of the *singularity*. That's new: a unique, singular disruption that will forever separate the past from the future. You could call this a crisis of the future as we used to know it. Together, both elements seem to indicate that we have the feeling of having lost our agency about the future. The sense of agency that science fiction used to proclaim.

Let me substantiate my point with a few quotes to prove this. Graeme McMillan wrote in *Time Magazine* in 2013: "Science-fiction seems to have become stuck in a rut of hopelessness", and that was striking him "as a failure of the genre as a whole" [9]. Neal Stephenson, author of *Snow Crash* and one of the most important science fiction writers alive, sees not only a crisis of science fiction, but a crisis of the future itself, a crisis of the future as a concept. He was lamenting the deplorable state of our species' efforts to get into space, and in that context he spoke of "a general failure of our society to get big things done."[10] While some speak of a "present shock", Stevenson and many others speak of a manufactured normalcy, a feeling of atemporality: that we are living in a continuous state of the present. I read the other day that in Berlin, they are building a House of the Future – six million Euros a year to explain that something like a future *could* exist. That kind of indicates that we have lost our sense of the future: Even the government thinks that it should open a House of the Future to remind the population that there could be something else than what is here right now.

In postmodernity, we lost the "grand narratives", as Jean-François Lyotard wrote in the late 70s: The overarching stories that explained the world and that enabled us to act. That was true in

9 Graeme McMillan, "Where Are Our Bright Science-Fiction Futures?", Time, March 29, 2013.

10 Neal Stephenson, "Preface: Innovation Starvation." In: Hieroglyph: Stories and Visions for a Better Future, ed. by Ed Finn and Kathryn Cramer, New York, 2014.

regard to the 1960s to 1980s, but in the last two decades, we, the creators and early adopters of digital culture, replaced these old and gone grand narratives with a new one. We are in the process of constructing this new narrative; and that's, of course, the singularity.

The singularity tells a story of the future not as progress but as disruption. That's very different from the industrial version! We all know this term of the singularity from the writing of Vernor Vinge and Ray Kurzweil, but I was really surprised after reading Nick Bostrom's book, to find out how far back this concept goes. Stanislaw Ulam – George Dyson mentioned him several times as well – already reported in the late 1950s on a series of conversations he had with John von Neumann, "Our conversation centred on the ever accelerating progress of technology and changes in the mode of human life, which gives the appearance of approaching some essential singularity in the history of the race beyond which human affairs, as we know them, could not continue."[11] The word "singularity" is already in that quote from 1958, and I'm pretty sure that it's the very first quote.

So suddenly that's the future: Something that cannot continue forever. Future not as a continuous progress to a better world, but as a disruption, as something that has an "afterwards" that nobody will be able to understand before. And that has a "before" – our times – that nobody will be able to understand afterwards. That's a very new concept of the future. Think of language: That is supposedly the first big singularity humanity experienced. We can't really understand humanoid life without language, and we can't imagine that humanoid life which didn't have a language could ever understand us. So that's a disruption, a singularity, and our grand narrative right now is claiming that we are moving towards a similar singularity (which in itself is a *contradictio in adjecto*: "similar singularity" – but that's how it is).

5. *In the digital age, visions of the future in literature, the arts, movies, TV series, simulations and digital games have begun to conceive of it as a looming singular disruption of time and humanity.*

The modern concept of future in Western culture came from the concept of a better place to the concept of a better time for humanity to the third modern concept of a singular disruption of time and (!) of humanity as well. Progress is not something we experience while we stay the same.

11 Stanislaw Ulam about his conversations with John von Neumann, as quoted in: Nick Bostrom, Superintelligence: Paths, Dangers, Strategies. Oxford University Press 2014.

That's what the previous visions of future were about. Of course, there was supposed to be moral change, change through education, change through knowledge, but not change through changing of our species.

II. Modern Visions of the Future: An Even Shorter History

Now let's see how these three different futures are – or were – envisioned.

In 1965, Marshall McLuhan was asked: "What about the future?" And his answer was: "We are always living way ahead of our thinking." He claims, the future is always already there. We're just living in the past and have to make an extra effort through self-reflection, so as to recognize brewing conflicts or changes. Actually, at the Cologne Conference Futures 2013, Kathrin Passig said something similar when asked about the future: You constantly have to force people to recognize what has already happened.12 So let's see what has already happened.

Of course, there are many different presents and futures. For example, there are presents and futures that our visions didn't see coming: From the fall of the Berlin Wall to the burst of the Dotcom-bubble (which actually cost us years on our way to the digital future), from the rise of global surveillance to the return of war in Europe. Almost nobody saw that coming.

And then there are presents and futures that our visions misidentified. We thought we'd see something, but we didn't. The rise of the Soviet economy for example was a big topic of the economic pundits in the 1970s. Or the rise of Japan, which was a big topic of the pundits in the 80s. These are all visions of the future that never came to be. I'm not even speaking about the colonies on the Moon that we should have for decades, or the jetpacks with which we should have ridden to work for quite some time.

And then there are the presents and futures that our visions kind of lost sight of. There was the Voyager I, which was sent off the planet when I was 22 years old (which obviously is a long time ago). And it works until today! With 64 K of computing power and with an eight-track tape deck as memory. And right now, it's eleven billion miles away in interstellar space. And it will go on for another decade or so. So it's far out there in our future, and it's from a past in which we thought that there would be a different future. Warren Ellis asked, "Can you even consider being part of a culture that could go to space and then stopped?" [13] That's actually what we did.

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12 Kathrin Passig: "I Can't Believe It's Not the Future: Technodreams and Technopanics", Lecture at the Cologne Conference Futures, October 2, 2013.

13 Warren Ellis, "How to See the Future", Keynote at the Improving Reality Conference, September 6, 2012.

So maybe there's not so much present shock, but stasis: Waiting, longing for a disruption. And that's what the grand narrative is about.

Anyhow, more important than all these misidentified, overlooked futures is the future that was conceived of and that actually came to be. Kevin Kelly said about the future, "Unless we can imagine it, we are not going to get there." [14] So the question, of course, is: How come that we *can* imagine it? Or more exactly: How come that some can imagine it and anticipate it while the majority of the living can't? Philosophers have thought about this phenomenon called anticipation since the late 18th century. It's a very old problem: Where does this foresight come from?

Immanuel Kant spoke of aesthetic apparition as prophecy – again, we have the secularization of religious topics. But he gave a reason, why aesthetic apparition can anticipate: He said that it has to do with our ability of pattern recognition. Pattern recognition gives us a shape of the universe, he said, before we were able to observe it. This thought is not far from and actually has influenced two important theories about the future that I will briefly introduce: That is Ernst Bloch's and Walter Benjamin's version of why anticipation comes to be.

Bloch, in his seminal work *The Principle of Hope*, considered art a "laboratory" of the future: An organized way of exploring patterns. And the excellent work of art he called – in a quite religious phrasing – "a star of anticipation", because it is an expression of advanced pattern recognition.

Walter Benjamin, quite differently but still coming from Kant, was applying Freud's tools to culture and borrowed the following sentence from the 19th century historian Jules Michelet as a motto for his arcade project: "Each epoch dreams the one to follow." This is kind of the opposite of what Bloch said, but it's still within the pattern recognition that Kant claimed. Bloch's "laboratory" of the future is a rational version, and Benjamin's "dream" of the future is a subconscious, an irrational version that has to be interpreted. But both have to do with the human capability of pattern recognition – some are better in it, some are worse in it.

Actually, Benjamin gave us a material logic of anticipation. We can't really go into that, but the main part in it is his understanding of experience: Through the experience of advanced states of human life – let's say in Paris, the capitol of the 19th century – the artist can train his ability of pattern recognition and then kind of anticipate what is soon to come. So it has nothing do with supernatural clairvoyance, at least not with Benjamin. It has to do with a very material logic

14 Kevin Kelly, "Current Technologies of Disruption", Lecture at the Cologne Conference Futures, October 2, 2013.

founded in social experience.

This anticipation, whether coming from artistic laboratories or aesthetic dreams and cultural desires, has consequences on the future once it becomes a work of media, because it's consumed: It's read, it's watched by people, and it influences what they think about the future. Thus, it influences what they will do to make the future happen. Stephen Hawking for example said that science fiction, like Star Trek, inspires the imagination. And Neal Stephenson stated, "Good science fiction supplies a plausible, fully thought-out picture of an alternate reality", that we then can go on to make our own reality.

6. *Since the Renaissance, media production anticipates and also inspires the creation of the future through hieroglyphic concepts and images.*

"Hieroglyphic concepts", that's a term of Neil Stephenson's and the title of his big project to reform science fiction.

However, what the contemporaries in the mechanical and the industrial age anticipated, was quite different from what we have as anticipations these days. If we think of Thomas Morus' *Utopia* or Francis Bacon's *New Atlantis*, we can see a concentration not on the stuff that science fiction was about (or sometimes still is), but on morals and education, politics and organization.

7. *Between the Renaissance and Enlightenment, visions of the future are concentrating on moral and political improvements, that is: on radically new ways of organizing society.*

And then, in industrial society, a strong shift happened: from morals and politics to science and technology. Of course, the anticipation of technological innovation already started in mechanical culture, but there, it was a niche thing. We all know that Leonardo da Vinci anticipated many modern devices, from machineguns to parachutes, from helicopters to Google Glass! (That's actually very interesting: It was only found out a few months ago. There are some drawings and writings of da Vinci which show that he basically came up with a device like Google Glass where you have text superimposed on reality.) We all know that Jonathan Swift came up with something like the computer. But with industrialization and science, not only the progress accelerated, but also anticipation.

Just to bring it back to mind: Jules Verne alone described so many later inventions: air

conditioning, automobiles, submarines. Actually, one of the guys who later built submarines, the American engineer Simon Lake, said, "Jules Verne was in a sense the director-general of my life." And Jules Verne invented even more: television, space travel and also something like the internet. And in the 20th century, H.G. Wells foresaw nuclear power and nuclear war; Arthur C. Clarke envisioned geostationary satellites; Isaac Asimov: robots, driverless cars, wall screens, satellite phones; Robert Heinlein: rocketships and the waterbed(!). When in the 1960s, some company tried to get a patent on waterbeds, the competitor could avert this because he could quote Robert Heinlein. The makers of Star Trek, of course, anticipated tablet PCs, non-invasive surgery and the cell phone; William Gybson: the cyberspace; the makers of the TV series *Person of Interest* described global NSA-surveillance years before we found out for sure – which for me was quite eerie in hindsight.

So rightfully, Michael Solana asked, "Has there been any major technological advancement that wasn't dreamt up first in man's imagination?"[15]

8. *Between the Enlightenment and Postmodernity, visions of the future tend to concentrate on technological and medial innovations, that is: on radically new artifacts and services as well as radically new forms of media.*

Now, with digital culture, we can see that visions of the future are starting to concentrate on a totally new aspect which started in the 1990s. Primarily, it's not about society and its optimal organization anymore; it's not primarily about artifacts, gadgets and services. The visions of the future are now about self-improvement and self-modification.

Of course, that started already in cyberpunk in the 1980s. The novels of Gibson or Stephenson were more about transformations of consciousness, changes in the nature of our personalities. But many visions of the future promise not only changes of personalities any more, but they promise changes of our bodies as well. The best symbol and symptom for that is the cyborg. Frankenstein or the robots of the early 20th century – they were the *others*, a different life form. They were fighting us and we had to fight them. But cyborgs are *us*.

Marshall McLuhan already at the end of the 60s in his famous *Playboy*-interview thought that human-computer symbiosis was coming. "The Eskimo is a servomechanism of his kayak, [...] the

15 Michael Solana, "Stop Writing Dystopian Sci-Fi – It's Making Us All Fear Technology", Wired, August 14, 2014.

businessman of his clock, the cyberneticist – and soon the entire world – of his computer. In other words, to the spoils belongs the victor."[16] (Think of what Susan Blackmore said in her lecture: The species who seems to be victorious is the victim.) In the mid-80s, Donna Haraway wrote her famous cyborg-manifesto, declaring the symbiosis of us and our machines to be our human condition (or our post-human condition). And in the mid-90s, Sherry Turkle reacted to the rise of the World Wide Web by saying that we all see ourselves as "plugged-in technobodies […] We are all dreaming cyborg dreams."[17]

9. *Since Postmodernity, visions of the future tend to concentrate on the techno-biological self-enhancement of the species, that is: on radically new forms of humanoids and humanity.*

III. Media Futures in Digital Culture: Outlook and Epilogue

In the last part of my lecture, I will try to reflect and to outline elements of a media theory of the future. I think that in digital culture, the creation of media and the creation of the future become more intertwined than ever before.

10. *In digital culture, not only visions of the future, but the future itself will be – and is already – produced medially to a large extent.*

What does that mean?

Let's have a look at what it means to be human these days, in biology as well as in media. In media, we are obviously moving from photorealism as a standard – the reproduction of reality of human beings, beings with an index – to either the arbitrary modification of images of real human beings or the *ex nihilo* creation of beings that look like humans but never lived, never existed, have no index. We have that in the movies as well as in digital games. You have to image that: The digital game, the new defining medium of the digital culture, has only one way of representing human life – by creating it *ex nihilo*. We have that in digital movies as an option and we have that in digital games as a necessity, as a *must* – there is no other way.

But we have that in math and in biology, in the process of cyborgization as well. Genetics look at the species as a program that can be rewritten and that we are striving to rewrite. We look at the

16 Marshall McLuhan, Playboy Interview, March, 1969.

17 Sherry Turkle, Life on the Screen: Identity in the Age of the Internet, Simon & Schuster 1995.

individual as a combination of this genetic program with personal data – as a kind of personal computer. And we speak of something like the "coming of a second genesis", a total reprogramming of the species. It is people who are working in genetic engineering who talk like that, not just the science fiction writers. So:

11. In digital culture, life itself turns into a medium.

A medium, that is: something that can be designed and redesigned, something that can be written and rewritten, something that can be augmented and enhanced and (most importantly) something that incessantly produces, automatically stores, and interactively communicates information. And that is what life is becoming: A hybrid of hard-, wet- and software. Hardware that can be replaced and software that can be reprogrammed. Wetware is what in game design we call the skin.
That's actually not a statement about the future. That's where we are already. But the same becomes true for the physical reality itself:

12. In digital culture, physical reality turns into a medium.

It is turning into a medium as well; into something that we can design, something that is more about information than about anything else.
In the industrial age, the defining medium was the movies. Probably a lot of you have read Siegfried Kracauer's seminal *Theory of Film: The Redemption of Physical Reality*. Look at the subtitle. All that the movies could do was to *redeem* reality.
Digital media however, the digital trans-medium, can *augment* reality. It can – as Teilhard de Chardin foresaw – wrap the planet with a networked nervous system, cover it (to say it less religiously) with media. Digital media is not just redeeming physical reality by reproducing it, but it is changing it, rewriting it, augmenting it. This media is not just representing. George Dyson said it very well in his lecture: The big change with digital was from numbers that represent to numbers that execute. And then, of course, the numbers in digital movies represent; the numbers in simulations, games and augmented reality applications, they all execute.

Obviously, the question now is, what all this means in practice: in business and everyday life. And actually, I will not even try to tell you. If you are talking about media visions of the future, if you are

in the business of making movies, making games, writing novels… If I had to explain to you what this all means, you wouldn't be able to do what your job is. You have to come up with that yourself. And I'm sure you will all come up with better ideas, solutions and applications than I as a media historian and media theorist could ever do.

I will just close with some last words from the man who was the founder of my discipline, Marshall McLuhan: "I am resolutely opposed to all innovation, all change. But I am determined to understand what's happening, because I don't choose just to sit and let the juggernaut roll over me."[18] Neither do I, and you don't have to either if you heed his advice.

In short: We are living and working in exciting and frightening times because we are offered the historic opportunity to help shaping a fundamental cultural shift. And we should make sure that it is for the better future.

18 Paul Benedetti & Nancy DeHart, Forward through the Rearview Mirror: Reflections on and by Marshall McLuhan, MIT Press 1996.

Diskussion:
Europa und die Geopolitik des Internets

Moderation:
Hans-Jürgen Jakobs (Handelsblatt)

Diskussionsteilnehmer:
Prof. Dr. Wolfgang Hagen, Dr. Ulrike Guérot, Dr. Lutz Hachmeister

The following text is a transcript of a discussion held at the
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Cologne, October 7th, 2014

Hans-Jürgen Jakobs

Google, Facebook, Amazon: Die großen Internetkonzerne unserer Zeit sind US-amerikanische. Wie kommt es, dass die Europäische Union dem scheinbar nichts entgegenzusetzen hat?

Ulrike Guérot

Es gibt einige interessante Analogien: In der Militärtechnik der vergangenen 40 Jahre europäischer Integration lässt sich nachzeichnen, dass wir immer zu spät waren. Die EU versteht immer erst sehr spät, dass es um Zukunftstechnologien geht, die auch Staatlichkeit, Macht, Souveränität brauchen, und dass man diese Technologien nicht auslagern kann. Wir entwickeln natürlich auch immer verspätet Strategien, uns das zurückzuholen. Wir haben das Satellitennavigationssystem Galileo gegen GPS, wir haben Airbus gegen Boeing… Das sind alles wirklich sehr politische Projekte gewesen, bei denen ganz bewusst Mittel zusammengelegt wurden, um Skalierungseffekte in der europäischen Wirtschaft zu haben. Aber es bleibt natürlich dabei: Es kommt immer zu spät, es ist immer ein Aufholprozess und es ist im Grunde immer ein sublimierter, antiamerikanischer Aufstellprozess, der politisch einfach schwierig ist, weil wir natürlich im politischen Rahmen immer noch der „Alte Westen“ mit der NATO und so weiter sind. Das heißt, die Abnabelungstendenzen, die sich bei diesen ganzen Technologieprojekten durchzeichnen können, dieser politische, souveräne Abnabelungsprozess, dass man auch Counter-Technologies entwickeln möchte, den kriegen wir polit-moralisch gar nicht hin.

Wolfgang Hagen

Silicon Valley ist seit den 40er Jahren – und dann ganz stark in den 50er Jahren – der Ort, in dem der militärisch-industrielle Komplex, der den 2. Weltkrieg gewonnen hat, mit völlig neuen Arbeitsformen, mit völlig neuen industriellen Unternehmertypologien etwas in die Welt gesetzt hat, das in Europa nicht in die Welt gesetzt werden konnte, weil Europa unter Führung der Unseligen – der Deutschen – den Krieg verloren hat. Diese Art von Kooperation zwischen Militär und Wissenschaft, die dann in Los Alamos und in der Folge im Silicon Valley weitergeführt worden ist, hat Europa überhaupt nie entwickelt. Deshalb hatten die Amerikaner immer schon einen Vorsprung, der dann die Erklärung dafür bietet, warum wir dort 30-50.000 Ingenieure haben, deren Qualifikation in Europa einfach gar nicht existiert. Klar, theoretisch gibt es die schon. Es gibt da einzelne, und die werden auch sofort geholt. Der Punkt, den ich damit setzen will, ist: Jede Klage im Sinne des Mond-Anheulens, dass wir zu spät gekommen sind, müsste sehr weit historisch zurückgreifen, nämlich bis zu dem Punkt, da wir Europa einmal in Grund und Boden serviert haben. Das waren nicht wir, sondern das waren unsere Eltern und Großeltern.

Was ist jetzt zu tun? Ich finde, dass man die Amerikaner nicht gewähren lassen kann in der Verletzung ihrer eigenen *roots*. Es gab bis ’92 einen nach dem Sherman Act laufenden Monopolprozess gegen Microsoft. Der ist damals regierungsamtlich von Bush Senior niedergeschlagen worden. Seitdem gibt es in Amerika keine Monopolprozesse mehr im Bereich von Software-Industries. Die Amerikaner haben sowohl Microsoft als auch Facebook als auch Google seither geopolitisch genutzt, um sozusagen die Märkte, die von Amerika aus gesteuert werden, über die Welt zu streuen. Das ist, wenn Sie so wollen, ein impliziter, neo-liberalistischer Imperialismus, oder so etwas. Wenn man etwas dagegen machen will, dann muss man in Europa Monopolklagen und Monopolregulierungsprozeduren in Gang setzen und denen sagen: Bei uns gibt es das nicht, dass 90 Prozent des Marktes einer Suchmaschine von einem Unternehmen beherrscht werden. Ihr kriegt keinen Cent mehr, wenn Ihr das nicht in zehn Jahren ändert. – Oder irgend so einen politischen Prozess, den ich in der Europäischen Union jetzt nicht beurteilen kann. Aber wenn wir das nicht tun – die Amerikaner werden es nie tun. Die Amerikaner haben einen derartigen geopolitischen Vorteil davon, dass sie erklärtermaßen seit Anfang der 90er Jahre, seit der Kommerzialisierung des Internets, ihre eigenen alten Monopolregulierungen ausgesetzt haben. Ich meine, es gab mal Rockefeller, es gab Standard Oil, das haben sie zerschlagen. Es gab AT&T, das haben sie zerschlagen. Es ist nicht so, als wüssten die nicht, wie das geht. Aber bei Google machen sie das nicht. Und bei Facebook machen sie das auch nicht.

Hans-Jürgen Jakobs

Lizenzen für Google gibt es ja nicht. Das ist anders als bei Radio- oder Fernsehsendern, dass es hier keine direkte medienstaatliche Aufsicht gibt, sondern nur eine wettbewerbsrechtliche, eine kartellrechtliche Aufsicht. Das hat so ein bisschen geklungen wie Sigmar Gabriel, der auch gesagt hat, er könne es sich vorstellen, Google zu zerschlagen. Herr Hachmeister, ist das der Weg, dass wir uns hier politisch selbstbewusst verhalten und das nachholen, was die Amerikaner sich aus nachvollziehbaren Gründen nicht getrauen?

Lutz Hachmeister

Selbstbewusst sollten wir sein, ja. Wir sollten auch im Sinne von Wolfgang Hagen einfach mal schauen, welche Regulierungsmechanismen wir so haben. Google zerschlagen sollten wir natürlich nicht. Es hat auch historisch gesehen sinnvolle Monopole gegeben, die dann nach-dereguliert wurden. Man muss sich wirklich den Prozess ansehen und dann mit den geeigneten Mechanismen darauf reagieren, auch durchaus eben nicht antiamerikanisch oder antikalifornisch oder so ähnlich. Aber ich finde, Herr Hagen, Sie haben den richtigen Punkt genannt. Es gab einen erstaunlichen Prozess. Wenn man sich die Berichterstattung über die USA noch vor fünf bis acht Jahren angeschaut hat, war das eigentlich eine kranke Industrienation, vollkommen überschuldet, dann gab es 2013 noch den Government Shutdown, als die regierungsamtlichen Institutionen nicht mehr funktionierten und man nicht mehr in den Zoo gehen konnte, weil die Wärter nicht bezahlt werden konnten. Und auf einmal hat sich das Image gedreht, indem man sagt: Wir haben hier wieder einen technologischen Super-Hegemon, der die Welt beherrscht. Eine technologische Pax Americana, kann man sagen. Und dass das von der US-Regierung, und zwar egal welcher Couleur, goutiert wird, leuchtet uns allen sofort ein. Das ist nicht moralisch, das ist auch wettbewerbsrechtlich zweifelhaft, aber egal ob George W. Bush oder Obama, die finden das natürlich großartig. Die sagen: Deregulierung solange es geht, solange uns das nicht angreift. Solange wir damit Waffen, Informationssysteme und Geheimdienste unterhalten können, umso besser. Das ist der entscheidende Punkt. Deswegen ist eine geopolitische Debatte auf einer neuen elektronisch-digitalen Ebene.

Hans-Jürgen Jakobs

Wie ist denn die europäische Antwort? Wenn man 95 Prozent Marktanteil hat bei Suchmaschinen, dann ist das ein klarer Fall von Monopol. Jedes Monopol unterliegt einer Missbrauchsaufsicht. Und

es gab ja zahlreiche Beschwerden von Wettbewerbern, die seit Monaten in Brüssel Sache der Verhandlungen sind. Der EU-Wettbewerbskommissar Almunia hat sich das genau angeschaut und kommt irgendwie nicht richtig zu einem Ergebnis. Gibt es hier ein eklatantes politisches Versagen in Brüssel?

Ulrike Guérot

Wahrscheinlich nicht nur da.

Hans-Jürgen Jakobs

Aber in der Frage besonders.

Ulrike Guérot

Wenn wir hier schon so US-zentrisch versus „Was kann die EU machen?“ diskutieren: Wir haben trotzdem George Packers „Die Abwicklung“, wir haben trotzdem „Who Stole the American Dream?“, also man kann natürlich auch die Gegenthese machen. Ich bin ja ganz bei Ihnen, Herr Hagen, dass wir die Entwicklung ein bisschen zurückführen müssen auf den ganzen Braindrain, den wir in den 30er Jahren hatten. Und dann haben wir die RAND Corporation und was darum aufgebaut wurde – das hat ja Frank Schirrmacher auch sehr gut beschrieben. Aber im Grunde gibt es drei strategische Bereiche – Militär, Finanzen und eben Cyber – und in diesen drei strategischen Bereichen gibt es einfach die US-Führung. Und in diesen im Grunde auch machtzentrierten, Macht ansetzenden Segmenten ist Europa eben besonders schlecht. Wir sind gar nicht so schlecht bei Autos, wir sind gar nicht so schlecht bei Nanotechnologies, wir haben ein paar vernünftige Investmentgeschichten. Das funktioniert schon alles. Aber da, wo es im Grunde ganz massiv auch um Souveränität geht, wo eigentlich staatliche Finanzierung von *large scale engineering* wirklich wichtig ist – nämlich zum Beispiel bei Militärprojekten, die in Europa ja kein Land mehr alleine finanzieren kann –, da kommen Sie sofort wieder an diese Frage: Wer macht das denn zusammen? Schauen wir uns Airbus an. Schauen wir uns jetzt dieses Satellitennavigationssystem Galileo an: Es hat zwölf Jahre gedauert, bis wir uns mal dazu durchgerungen haben. Und das nur wegen des Irakkriegs, weil die Europäer dort bemerkt haben, dass sie nicht alle Aufklärungsdaten bekommen. Im Grunde ist da immer diese politische, sublimierte Frage, ob wir uns von den USA abnabeln dürfen, die gerade in diesen super machtpolitischen Industriesegmenten – nämlich Cyber/NSA, Finanzierung des Staates, Militär – geballt zutage kommt. Und da sieht die EU tatsächlich immer

sehr machtlos aus. Lassen wir mal als Fußnote dahingestellt, wie gutes Lobbying Google im Europäischen Parlament und in Brüssel betreibt. Da muss man ja nur mal Jan Philipp Albrecht zu fragen, dann weiß man Bescheid, was die in Brüssel alles finanzieren. Warum zum Beispiel ist das EU-Data-Protection-Abkommen nicht mehr in der letzten Legislaturperiode des Europäischen Parlaments verabschiedet worden, sondern einfach nochmal in den Prozess geraten? Und so weiter und so fort. Das ist natürlich ein wahnsinnig geschickt aufgestellter amerikanischer Konzern, der die Mühlen von Brüssel wie das Alpha und Omega beherrscht und der inzwischen natürlich im Grunde auch über rechtliche Geschichten seine Machtbasis sichern kann. Das muss man einfach mal vor Augen haben.

Hans-Jürgen Jakobs

Alles, was ich höre, ist Beschreibung von Macht, ist Beschreibung von Zuständen, ist eine Bestätigung der Oligopoltheorie. Aber die Frage ist ja: Müssen die Europäer das so hinnehmen? Oder können sie eine Gegenwelt aufbauen? Können sie hier mit politischen, diskretionären Maßnahmen eingreifen? Können sie vielleicht sogar eine eigene Industrie schaffen? Es gibt hier ja genügend Startup-Firmen. Braucht man eine nationale und supranationale Förderung ganz anderer Art, um hier den Amerikanern etwas entgegenzusetzen?

Ulrike Guérot

Ja, aber das ist eben das Gretchenproblem der europäischen Integration. Wenn Sie irgendwie Estland und Frankreich auf einen Ratsbeschluss bringen, dann haben Sie ja fast schon gewonnen. Wir haben in allen wirklich zentralen Fragen im Grunde immer noch so einen *cleavage* zwischen Ost- und Westeuropa. Der ist mal lauter und sichtbarer, mal sublimierter. Ich habe zehn Jahre lang Europäische Security and Defense Policy studiert. Wenn Sie nur mal gucken, was nach zehn Jahren allein an Fusionen im Deutsch-Französischen entstanden sind; Deutschland-Frankreich, Tandem Europas, die großen Freunde! „Wir machen das jetzt alles zusammen, die Panzer und so." Nichts! Wir können uns noch nicht mal auf Munitionsfirmen einigen und auf gleiche Munition für Gewehre, denn am Ende heißt es immer: die Arbeitsplätze! Und: In welchem Land wird produziert? Wenn man also sagt, wir wollen das herausfordern, was die Amerikaner da haben, dann wäre die Frage: Macht das Siemens? Macht das Infineon? Dann schaue ich mir Siemens-Areva in der Nuklearindustrie an: Der Super-GAU. Das ist ja gerade das Problem der Europäischen Union, dass wir im Bereich der Industriepolitik einfach noch ein nationales Design haben, das uns diesen

Skalierungseffekt von Oligopolen im Grunde immer wieder mit nationalen Interessen durchkreuzt.

Wolfgang Hagen

Alle diese Bereiche, die Sie als defizitär benannt haben, sind deswegen defizitär, weil wir keine Prozessortechnologien entwickeln können. Das kann man auch nicht mit Startups machen. Sondern dazu braucht man eben diese jahrzehntelange Erfahrung, die in Silicon Valley aufgebaut worden ist von Fairchild über Intel bis hin zu den inzwischen in Hongkong oder China angesiedelten Unternehmen. Das ist in Europa nicht reproduzierbar! Man kann gegen diese Prozessorweltmacht nicht ankommen. In all diesen Bereichen – ob es Militärflugzeuge sind, ob es das Internet ist oder am Ende auch die Autos – da stecken die Prozessoren drin, um deren Entwicklung es geht. Wir können kein deutsches Smartphone entwickeln. Wir können auch kein europäisches Smartphone entwickeln. Das ist im Moment eine Sache von Samsung und von Foxconn und von Apple, wie wir wissen. Das hat auch gar keinen Sinn, den Mond anzuheulen und zu sagen: Wir müssen jetzt endlich ein europäisches Smartphone haben! Ich glaube, das verkehrt die Verhältnisse und überspielt die Dramatik, die die Historie Europas uns hier mit einer langen Nachwirkung von über einem halben Jahrhundert immer noch beschert. Und deshalb gibt es nur politische und keine ökonomischen Möglichkeiten zu reagieren.

Hans-Jürgen Jakobs

Was steht denn bei Ihnen auf der politischen Agenda?

Wolfgang Hagen

Auf der politischen Agenda steht natürlich nicht die Zerschlagung von Google, das ist ja gar nicht möglich von hier aus, sondern da sind Auflagen. Sagen wir mal ganz konkret in der Analyse von Google, um jetzt auch ein bisschen medientheoretisch zu werden: Google verarbeitet in seinem eigenen Pagerank, also in seinem eigenen Algorithmus, sehr wohl die Suchanfragen, die die Community der Welt auf Google macht. Es gibt aber keinen Graphen, wo ich mir die Suchanfragen, die Google trifft – nicht die Seiten – ermitteln kann. Es ist aber rechtlich nicht mal schwierig zu sagen: Wem gehören eigentlich die Suchanfragen, die bei Google landen und beantwortet werden? Gehören die Google? Oder gibt es nicht eigentlich europäische Rechtsgrundlagen, die sagen: Nein, wir wollen das – nicht personalisiert, sondern depersonalisiert – als Graph haben. Das ist nur ein konkretes Beispiel, ich könnte drei, vier andere nennen, die auch soziale Netzwerke

betreffen, wo die Situation zum Teil noch schlimmer ist, wo man Auflagen machen könnte, die auf Rechtsgrundlagen basieren, die es in Amerika so nicht gibt. Und die sehr wohl diese Unternehmen schrecken, weil Europa immer noch ein hochinteressanter und –relevanter Markt für sie ist. Das gleiche gilt natürlich für diese ganze Steuersatz-Diskussion, da muss ich jetzt nicht noch mal unseren Wirtschaftsminister zitieren. Das muss natürlich wirklich geändert werden, und dazu braucht man meiner Ansicht nach auch nicht die europäische parlamentarische Chaossituation, sondern da müssen jetzt einfach die Finanzminister mal zusammenkommen und sich vom amerikanischen Einfluss befreien.

Das wären ein paar Punkte, an denen ich konkret ansetzen würde. Das kann bei Google dazu führen, dass man nicht am Ende eine eigene europäische Suchmaschine aufmacht, wie es Herr Hege erträumt, sondern dass man das forciert, was Google selbst schon macht. Sie wissen, dass Bing, das ja eigentlich der Konkurrent in Amerika ist, tatsächlich auf den Spidern und Crawlern, das heißt auf dem ganzen Back-End von Google aufsetzt. Das heißt, Google verkauft sein Back-End. Wenn Google sein Back-End verkauft, könnten wir Europäer fordern, dass wir das Back-End auch kaufen können. Warum eigentlich nicht? Wieso kann man nicht darauf bestehen, dass wir sagen: Wir wollen Google nicht zerschlagen, aber wir wollen Back-End-Zugänge haben. Das heißt, wir wollen an eure ganzen Indices und an eure ganzen Datenbanken ran, einfach deswegen, weil wir es für ein soziales und gemeinschaftliches Gut halten.

Hans-Jürgen Jakobs

Herr Hachmeister, ist das die richtige Kollektion von politischen Schritten, oder was fehlt da noch?

Lutz Hachmeister

Ich glaube, dass diese, nennen wir es Mikrointerventionen, schon schmerzen und dass sie gangbar sind. Da muss nur mal jemand den „Gamechanger“ machen. Matthias Machnig zum Beispiel, der Staatssekretär für Digitales bei Sigmar Gabriel ist; der ist schon jemand, der das gemeinsam mit Herrn Oettinger in Gang bringen muss. Es gibt die Ansprechpartner, es gibt die Vorschläge, und das muss man dann abarbeiten. Nur zu sagen, das sei ja alles Neuland für uns, was ja stimmt – Frau Merkel hat da ja gar nicht unrecht als subjektives Gefühl –, das reicht natürlich nicht aus. Ich würde aber trotzdem, was die Entwicklung von Grundlagentechnologien anlangt, nicht so pessimistisch sein. Denn man könnte ja einen Schritt weiter denken, indem man sagt: Wir haben jetzt einen Status quo, aber es wird andere Übertragungstechnologien geben. Es wird wieder nachgedacht

über neue, eher – in meinem laienhaften Verständnis – biologische Übertragungsmechanismen, die vielleicht noch schneller sind oder in Kombination mit digitalen Prozessen anders funktionieren. Also die Frage, ob wir sozusagen unsere fast jahrhundertealte Forschungstradition hier aufgeben, weil wir herausragende Wissenschaftler in den 30er und 40er Jahren an die USA verloren haben, das muss glaube ich nicht so sein. Was ich auf der anderen Seite verheerend finde, ist, wenn das Institut für Internet und Gesellschaft, das in Berlin aufgemacht worden ist, de facto Google gehört und der Berliner Senat und die Bundesregierung das einfach zulassen. Das Institut ist gegründet worden, um nichts zu tun, um die Debatte zu kalmieren. Die sind nie öffentlich aufgetreten.

Hans-Jürgen Jakobs

Aber es gibt doch abends schon mal Empfänge.

Lutz Hachmeister

Genau, es gibt so ein paar Empfänge. Aber so eine Diskussion, wie wir sie hier führen, habe ich dort nie vernommen.

Hans-Jürgen Jakobs

Die laden uns nicht ein.

Lutz Hachmeister

Um es konstruktiv zu wenden: Dass man damit einmal anfängt, diese Debatte etwas stärker auch an konkreten Zielmarken orientiert zu führen und sie unabhängig zu führen von dem Einfluss des amerikanischen Oligopols, wäre ja schon ein erster Schritt.

Hans-Jürgen Jakobs

Und Oettinger und Machnig, das ist jetzt wirklich das deutsche Dreamteam, das alles umsetzt? Oder haben wir Hoffnung auf die neue EU-Kommission unter Herrn Juncker, dass das prioritär angegangen wird?

Ulrike Guérot

Ich habe zu der neuen EU-Kommission ein Interview gegeben, in dem ich gesagt habe, das sei der

Ansatz der Homöopathie bei der Besetzung. Was ich damit meine: Homöopathie bedeutet ja, dass Sie, wenn Sie sich verbrannt haben, etwas Heißes draufpacken und nichts Kaltes, wie der Reflex wäre. In der EU-Kommission haben alle das bekommen, was sie nicht können. Die Deutschen NSA, Oettinger Internet, die Ungarn haben jetzt das Dossier für Demokratie und Kultur bekommen, die Briten haben Finanzen bekommen und die Franzosen Wirtschaft. Soll heißen: Moscovici, weil er ja demnächst für die EU spricht und nicht nur für Frankreich, kann nicht mehr Ausnahmeregelungen für Frankreich verlangen. Und die Ungarn müssen auch schauen, wie sie in Konvergenz mit Demokratie und Europa kommen.

Damit bin ich bei Oettinger. Die Kommission hat die Vorlage zum Data Protection Agreement im November 2013 auf den Tisch gelegt. Es gab große Hoffnung, dass das Europäische Parlament das noch durchwinkt vor den EP-Wahlen im Mai. Und es war unter anderem ein ganz starker deutscher Einfluss, der dazu geführt hat, dass das nicht geschehen ist. Wer dahinter steckt? I don't know. Warum wir das nicht wollten? Wollten wir unser eigenes Ding machen? Da müssen andere Leute hingucken. Aber wenn jetzt Oettinger immerhin für die Kommission spricht, dann ist es eben auch das Einbinden des größten Landes – in diesem Fall Deutschlands – in ein strategisches Zukunftsziel, nämlich die Ausarbeitung einer autonomen, unabhängigen Internetstrategie für die Europäische Union, bei der dann eben Deutschland – sollte das denn der Grund gewesen sein – keine Alleingänge machen kann. Das heißt, man würde praktisch Deutschland einbinden in das, was EU-weit geschehen muss.

Dafür gibt es jetzt zwei oder drei konkrete Sachen. Eine ganz kleine ist ja, dass die Kommission eine Forderung gestellt hat. Das war noch Neelie Kroes, die gesagt hat: Diese Regulierungsbehörde ICANN muss jetzt mal aus Kalifornien raus. Das ist ja der erste Ansatz, um mal zu sagen: Das muss ein globales Setting haben und auch *global-stakeholder*-Prozess werden. Und das ist nicht dumm, denn wenn man sich anschaut über 60 Jahre, wie im ökonomischen Bereich die Weltbank und der IMF globale Wirtschaftspolitik gemacht haben mit einem Staff, der zu 80 Prozent aus US-Ökonomen besteht, dann ist es klug, dass man die Regulierungsbehörde schon mal außerhalb Kaliforniens schafft. Ein ganz konkretes Ding. Dann dieses Data Protection, das ist ja jetzt auf dem Tisch und wird nun hoffentlich mit deutschem Befürworten bald verabschiedet.

Hans-Jürgen Jakobs

Die Deutschen haben doch immer gesagt, das geht ihnen nicht weit genug.

Ulrike Guérot

Das Parlament hat schon zugestimmt und im Rat wird gekungelt. Naja, da kann man natürlich schön sagen, dass es einem nicht weit genug geht. Hauptsache, man stimmt nicht zu. Und das dritte ist, dass wir ja jetzt diese Digital Agenda Europe 2020 haben, mit der ja immerhin geschaut werden soll, dass wir europaintern, binnenmarktintern, einfach mal auf Vordermann kommen. Aber das ist natürlich sozusagen erst mal die Aufstellung der eigenen Bataillone, um dann vielleicht mal zu anderen Oligopolstrategien auch hier auf dem europäischen Kontinent zu kommen.

Hans-Jürgen Jakobs

Herr Hagen, haben Sie auch Hoffnung auf die Digitale Agenda Europe 2020?

Wolfgang Hagen

Das kann ich nicht beurteilen. Ich steck da nicht drin, ich bin kein EU-Politiker und ich weiß nicht, was man da so alles ganz konkret machen kann. Ich würde gerne vom Feld der Medien aus noch zwei Bemerkungen machen. Und zwar mit der Vorbemerkung, dass in den 80er Jahren praktisch der gesamte noch existierende schwarze amerikanische Jazz nach Paris gegangen ist. Und den gäbe es gar nicht mehr, es gäbe diesen Oliver-Lake-Jazz überhaupt nicht mehr, wenn nicht seither amerikanische Musiker in Europa ihre Kunst weiterentwickeln könnten. Das weiß jeder. Was will ich mit dieser Metapher sagen? – Wofür ist Europa gut? Das ist unsere Frage und die müssen wir uns stellen. Europa ist für bestimmte Dinge gut, die auf gar keinen Fall heißen können: Wir machen die besseren Prozessoren. Aber wir machen die bessere Kultur und wir gehen mit Menschen besser um. Wir haben eine andere und vielleicht ausgefeiltere Form von Demokratie, *hopefully*, in manchen Ländern und vielleicht sogar irgendwann auch in Deutschland.

Und jetzt komme ich zu dem Punkt des Public Service, für den ich sehr lange gearbeitet habe. Öffentlich-Rechtlich heißt das bei uns, aber ich nenne den ganz bewusst Public Service, weil ich nie einverstanden bin mit der Organisation des Public Service in öffentlich-rechtlichen Anstalten. Der Public Service muss ins Netz. Wenn der nicht ins Netz geht und dort auch sozusagen an diese Grenzen stößt, die wir da gerade diskutieren, dann gibt es nicht mal einen Fürsprecher dafür, da irgendwas zu ändern. Denn wenn die Öffentlich-Rechtlichen – sprich der Public Service – ins Netz ginge und zum Beispiel versuchen würde, über die Social Media das wieder herzustellen, was verlorengegangen ist in einer jungen Generation, sich nämlich an Öffentlichkeit und an öffentlichen Nachrichten zu orientieren, dann stoßen wir sofort an diese oligopolen Grenzen. Das heißt, hier

besteht ein Zusammenhang zwischen Medienpolitik und einer neuen Form von Kartellpolitik, die keineswegs eine Wirtschaftskartellpolitik sein muss und darf. Das ist eben ein neues Zeitalter, das Internetzeitalter. Diese Überformung der Realwirtschaft und der realen Gesellschaften durch einen Datenkapitalismus, wie wir das im Moment haben – komplette Überformung, als wenn es ihn noch einmal gäbe mit einer Schicht darüber und wir ihn kaum noch realiter sehen –, das muss begriffen werden als die Herausforderung für eine Medienpolitik im Netz.

Hans-Jürgen Jakobs

Das verstehe ich jetzt ehrlich gesagt nicht. Public Service ist doch im Netz überall.

Wolfgang Hagen

Null.

Hans-Jürgen Jakobs

Natürlich, Sie können doch alle Sendungen abrufen, Sie können sich noch dazu beteiligen --

Lutz Hachmeister

Herr Jakobs, da muss ich mal dazwischengehen. Was mir und vermutlich auch vielen hier im Raum aufgefallen ist: Die größten Werbeagenturen für Facebook und Twitter sind momentan ARD und ZDF, und ich glaube weltweit. Denn minütlich wird eingeblendet: „Kontaktieren Sie uns auf Facebook! Schreiben Sie uns einen Tweet!“ Nichts gegen Facebook und Twitter, aber das ist natürlich eine kostenlose Werbung, die ist gigantisch. Das heißt, da sind eigene Systeme nicht aufgebaut worden, politisch nicht gewollt oder technologisch nicht gekonnt. Und natürlich entwickelt sich der öffentlich-rechtliche Rundfunk, obwohl er hier mit acht, neun Milliarden subventioniert wird von uns allen, zu einem komplett vernachlässigenswerten Residuum dieses neuen globalen Informationskapitalismus. Wenn es so weitergeht.

Wolfgang Hagen

Ich verstehe ja auch Ihren Einwand sofort, Herr Jakobs. Solange die Anstalten das Netz benutzen, um ihre jetzige terrestrische Reichweite zu erweitern und dann zu dem Ergebnis kommen: Der Tatort im Netz, der bringt uns nur 1,5 Prozent Reichweite mehr; warum erforschen wir das überhaupt? – Das ist die Diskussion in der ARD, weil das Erforschen dieses Mehrwerts teurer ist als

der Gewinn der Reichweite, die man erforscht. Also lassen sie es lieber. Diese Art von Engagement im Netz meine ich natürlich nicht. Sondern ich meine eine Neuaufstellung von Public-Service-Unternehmen im Netz, die dazu dienen, den Generationenabriss zu korrigieren, und das kann man nur aktiv. Das kann man nicht, indem man in seinen klassischen Medien, die sowieso kein junger Mensch mehr guckt, darauf hinweist, dass sie uns auf Facebook kontaktieren können.

Hans-Jürgen Jakobs

Sie reden von Neugründen von --

Wolfgang Hagen

Ich rede von neuen Initiativen, die einen gesetzlichen Auftrag brauchen und dann von kleinen Unternehmungen, die nicht mehr öffentlich-rechtlich verfasst sind, realisiert werden. Zum Beispiel von der Intelligenz Agentur: Die kriegt halt einen Auftrag, etwas im Netz zu entwickeln, das öffentlich-rechtlich ist, und ich glaube, in zwei Jahren würden die uns einen Erfolg geben. Wir müssen auch die Unternehmerschaft im Netz völlig neu bewerten. Das tut die EU ja auch richtigerweise. Springer macht gar keine Medien mehr, sondern Springer macht Plug and Play. Jeder weiß das. In Berlin gibt's ein großes Loft, Plug and Play, da sitzen hundert Startups drin, die zur Hälfte und inzwischen ganz von Springer bezahlt werden. Und dort holt sich Springer sein Know-how, nicht für Medien, sondern im Moment für Marktaktivität im Internet und zwar vor allen Dingen in den östlichen Ländern. Das kann man auch für Medien machen. Das gibt's auch in Amerika. Also, es gibt jede Menge Möglichkeiten, in diesem neuen Markt, in dieses neue „Leben" (mit Anführungszeichen!) mit einem klaren Auftrag Aufträge zu verteilen und dann zu gucken, was hinten rauskommt. Das, was die ARD im Moment im Netz macht, ist eine ungewollte Erweiterung.

Lutz Hachmeister

Ich möchte noch einen Gedanken anschließen, der das vielleicht ein bisschen konterkariert. Ich glaube, was wir hier nicht verstanden haben, ist im Grunde die philosophisch-theologisch-theoretische Grundlage dieser Netzwerkkommunikation. Obwohl wir darin eigentlich mal sehr gut waren – von Leibniz bis Hegel sozusagen. Diejenigen, die hier darüber reflektieren, sind so niedliche Netzvereine wie die Digitale Gesellschaft oder D64 oder irgendwelche jungen Sozialdemokraten, die natürlich die machtpolitische Brisanz dieser Sache nur ansatzweise begreifen. Alleine, sich Digitale Gesellschaft zu nennen, was einfach eine absurde Erfindung ist...

Schon „Industriegesellschaft“ ist mehr eine Metapher, aber Digitale Gesellschaft gibt’s einfach nicht. Aber sich so zu fühlen und sich so zu verhalten, zeigt eine vollkommene Missachtung der geopolitischen Fragen, die wir hier diskutieren. Und solange wir das nicht auch implementieren, also das überhaupt theoretisch-strategisch zu begreifen, und das eben irgendwelchen Google-Instituten überlassen, die das nicht machen, haben wir einfach ein klares Strategiedefizit.

Ulrike Guérot

Nicht nur ein Strategiedefizit. Und ich bin ja ganz bei Herrn von Hagen, aber dann müssen wir natürlich auch definieren: Who pays? Wenn Sie sagen Public Service, dann heißt das: Who pays? Und im Zweifelsfalls ist die Korrelation, who pays, der Staat. Und der Staat macht Austeritätspolitik in Europa, und das geht halt gerade gar nicht. Ich würde in dem Zusammenhang gerne eine Anekdote erzählen. Ich war nämlich mit Herrn Obermann mal essen, da war er noch CEO bei der Telekom, und da ging es auch schon um Europa und um Strategie und wie wir ICT-Technologies in der Europäischen Union fördern. Und dann bekam ich nach dem dritten Glas Wein einen Schwall der Entrüstung von Herrn Obermann auf den Tisch geknallt, der ungefähr lautete: Solange die EU nicht weiß, wie man Oligopol buchstabiert, weil sie nur Deregulierung und Liberalisierung betreibt, kann die Merkel warten wie sie will, da baue ich hier keine Netze bis Rügen. Denn nachher kommt die EU-Kommission, ich habe die Infrastruktur bezahlt und dann klinken sich irgendwelche O2s da ein und machen mir den Markt kaputt.

Und die klare Botschaft von Obermann war: Wir müssen den Begriff von Oligopol und damit Public Services – da bin ich ganz bei Ihnen, Herr Hagen – redefinieren, in einen positiv konnotierten politischen Kontext stellen. Wir haben ja alle abgespeichert, nachdem die USA uns 30 Jahre lang erzählen: „State is bad and state is bad“, dass Oligopole und alles, was mit Staatlichkeit einhergeht, sozusagen auch im semantischen Sprachgebrauch einfach schlecht ist. Und dies müssen wir redefinieren und sagen: Wenn die EU Policy Conclusions nicht nur daherkämen mit Deregulierung, Wettbewerb und Liberalisierung, dann hätten wir natürlich andere Ansätze für Politik. Zum Beispiel, dass wir Broadband in Europa nicht als nationale Aufgabe verstehen, sondern einfach mal als europäische, die zum Beispiel dann mit europäischen Krediten auch finanziert werden könnte. Kann sie aber nicht, weil die EU als Institution, als *political entity*, de facto keine Kredite aufnehmen kann. Das ist echt ein großes Problem. Dann schreibt die Deutsche Bank wie jetzt kürzlich im Juli 2014 große Studien, dass das eigentliche Problem für strukturschwache Regionen, also im Sinne der Wettbewerbsförderung und so weiter, fehlendes Breitband ist. Das Land ist

überhaupt nicht entwickelt. Und wir bekommen diese ganzen Regionen nicht nach oben, weil wir das mit der Breitbandförderung nicht hinbekommen. Und das Problem der EU ist, dass wir nicht zusammen denken, dass der Breitbandausbau eben keine nationale Aufgabe mehr ist, sondern eben eine Oligopolaufgabe für die Europäische Union wäre. Das aber zu denken, und da bin ich ganz bei Ihnen, hieße, dass wir einen Begriff der Europäischen Union entwickeln müssen im Sprachgebrauch, der in Richtung Politisierung, in Richtung Verstaatlichung geht. Wir müssen in ganz neuen Formen über die EU nachdenken, und das lassen wir im Diskurs nicht zu. Und weil wir das nicht besetzen können, eben dass die EU etwas mit Staatlichkeit zu tun hat und mit Finanzierung von öffentlichen Großprojekten, haben wir diese Probleme am unteren Ende.

Hans-Jürgen Jakobs

Sie meinen, Binnenmarkt, davon reden wir ja seit vielen Jahren, ist nur eine Chiffre? Der Binnenmarkt muss im Prinzip auch ausgefüllt werden mit starken Akteuren. Wenn wir hier die vier Oligopole haben, die haben ja starke Leitfiguren: Jeff Bezos, Mark Zuckerberg und all die anderen. Die kennt man, die ziehen Diskussionen an, die treiben Innovationen, weil sie Größe haben und noch mehr Größe wollen. Was ist das Pendant in Europa? Könnte ein Herr Höttges, der Nachfolger von René Obermann, den Sie erwähnten, könnte der so eine Rolle spielen? Oder welche anderen Unternehmer könnten in der Lage sein, Treiber der technologischen Entwicklung, des Wachstums in der Internetökonomie zu sein?

Ulrike Guérot

Das wird Herr Hagen besser wissen, wer die Treiber sein können. Aber was ich sagen würde: Wenn man hinschaut, was die Amerikaner da sozusagen als Innovationscluster noch dazu haben, ist das einfach Silicon Valley, sind es die Universitäten. Das gibt's ja bei uns auch. Stuttgart, Automobilindustrie, das ist ja auch so ein Cluster. Da haben Sie Fraunhofer Institut, Universitäten, Zuliefererindustrie, und dann funktioniert da was. Aber wir haben ja diese Clusterbildung gar nicht, das heißt, ich weiß jetzt nicht, wer der Treiber sein könnte, welche einzelne Industrie, aber darüber nachzudenken, ob wir solch eine Clusterbildung hinbekommen, das hat dann schon wieder was mit dem Punkt zu tun, den ich eben machen wollte.

Hans-Jürgen Jakobs

Aber Telekom, das sind keine Cluster, sondern das sind Netze, die man über ganz Europa ausrollt.

Ulrike Guérot

Genau. Und diese Netze müssen ja noch verbessert werden, aber die müssen natürlich auch zusammmengeführt werden. Es geht nicht nur um ICT-Netze. Ich kann Ihnen das gleiche erzählen für die europäische Energiepolitik, die zum großen Teil daran hapert, dass wir unseren schönen Ökostrom aus dem Norden nicht nach Bayern bekommen, weil wir vorher die Tschechen fragen müssen.

Hans-Jürgen Jakobs

Den Herrn Seehofer müssen wir da auch fragen, aber das ist ein anderes Thema.

Ulrike Guérot

Ich will nur eines sagen: Diese großen drei Infrastrukturprojekte, die die EU gemeinsam und damit auch staatlich finanzieren und treiben müsste, mit einer im Grunde auf staatliche Zentrierung fokussierten Kommission, ist eben ICT, ist Verkehr – dann haben wir auch nicht mehr die Wutbürger in Stuttgart, die dort einen lokalen Bahnhof wollen oder eben nicht wollen, sondern dann würden wir diskutieren, ob wir ein modernes Zugverkehrssystem haben, wo wir von Paris nach Budapest fahren. Und dann ist nämlich Stuttgart der Umsteigeplatz, dann haben wir aber eine andere Diskussion. Das heißt, dass wir in diesen großen drei Infrastrukturpaletten, und ICT ist da nur eines, im Grunde ankommen müssten bei einem komplett nachnationalen Paradigma in unserer Gedankenführung. Denn wenn wir das national runterbrechen, haben wir schon verloren.

Hans-Jürgen Jakobs

Also Hoffnung auf die neuen Unternehmer oder reicht Public Service, Herr Hagen?

Wolfgang Hagen

Ich werde Döpfner nicht das Wort reden. Denn der wäre da ja fast schon der einzige, der einem da einfällt, weil er als einziger irgendwie ein bisschen im internationalen Internetgeschäft unterwegs ist. Aber das ist mir zu viel Camouflage und hat auch sehr mit Europa zu tun. Ich bin mir nicht ganz sicher, ob man einen staatlichen Netzausbau oder einen europäischen Netzausbau auf Staatskosten braucht. Da bin ich mir einfach nicht ganz sicher. Das müsste man mit der Netzneutralitätsdebatte verbinden, die meiner Ansicht nach manchmal ein bisschen sehr europäisch geführt wird, weil sie das Problem einfach gar nicht erkennt. Ich will aber kein weiteres

Fass hier auf den Tisch legen. Obwohl dort das Problem des Netzausbaus natürlich ganz wesentlich drin liegt. Denn wenn man in §41a TKG eine vernünftige Verordnung und Regelung hätte, würde sich vieles von alleine ergeben.

Nur, ich will noch mal zurück zu diesem medienpolitischen Ansatz, weil Sie vorhin gefragt haben, who pays. In Deutschland gibt es sieben oder acht Milliarden, die irgendwie einfach öffentliches Geld sind, Gebührengeld. In der Schweiz sind es irgendwie 1,6. Und die gehört zwar nicht zur EU, aber wenn man das mal zusammenzählt, kommt da einiges Geld zusammen. Und es ist ganz wichtig, dieses Geld zu verteidigen und nicht in der Austeritätspolitik sozusagen auch noch in den Sparstrumpf zu stecken. Weil die Menschen das ja auch wollen, das ist ja keine Steuer, sondern diese Abgabe wird ja gezahlt. Und diese ganzen Polemiken, „Zwangsabgabe“ und so, wenn die wirklich so wären, dann hätte irgendein Landtag schon mal der Mehrheit der Bevölkerung das Wort geredet, und die hätten dann einfach mal den Gebührenbeschluss nicht mitgetragen, wie das ja mal in Sachsen der Fall war. Also ich glaube daran, dass das noch eine hohe Akzeptanz in der älteren Generation hat und dass der Generationenabriss uns an der Stelle noch nicht erreicht hat. Der erreicht uns aber spätestens nach 2020, das denkt ja auch die Politik. Deswegen ist bis dahin Wachstarre angesagt: Keiner redet mehr über Medien, denn Geld ist da und zwar mehr als man erwartet hat, durch das neue Gebührenmodell. Und jetzt sind wir alle ruhig bis ’19! Und das ist noch eine Weile hin. Weil alle davon ausgehen, dass dann irgendetwas passiert, weil dann auch neue Entscheidungsträger kommen, bla bla. Deswegen finde ich, ist jetzt die Situation – gerade für uns, die wir eigentlich aus den Medien kommen – uns zu überlegen, welche Vorschläge auf den Tisch müssen, die dann diskutiert werden. Mein Vorschlag ist der, dass man fast bis zum Rand einer grundgesetzlichen Reformüberlegung von Artikel 5 geht, in dem leider nämlich nicht wirklich drinsteht, dass es so etwas geben soll – sondern das ist noch Verfassungsrichterrecht, was wir als Public Service haben –, dass man da eine politische Kampagne macht und sagt: Das schreiben wir jetzt mal richtig rein. Weil wir nicht wollen, dass durch unsere jüngere Generation und deren Sozialisation unsere Gesellschaft von innen zerfällt. Denn die sind bereits nicht mehr in der Society.

Hans-Jürgen Jakobs

Formulieren Sie mal, was würden sie dort hineinschreiben in Artikel 5?

Wolfgang Hagen

Ich will nur schnell noch mal den Punkt machen: Alle Internetanalysen, die ein bisschen tiefer

gehen, sagen: So wie das Internet jetzt verfasst ist, bestätigt es den Satz von Thatcher aus dem Jahre ’87: „There is no such thing as society“, weil es so ist, dass die Kommunikationsstrukturen und Interaktionsstrukturen, die mit dem Internet geschaffen werden, diese Überwölbung algorithmischer Datenstrukturen auf die Realwirtschaft und Gesellschaft, dazu führt, dass die Gesellschaft nicht mehr existiert, kein Ding mehr ist. Und das heißt ganz konkret in der Demokratie: Die Öffentlichkeit gibt es nicht mehr, sondern Teilöffentlichkeiten. Jeder weiß genau, was ich meine. Und wir dürfen nicht zulassen, dass das in die Sozialisation so eindringt wie die Popmusik eingedrungen ist von den Privaten ’85 – als ich einer derjenigen war, die dagegen ein öffentlich-rechtliches Jugendprogramm gesetzt haben mit dem Ergebnis, dass wir da heute *pari pari* sind. Wir müssen etwas dagegensetzen! Und dazu braucht diese ARD meiner Ansicht nach eine Abschaffung, denn sie kann den Auftrag weder erfüllen noch annehmen. Sie können denen gar nicht mehr diesen Auftrag geben. Die Menschen, die da drinnen sitzen, können das nicht. Das müssen Sie mir glauben. Und ich glaube, Herr Hachmeister weiß das auch. Die können das nicht.

Hans-Jürgen Jakobs

Also abschaffen und neugründen?

Wolfgang Hagen

Richtig, und das geht eben nur mit einer Änderung von Artikel 5, weil Sie dann die Verfassungsrechtsprechung, die Kette des Richterrechts, kappen. Denn wenn Sie die nicht kappen, können Sie auch das 2. Rundfunkurteil nicht kippen, und dort steht drin, dass es öffentlich-rechtlich sein muss. Im Grunde genommen ist das alles ganz logisch, alle stimmen mir auch zu, wenn ich diese kleine, hübsche Ableitung mache, und dann sagt man: „Joa, schauen wir mal..“

Hans-Jürgen Jakobs

Und Herr Hachmeister stimmt auch zu? Ich meine, das Groteske ist ja: Klar, wir zahlen Rundfunkgebühren, aber wir zahlen ja auch für diese ganzen tollen Dienste, über die wir jetzt gesprochen haben. Wir unterliegen einer Geldillusion. Wir glauben, wir genießen das alles kostenlos, Google, Facebook und so weiter, aber wir geben das Wertvollste, was wir haben. Und was andere überdimensional monetarisieren, das sind die Daten. Die Daten, die dann zu Vermarktungszwecken zusammengeführt werden, aus denen dann Profile entstehen, die mit einem Supermehrwert, mit einem Superprofit dann international verkauft werden. Also, eigentlich

müsste der Lieferant von Daten Geld bekommen, aber er gibt das hin als Tauschwert, weil er der Illusion erliegt, dass er hier wunderbare, kostenlose Dienste hat und mit der Teilöffentlichkeit mit Social Media und Facebook viel besser kommunizieren kann. Eigentlich müssten wir diese Dinge gesellschaftlich geraderücken. Oder, Herr Hachmeister?

Lutz Hachmeister

Ja, das ist schon richtig. Es gibt ja auch diese Modelldiskussionen, es gab diese Kulturflatrate-Diskussion, es gab Steuermodelle… All das kann ja mal angegangen werden. Man wird dann auch ein Modell finden, das funktioniert. Der einzige, der sich bislang so etwas ein bisschen hat abkaufen lassen, ist der französische Staat mit der Einmalzahlung. Dann dieses obskure Leistungsschutzrecht, das hier eingeführt worden ist, was auch nicht so richtig funktioniert. Also, da muss man dann schon auch wirklich mit dicken Kanonen schießen, was denen auch noch mal ein bisschen Angst macht und wehtut, bei all ihrer Lobbyarbeit und ihren Figuren, die sie da in Brüssel haben.

Aber noch mal zurück zu dem öffentlich-rechtlichen Modell. Darüber müssten wir ja gar nicht reden, denn das ist so winzig inzwischen im Vergleich zu diesem amerikanischen Oligopol. Es ist aber tatsächlich – da stimme ich Ihnen zu, Herr Hagen – vielleicht der eigentliche Nukleus für die Schaffung eines Bewusstseins für die Situation, in der wir sind. Alle, nicht nur die Älteren, die Mittleren, die Jüngeren, sondern alle. Dass das tatsächlich reorganisiert werden muss, das sehe ich auch so. Bislang lassen die Ministerpräsidenten hier in Deutschland das einfach so laufen, weil es ihnen natürlich auch gefällt: Es ist einfach da, man wird interviewt, man sitzt im Rundfunkrat, im Fernsehrat. Aber irgendwann wird die verfassungsrechtliche Frage auch kommen, ob dieses System seinen Kernauftrag, nämlich die Produktion von Inhalten, überhaupt noch in angemessener Weise erfüllt. Da müssen die Richter dann einfach – wenn man denen das finanziell vorrechnet, was wird eigentlich für was ausgegeben – befinden. In diese Situation werden wir unweigerlich kommen, wenn es nicht massive interne Reformanstrengungen gibt, die ich nicht sehe im Moment.

Ulrike Guérot

Aber wenn wir das noch mal gesellschaftspolitisch überhöhen wollen: Ich stimme Ihnen ja zu. Ich habe selber zwei Söhne, 21 und 23, die lesen nichts mehr, was Print ist. Wenn man sich vorstellen kann, welche Generationendynamik wir da bekommen, dass wir alle verlieren und dann im Grunde keine öffentlichen Debatten mehr über Zukunftsfragen politischer Art herstellen können, da bin ich

ganz bei Ihnen bei dieser Analyse. Also brauchen wir die Aufrechterhaltung von öffentlichen Gütern. Und Sie haben eben zu einem früheren Zeitpunkt in der Diskussion gesagt: Was hat Europa denn? Vielfalt, ein positiver Begriff von Staatlichkeit, das Soziale zum Beispiel. Das heißt, ich würde noch mal das Plädoyer machen, dass wir mit dieser Diskussion, die wir hier führen, eben auch verbinden – wenn wir das alles wollen, nämlich *public good* im Internet zum Beispiel –, dass wir dann tatsächlich auch in einer anderen Begrifflichkeit darüber reden müssen, was die Europäische Union ist. Und dass wir mehr zulassen müssten, dass sie Elemente von Staatlichkeit, um es mal ein bisschen runterzudimmen, zumindest übernehmen muss. Denn wenn Sie Herr Hachmeister, von GEZ-Gebühren-Einzugszentrale, öffentlichem Rundfunk und so weiter sprechen, dann ist das jetzt mal ein deutsches Problem oder eine deutsche Debatte. Da will ich nach Frankreich gar nicht gucken. Wer finanziert denn arte? Wo ist denn der öffentliche Rundfunk? France Culture. NPR, National Public Radio, wer das mal gehört hat, weil er letztens in den USA war: Wenn da nicht private Funder permanent Dollar für dieses letzte halbwegs vernünftige Radio in den USA ausgeben würden, dann wäre auch dieses Radio platt. Dafür hat man aber alle drei Minuten auf National Public Radio: „This documentation has been…, was brought to you by…, was paid by…“, und so weiter. Das wollen wir doch nicht ernsthaft haben.

Und da bin ich wieder dabei: Wenn wir ein Alleinstellungsmerkmal haben wollen – wir haben angefangen mit so einer Europa-USA-zentristischen Debatte –, dann ist es im Grunde die Wiederentdeckung des Prinzips der Staatlichkeit in einer wirklich überhöhten Form, das wir anwenden können auf ICT, auf Energienetze, auf Militär, öffentlichen Dienst, Education, wo auch immer wir meinen, dass wir das aufrechterhalten sollten im Sinne eines *public goods*. Und dann müssen wir uns fragen: Können/wollen wir das europäisch organisieren, und wenn ja, was kostet das? Das wäre eine Debatte, die würde ich mir wünschen. Dass wir das nämlich verknüpfen und dass dann aber so eine Debatte hier auch nicht wieder ins Deutsche abgleitet – geht es um unseren öffentlich-rechtlichen Rundfunk? –, sondern: Was ist denn ORF? Was ist denn in Griechenland?

Lutz Hachmeister

Nein, das ist klar. Darum macht unser Institut auch diese berühmte Datenbank im Netz.

Hans-Jürgen Jakobs

Darum machen wir ja auch diese Podiumsdiskussion.

Lutz Hachmeister

Aber ich wollte noch eines sagen, um von dem Medienaspekt im engeren Sinne noch mal wegzukommen: Was wir erleben werden demnächst, ist das entscheidende Spiel, wie sich sozusagen die *leading industries*, die wir hier noch haben – die Autoindustrie zum Beispiel – sich verhält im Kontext dieses neuen informationstechnischen Oligopols. Weil eben ein Automobil sich mehr und mehr zu so einem Gesamtinformationssystem wandelt. Also: Wird VW diese Zulieferungen aus dem Silicon Valley nur als Services benutzen? Oder wird es genau umgekehrt kommen, dass das Silicon Valley sich das letzte Know-how noch einverleibt und dann die selbstfahrenden Autos und die Leitungen und Netze einfach liefert? Und das, finde ich, ist der entscheidende Punkt, auf den wir zusteuern.

Hans-Jürgen Jakobs

Ich glaube, das ist dann noch mal ein Thema für eine eigene Diskussion, denn die Digitalität wird natürlich alle Branchen verändern. Und alle Wirtschaftsführer in Deutschland haben Angst davor, herausgefordert zu werden und dass Google und die anderen Unternehmen mit neuen Aktivitäten in ihre Stammgeschäfte und Stammaktivitäten eindringen. Aber wie gesagt, das führt jetzt zu weit. Wir haben jetzt 13 Uhr und ich denke, wir sollten die Diskussion für Fragen aus dem Publikum öffnen.

Speaker-Biografien

Susan Blackmore

Susan Blackmore schreibt regelmäßig für mehrere Magazine und Zeitungen. Neben ihrer Arbeit im Bereich der Bewusstseinsforschung und Evolutionstheorie ist sie Expertin auf dem Gebiet der 1976 von Richard Dawkins begründeten Memetik.

Susan Blackmore studierte Psychologie und Physiologie an der Oxford University und erlangte 1980 einen PhD in Parapsychologie an der University of Surrey. Ihr 1999 veröffentlichtes Buch „The Meme Machine“ wurde in 13 Sprachen übersetzt. Darin untersucht sie die Effekte von Memes – kleinsten kulturellen Einheiten, die sich durch Imitation fortpflanzen – auf die menschliche Kultur.

George Dyson

George Dyson beschäftigt sich mit der Evolution von Computertechniken und Telekommunikation. Er ist Autor mehrerer Sachbücher im Bereich von Technikgeschichte und -philosophie.

Im Alter von 16 Jahren zog George Dyson, Sohn des Mathematikers Freeman Dyson, von den USA nach British Columbia, wo er von 1972 bis 1975 in einem selbstgebauten Baumhaus lebte und ein Unternehmen gründete, das traditionelle Kayaks herstellt. 1997 erschien sein Buch „Darwin Among the Machines“. 2014 wurde sein Sachbuch „Turing’s Cathedral“, in dem er den Gründungsmythos des modernen Computerzeitalters nachzeichnet, auch in deutscher Übersetzung veröffentlicht.

Nick Bostrom

Nick Bostrom ist Professor an der Philosophischen Fakultät der Oxford University. Seine Themenfelder umfassen Transhumanismus, Technik- und Zukunftsforschung.

Nach einem Studium von Physik und Neurowissenschaft am Londoner King’s College machte Nick Bostrom 2000 seinen PhD an der London School of Economics. Er ist Mitbegründer der *World Transhumanist Association*. und des *Institute for Ethics and Emerging Technologies*. Seit 2006 ist Nick Bostrom Direktor des *Oxford Future of Humanity Insitute*, seit 2011 steht er ebenfalls dem *Programme on the Impacts of Future Technology* vor. 2014 erschien sein Buch „Superintelligence: Paths, Dangers, Strategies“.

Gundolf S. Freyermuth

Gundolf Freyermuth ist Professor für Media and Game Studies am Cologne Game Lab und unterrichtet Comparative Media Studies an der *ifs internationale filmschule köln*.

Nach einem Studium der Allgemeinen und Vergleichenden Literaturwissenschaft, Germanistik und Amerikanistik an der FU Berlin promovierte Gundolf Freyermuth 2004 zum Thema Digitalisierung von Kunst und Unterhaltung. Von 1983 bis 1990 war er Kulturressortleiter des stern. Seit 2011 ist er Beauftragter der Filmstiftung NRW für die Entwicklung neuer Medienförderungen. Er ist Mitherausgeber der Schriftenreihe "Bild und Bit. Studien zur digitalen Medienkultur".

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