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THE WORLD IS THINKING

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□□□□□□□□□□Stewart Brand:
□□□□□□□□□□Good evening. I am Stewart Brand from the Long Now Foundation. We are going to have a vote shortly so I am going to need lights up in the house or we won't know who won. Our next speaker you should know is on the Wednesday, May 21st, it's Iqbal Quadir who is the guy who started the Grameen Phone in Bangladesh which started the cell phone revolution which is bringing about two billion people out of poverty these days. And his theme is that that works for technology across the board, Technology Empowers the Poorest. After that my old teacher Paul Ehrlich in June – June 27th. He has taken on a new field in his 70s which is Human Cultural Evolution and here we are talking about that, I think for first time – in June.
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□□□□□□□□□□Now the idea of the Long Now – actually its size was determined by Peter Schwartz who is here in the middle seat, and its 10,000 years have passed because that's how long we have been doing agriculture in towns and domesticating animals and ourselves and things like that. And the next 10,000 years the idea that whatever the story is right in the middle of it, not at the end, not beginning right in the middle.
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□□□□□□□□□□One of the peculiarity is this odd asymmetry between the last 10,000 years and the next 10,000 years, past and future of different animals. And they have different disciplinarians who teaches about them, and very few – and in fact I think no futurist have actually had historical training; is that right Peter? Yeah there you go, and not that many historians even want to speak about the future, though we have ones tonight. So there is a philosophical, epistemological, disciplinary mindset between these two areas which is quite different. And so tonight we have leading practitioners one of each.
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□□□□□□□□□□Now the way these Long Now debates work, we have had one. So it's now a tradition. It's the audience decides who goes first, that person then come up and hold this forth for exactly 15 minutes and goes and sits down and is interviewed by the second speaker for 10 minutes, just basically drawing them out, its not a debate point making deal, it's – its an interview. And then that person who is doing the interview has the job of summarizing the first speaker's argument to that person's satisfaction. And then they reverse roles. Second speaker comes up for 15 minutes, gets interviewed for 10 minutes, and so on. All this time some of you will be writing questions, I hope, which will be forwarded up to Kevin Kelly who will processes for the best ones and bring them up to – he will be up here on the stage and at that point and through out the questions we will be keeping questions coming up, you guys are in the thick of it as well.
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□□□□□□□□□□I have been asked to give some framing for how to vote, and one is a historian, one is a futurist. The existing entity that in a sense both are dealing with that is this recent book by Niall Ferguson called "The War of the World". It is about the 20th century, and it is a dark, bleak grim book; "The age of hatred" is the subtitle, in England not here. And Peter's books tend to be things like inevitable surprises, the art of Longview, one called the Long Boom and they are all future ended. So we are about to have a vote and you are – you should be thinking about what you want, not join some title flow but actually you know do your vote, it will be a hand and if you want to say something you can, and I don't know which one I will go first. Okay who want Niall Ferguson to go first? Alright hands down. How many Peter Schwartz to go first? I make that as slightly less, do you guys agree that Niall is – just won the vote, do you think Niall

won the vote? Or we could do this like the democratic primary and just –.
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□□□□□□□□□□Peter Schwartz:
□□□□□□□□□□Niall you –
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□□□□□□□□□□Stewart Brand:
□□□□□□□□□□Niall you are on, good luck.
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Thanks very much. Well, well it's a great pleasure to be here, I am a huge fan of the Long Now, we have been trying to make this happen to for some considerable time and I can only say it's a great honor to be on the same stage with Stewart and Peter, time is not on my side. I am now going to cut the flattery and get straight to the point. There is one thing that I think Peter and I agree on and that is that there is ladies and gentleman no such thing as the future, there are only futures; plural. However there is only one past, albeit a past which can be interpreted in multiple ways. Now I want to explain to you what the past and then what is history is. The past used to be said is another country, that's not true, it's another planet. And it's a planet inhabited by the dead. And the dead out number us massively. According to the population reference bureau from 50,000 BC, when Homo Sapiens first appeared until 1990s, I haven't updated the figures; a hundred billion human beings have been born. So the current world population is about six percent of all the human beings who have ever lived. And the past is that other planets where the dead majority lives.
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□□□□□□□□□□What historians do is to try to understand that planet, what they can't do – and I want to be very clear about this, they can't establish universal laws of social or political physics with reliable, predictable past, there are two reasons for this. The first is there is no possibility of repeating the experiment called history. The sample size of human history is N=1. The other problem is that you can't really have physics when the particles have consciousness, particularly the kind of consciousness that human beings have evolved which interestingly enough turns out to be especially skewed when it comes to understanding the past, our heuristic biases are very bad when we try to access past events. That's what historians can't do. But ladies and gentleman they can do some important things nevertheless. They can do is – first they can analyze and interpret human experience in the past at multiple levels. We can go from the micro, the individual's experience, to the macro, the entire experience of humanity, over short or long time periods. It's a very flexible discipline in that sense. And we work in a certain rough and ready way, that's not such a bad thing. We can with – rather coarse grained approach. We can draw analogies between different situations in the past or between situations in the past and situations in the present.
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□□□□□□□□□□For example we can quite easily make comparisons between financial crisis over time. They have certain common features even although now two can be said to be identical. The same goes the geo-political crisis and wars. The other thing the historians can do which is quite clever in my view, though hardly any of them do it, I do it compulsively, is we can imagine or simulate alternative pasts, and I use the term advisedly, because there is only one past, fake pasts that didn't happen, but might have. There are terribly important device for understanding what did happen. It was the great [0:09:39] Louis _____ who once said that the historians could only really be said to be doing their job well if they had an instinctive sense of what didn't happen. Part of the point of my book "The War of the World" is to explore a particularly important counterfactual scenario, and we can just say we have jargon for this procedure of "what if" questions – "what if" questions. What if World War II had broken out in 1938? That's – the very coarse of the book, I am not giving up away too much when I say that it would have been a shorter war and many – many few of the people would have died. But now the critical thing to understand is how historians do what I have just described, how to

do it? Well the answer is that we commune with the dead, we do. Science quite weird when I put it like that. To be honest being a historian is to roll out more but possibly psychotic activity. I genuinely prefer the company of the dead. I spend much more time with dead people than with people like you. And I am sure future psychologists will explain this in ways that are not favorable to me. Have I have a rationale for this which I will explain. R.G. Collingwood who is one of the great philosophers of history are produced my old university Oxford, once said in his wonderful brief autobiography and I quote, 'Historical knowledge is the reenactment of a past thought encapsulated in a context to present thoughts, which in contradicting it confine it to a plain different from this.' That's actually the single most important sentence ever written about historical methodology in my view.

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□□□□□□□□□□We are reuniting past source; we can only do this by communing with the dead through the records that they have left of their past thoughts. What did you feel like to be an ethnic German in central and Eastern Europe after 1918? That's one of the questions that I try to address in "The War of the World". But historians done just do that, the other thing that we do simultaneously in a complete different methodological way is that we try to infer what Carl Hempel called covering the laws about the way that – that the human past is operated for mainly quantitative data. There is a kind of rough and ready covering law at the heart of "The War of the World" and it goes like this. If you have simultaneously Economic volatility, Ethnic disintegration and Empowers in decline - each of these begins with the letter E which makes it easy to remember. Then the probability of a high level of organized lethal violence is significant. Probability not certainty, this isn't a law, it's not a model, in the way that social scientists would attend to - to think. It is just a statement of a rough regularity. Take these things together, Economic volatility, Ethnic disintegration and empowers in decline and violence is likely to be significantly higher than on the different circumstances.

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□□□□□□□□□□Now what a futurist do? If that's what historians do in a nutshell. The answer is that they infer future scenarios on the basis of past examples and past data but without necessarily acknowledging that the knowledge is their drawing or historically inspired. They – they claim to be concerning themselves with the future, but in reality they are as much concern with the past historians because what else did they have to go on. It's not the power prophecy with which Peter is in doubt. What she is trying to do is in infer from the past, future possible scenarios. No, I don't think that's about procedure and I want to make it clear that this is not the house of comments and I am not here to oppose of things he says. On the country we in fact much in common and been asked to do this, forced me to ask myself or don't we agree about, not known for at least 10 years, and much of the time we are in almost beautiful and perfect harmony. But it seems to me there is a methodological problem, that Peter not being a historian made underestimate about what he does and the problem is this, if you are constructing future scenarios on the basis of past data without adequate historical training you are more likely to be susceptible to the kind of heuristic biases that I mentioned before.

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□□□□□□□□□□Peter scenarios are in fact that he himself acknowledges plots for unmade movies, that is what they are. And it seems to me that they are inspired as much by his own personal pre-elections as by any very rigors assessment of past data. I won't go through the full list of heuristic biases of which I think he may be guilty though it is quiet tempting. I want to – because time is limited, give you a tale of five futures, the two futures that are implied in my book which I made explicit in an article that was published in foreign affairs shortly after the book was published. And the three futures envisaged in Peter's book the "Art of the Long View". My future is very simple. I make the points in "The War of the World" that we can learn from the history the 20th century that scientific and economic progress does not reduce the risk of organized lethal violence on the country. Despite the advances that we made economically, scientifically and otherwise in the 20th century we prove to be capable of unprecedented levels of murderous behavior. We should learn from this, that globalization is vulnerable, may even generates its own destruction. That there is a potential for conflict regardless even of levels of education, and that the three things I mentioned earlier Economic volatility, Ethnic disintegration and Empowers in decline can still cause high levels of violence in all time.

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□□□□□□□□□□The implicit second future, is that we learn from history and make sure or at least endeavor to make sure that's these things do not coincide again, in other words aware of the fragility of the order we call globalization, we do our best not to have a 1914. "Art of the Long View" is a wonderfully stimulating book and deserves all the phrase that's been keeps upon it and it contains three future scenarios, for the period between 1991 when I was written and 2005. And its fascinating to read these now three years after 2005, the three scenarios Peter favors three rather like the UN with its population projections, there is a cheerful, there is a gloomy, and there is just right – the goldilocks future. The three features have - some of you will doubtless know from your reading the following titles, new empowers, market world and change without progress. I am not sure which movies inspired the first two but he admits that the third pessimistic one was inspired by 'Blade Runner'. Its clear that out of the three the middle goldilocks projection has come closest be in right. It is a kind of vision of globalization and this much at the time and understanding of the way in which compute micro worlds he uses the term that hasn't really caught would transform the way in which the world works. That is even on 1997 financial crash – full marks, however.

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□□□□□□□□□□There is a missing elephant or rather giant Panda. In scenario one, China quite goes its own way preoccupied with territorial disputes with India. And scenario two, China causes a financial crisis by defaulting on its deaths to Japanese banks. And scenario number three the Blade Runner scenario China fights a major war with India using Pakistani weapons. The only thing I can find salvage this story is the China in scenario three could exterminate the Tibetan Independence Movement. Well that to me turned out to be dead right. But everything else that Peter wrote about China in his best selling book has been wrong. And to be wrong about China is to be wrong about the single most important thing that has happened since 1991. That seems to me to illustrate, not that the perils of being Peter Schwartz, on the contrary it illustrates the parallels of being a futurist.

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□□□□□□□□□□The inherent impossibility of making predications about a system is complex as the world of human beings. Could not be better illustrated, than by this clearing a mission in all three of the scenarios in "Art of the Long view". How can we work together? It seems to me we can work together, the futurists can learn from historians and historians from futurists. I think our best hope is to make historical enquiry more rigorous than it is and I want to make it clear that I don't in fact to guard my profession as particularly impressive when it comes to standards of scientific and scholarly rigor. Historians need to know more about Chaos theory. They need to know more about complexity theory. They need to know what a power law is and they particularly need to understand evolutionary biology. They need to learn from the sciences much more than they do. Here I think we would be incomplete agreement. But I want to conclude ladies and gentlemen by suggesting that futurists really do need to learn from historical method. They need to understand better that point that Collingwood made. But it's not enough just to understand the world as some kind of hydraulic system. It's important to get inside the heads of the dead, and if you don't do that it seem to me your future scenarios are likely to be worth rather less than the paper that printed. Thank you very much indeed.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Hope I was in to that. Okay I will first of all thank you, both for the flattery and the equity. So I have a few questions to see if we understand, first of all what are you saying I want to come back later to the questions of your view of the world and where it is heading and so on which you touched on as well. But I want to spend a few minutes on what I think was your central point which is the issue of how we think about the future and what the nature of learning from history is. So first question you eluded to heuristic biases and you know you said why you could enumerate them and we are very explicit about them please.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Well where to begin? One of the greatest problems that we have from what thinking about the future is that, we are attracted to certain scenarios more than to others we have a certain confirmation bias; illustrate this point with another part of your book. You were strongly attracted to the importance of the teenager, and the global teenager is a key player in your book. I think that's a classic product of a strong player that you instinctively felt that it was important because you were once a teenager when teenagers matters. Would be typically a baby boomer and thought the teenagers would continue to matter. They don't matter they became less and less important with every passing year. The demographics not only the United States, but of China itself make teenagers increasingly unimportant as a group. But because you had a strong prior in favor of thinking the method you wrote a whole chapter about the global teenager and I – I strongly – I strongly feel that the global teenager is a minor player compared with the global oldie. And I would certainly you know say that having addressed the major manufacturers of the Hoover Institutions this morning who are global oldies.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□That's a good example, okay another point you made which I think is actually quite profound and worth exploring for a moment I think. Because you – you know, I think time is running down and you touched on it without exploring it further. And that is one of the sources of learning in sense for the historical community in terms of being able to look at novelty and new things like the frontiers of science and so, and you touched a few of those, biology, complexity and so on. Expand a bit more how you would see those kinds of ideas coming to play in the world of history. Because I think it is a challenge you know brining these worlds together.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Well it's most easy to do if you are likely concerned with economic and financial history, because that there is no question that when it comes to trying to understand financial crisis. There are all kinds of benefits to understanding complexity. That – that's to say that in many ways financial systems do behave a lot like complex systems in the natural world. That the regularity of financial crisis does not follow – the bell curve normal distribution, they are very fat tails in the history of finance. And this is a current feature that it takes you all the way from the South Sea bubble of 1720 to the present. And so simply understanding a little bit about distributions of extreme events, understanding a little bit about how systems can become critical seems to me absolutely essential if you want to. If you want to understand how financial crisis occur. That's actually more helpful in understanding the theory of modern finance as exemplified by the Black-Scholes Formula because actually the theories of option pricing is based on the completely false notion about the distribution of financial art and it does come to the effect that it does follow bell curves, so one that's one example.

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□□□□□□□□□□Chaos theory was something that inspired me when I was writing a book called Virtual History, because I was acutely aware of the sensitivity of political and social systems to initial conditions and the probably a butterfly flapping its wings can cause the hurricane at the other end of the earth. It's important the historians understand this because historians have their own heuristic basis. Please let me make that clear, one of our heuristic basis that we really do great events to have great causes. We hate the idea that a war as big as the First World War could have origins that date back no further than July or June of 1914. We want big origins for big wars. We want the origins to be in at least in 1890s may be even the 1870s and I have read books that date the origins of the First World War back to 1815 which is the hundred years before the World War broke out. Now that seems to me to be based on a fundamental misunderstanding of the historical process, that a small misjudgment. And I think it goes on small misjudgment on the part of political activities in European capitals in 1914 is the finest to cause for in the quarter years of carnage. One last thought which is particularly important to me at the moment is understanding evolutionary biology. If you are writing as I am at the moment the history of world finance rather a financial history of the world that's a better way to –.

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□□□□□□□□□□Peter Schwartz:
□□□□□□□□□□Could you give the name of the book?
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Which is going to be entitled “The ascent of Money”. If you are old enough you would remember Baranoski is a sensitive man, it’s an ironic part of that, 4000 years of financial history strongly resemble the history of evolution in the natural world. It’s almost all there - there are – there are great times there were appreciations there were natural selection I can think of the story of – financial history as a very compressed evolutionary story. There are differences some of the mutation is conscious it’s Lamarckian not Darwinian, but it’s nevertheless it seems to a very helpful way of thinking about it, for finally important historic processes they hardly need to say how important is this year.
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□□□□□□□□□□Peter Schwartz:
□□□□□□□□□□I would say Steward is big fan of a book called “Why Big Fierce Animals Are Rare” which is all about in fact precisely that kind of evolutionary -.
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Okay pushing on you – you are moving now crossed in some sense the boundary between methodology and substance.
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□□□□□□□□□□Peter Schwartz:
□□□□□□□□□□You said something I think very important but it was in the contest of alluding to methodological issues and that had to do with – in the future, you view of the future was, simple that the science and technology had not reduced the risk of increasing violence. But you also have cleared example in the modern history of mutually assured destruction in which we avoided the Cataclysmic war. How do you deal with the – the differing effects of science and technology in that area as well as others that may have reduced the levels of violence from as a result of the economic progress and better health care, water, environment all those kinds of sources of conflict that emerge from advances in science.
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Well, There are two ways of thinking. One is that the mutually assured destruction might easily have lead to mutually assured destruction and it only just fail to by his - at least two of occasions, I mean one can - again allow the retrospect to fallacy to turn the cold war in to the long peace. I am certainly old enough to remember how very unpeaceful it felt to be stirring the abuse of nuclear destruction in the face. I must say that the – that the more ones thinks about the history of cold war, the more one becomes aware of how close it came to disaster, particularly in the Cuban missile crisis. And although the stakes where the crisis were so high in 1973 the nuclear arsenals were substantially larger so the risks were even more terrifying. So I am not sure I have the idea just because post talk there was no third world war ergo out there for it was because of the deterrence works. I think we were lucky. In 1914 could have happened in the early 60s or the early 70s. The other way looking at it is that of course there was a third world war. It was just and this is the point I am making in “The War of the World”. It was the third world’s war that having established arsenals that were too powerful to use in each other, the super powers waged a war that was just as destructive in terms of human lives as the first world indirectly by proxy it was succession of third world countries. And so in a sense the volume of the violence didn’t decline in the world after the invention of the atomic bomb. It – it didn’t decline in a substantial way. By the end of the century there was still the potential for genocide and it could still be carried out with extremely permissive weapons in countries like Cambodia or Rwanda. So that’s – that’s the – the double

argument that I would make.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well, actually you – in your answer you actually answered my last question as well, because you alluded to the – the forces of economic volatility, ethnic conflict and empires in decline as the powerful engines of violence and expressions of hatred, etc. And the question I really had for you was what was the difference in first half and second half of the 20th century and you are basically saying – if I get you right, 'not much'.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Yeah, location, location, location. That was the difference, because all that happened was the – the violence which in the first half of the century was heavily concentrated in Central and Eastern Europe and Manchuria, Korea. They were these two great killing zones of each end of Eurasia. These zones finally become off limits in the early 1950's. Germany and Korea are partitioned and it's realized that fighting over these areas is in some ways too destructive to – to happen again. But the violence has just moved, and takes place in Guatemala, in Cambodia, in Angola and so on. So that's the simple answer. And of course that's why my first gloomy scenario about the future is that this could happen somewhere else. And the obvious place today where there is economic volatility are plenty, ethnic disintegration in full swing and an empire in decline is of course the Middle East.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Thank you.

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□□□□□□□□□□Stewart Brand:

□□□□□□□□□□Now your summary.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Okay, well it seems to me you are – you are talking about two obviously related sets of ideas. And the first has to do with how one thinks about the future. I think the wonderfully eloquent description of the planet of the past, very hard to get to, we don't know yet how to travel there and so we can only get there by empathy as it were. And I thought the – the empathy with the dead was a very eloquent way of putting it. I think you also clearly challenged how we think about the future in terms of the depth of understanding of history, and what one can draw from an extremely complex, rich record and what meaning one draws from that. And particularly I think you know – and one thing that I admire about your work is the willing just to consider and learn from alternative interpretations of the past, different ways of thinking about what happened and what might have happened as you did both in virtual history and at various points in The War of the World. I think you also rightly drew attention to the source of novelty that ought to inform even historical thinking when one draws conclusions for the future and that is sources of new knowledge from the sciences and so on. And I think you identified several that I find particularly important by logical thinking and evolutionary thinking, complexity and chaos and that line of thought. I think obviously you also had a critique I think some of my work. You know I think – and I will come back to particularly the issue of China and how and why. But I think it is indicative of something which you touched on and which I will come back to when I speak. And then finally I think you also provided a framework for thinking about the recent history of the last century and what it implies in particularly the focus on these things. And I think this – this was new in your book. I don't think people had put this particular story together of these three forces of economic volatility and its impact on societies and the social fabric, the impact of ethnic and religious conflict and its virulence and depth and the inability of empires to manage the world as it where and sustain an order, in both the decline of Britain and the failure of the US to rise the imperial challenge. And that that leads one to ask a serious questions about what may happen not very far ahead, particularly looking around what we see as events like

financial crisis and wars in Iraq.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□I am told I am supposed to say you got it. But I never say you got it under any circumstances, what I will say is – yes but there is a – a couple of points that I would like to just throw in. “You got it” is my first. One of them is actually self criticism. I wondered if you had spot the flaw in my argument, perhaps somebody else has. I don’t think I can convincingly show that you would have got China anymore right if you had been a historian.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well, I am going to make that argument myself.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Rule number one, I am from Glasgow. Get your retaliation in first. I wouldn’t make the other point, you are Republican American, I just leave you one.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Go ahead, go ahead, go ahead -.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□No, no I will leave you the other one.

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□□□□□□□□□□Stewart Brand:

□□□□□□□□□□Are you basically satisfied?

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Oh, I am always – I am always satisfied with what Peter says that was – that was a mere quibble. Can I borrow your pen Peter, I don’t have one.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□I have borrowed it from Stewart; please. I said to my wife Katheline when we came over here, I am – I am either brave or very stupid to take on Niall Ferguson. You have seen why I feel really honored to be on the same stage with Niall, I truly admire his work, I have read I think everything since the Pity of War. Most of us who write nonfiction wish we could write books with such scholarship depths, originality, elegance of prose; they are real page turners. He always makes me think. And I highly recommend reading The War of the World which you can buy out there. And indeed this debate came about from a dinner that Niall and I had about 18 months ago while I was beginning to work on a new book. And that book was optimistically titled the Case for Optimism. I had just finished The War of the World, and was shattered. It really challenged my thinking as each of his books has done, forced me to reflect on my basic assumptions about where we were headed and what it meant, and it basically stopped my book. I said alright, I have gone to confront the issues that Niall raises in his book and really think them through in a very fundamental way. And I have spent the last eighteen months doing that. So in a sense you are part of my thought process, by having this debate I have forced myself to reach some conclusions about the arguments which Niall so eloquently made in his book.

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□□□□□□□□□□And as Niall rightly puts he does alternative past, I do alternative futures, but here is where I want to take a small line of difference and that is that – well you know you have talked about the Land of the Dead where we futurists have imaginary friends; imaginary friends in the future as it were. And that is that we on the one hand really do

need to do good history and I will allow that from time to time, we fail in that. But I spend most of my time reading either history or science; the things that changed the future, the frontiers of the new. And you know we have to live in science with the laws of physics, there is no real “beat me up Scotty”, but you know yes to the flip phone, we have what Star Trek saw then, so imagination sometimes works and Niall unlike most historians brings imagination to his task. That’s indeed what part of virtual history task is. And indeed in the case of China, mine was a failure of imagination, not a failure I think of history. In fact we are probably too bound by our view of the limits of how much China could evolve. And if anything I would say many of my historic mistakes have been not from a failure of good historical analysis but a failure of imagination. But I will allow both of those frankly, because I have made both classes of mistakes.

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□□□□□□□□□□So now let me turn a bit to how we think about things differently, in particular with respect to the book and some of the arguments which you have made about what shaping modern times in history. And I think if I would characterize a very simple framework for thinking about how I think you see it versus how I see it, and which leads to different scenarios is I think you see the momentum of history as on a kind of downward slope or at best flat, with the possibility that we could get it right and reverse direction. And I on the other hand see the momentum of history basically on an upward trajectory with the possibility that we could get it more – and head down. So your uncertainty is mainly on the upside and mine is mainly on the downside. And in fact I agree with everything in The War of the World until we get to the epilogue, which is what deals with the last fifty years. It basically – the book brilliantly covers the run-up to World War I and all the way through the Korean War as one – in a sense continuous context of conflict. And this – and you touched on this I think in your remarks has to do with how we view the second half of the 20th Century versus the first half. I think you see them as mostly not very different, but I see them as – the second half as representing real progress, where we have meaningfully fewer deaths for example. In the first half – I think in the book your numbers are 160 to 180 million, in the second half it’s close to the 10 to 20. What that means that is that the first half of the century we killed off somewhere on the order of five percent of humanity, in and twenty. In the second half it was one sixth of one percent.

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□□□□□□□□□□Now if you were – you know the mother of the soldier who died among those, or the family that was raped in Bosnia, that matters a lot. But I submit that there is a huge difference between killing one in twenty and one sixth of one percent. And part of the reason is that we made real progress in human institutions that constrained the violence, that limited the conflict, part it was mutually assured destruction, but part it was the rule of the law that limited particularly trans border conflicts to very few. Most were civil wars and they were ethnic and violent and particularly ugly. But I submit that nothing reach the levels of the holocaust in that respect in World War II. We also have much wider prosperity with vastly more people enjoying the benefits of progress and much more freedom and democracy in many places, and by the way there is more eco friendly. So you know we have seen a lot of progress. So unless we blow it we have a chance of getting it better. But I will say this. I want to set the bar even higher, because something that you don’t touch on your book, which I think is an issue for the future, is climate change. And so that could be another set of – sources of conflicts and if we don’t deal with that, then we are leaving something very big. If the China was the elephant of the last decade climate change is the elephant of the decades ahead.

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□□□□□□□□□□So I think there are real powerful forces for progress. And if we think about the last 30 or 40 years we have seen enormous changes that have surprised us. The rise of the women’s movement and now it’s transformed the role of woman in America. So today four out of five Americans say they would vote for Hilary Clinton without thinking about – you know it’s not 100 percent, but it’s 4 out of 5. We have seen the population bust. We have lowered the population expectations for the future. We saw the end of the Cold War, basically Soviet Union said, ‘We are not fighting anymore’, gave up, went away without violent revolution. And we have seen dramatic transformations in China. All of these things have left the world in a much better place, and very hard to have anticipated. I got it wrong in China. So it is the essence that we can make very real progress. So we think about the issue of prosperity. We have a long history of

increasing prosperity. More countries are in the game. First it was the US, Europe, Japan; now China and India, lots of new technology that increases productivity, knowledge is spreading around the world, Wikipedia is the best new anti-poverty tool we have ever seen, spreading access to knowledge everywhere at essentially no cost. We see the difference in places like Singapore versus Nigeria where knowledge drives growth and resources fail you. So many more people have a stake today in the system in preserving what we were doing. And indeed I would argue that even today's financial crisis; one possible outcome is real reform, again part of the learning process of our system.

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□□□□□□□□□□I think the second big thing is that we have learned how to contain conflict. We avoided the big nuclear war. We have had very few trans-border conflicts. So we are – I have been involved in one right now. We have more means for intervention. And a great example of getting it right is what's going on today in Kosovo. Here is Kosovo declaring independence – and oh by the way the last time this happened there was wholesale slaughter. This time, as a result of the previous intervention, we are not doing that. The Serbians aren't slaughtering the Kosovars, because they learned something along the way. They will get hit if they do. And so – in fact the system of intervention and prevention of conflict is working. We see it happening. And I think we will be chastened by the Iraq war, you know. We are going to find that Unilaterism doesn't work. So we are seeing improvements in the international security systems, improved governance, more and more countries are better governed. China and India today compare before may be even Russia. New regional governing structures, the EU the OAU, global level the WTO, Security Council, IMF, World Bank, NATO. And in fact one of your articles recently which I loved – and reading Niall is a real delight regularly, publishes a great deal, you talk about a world of powerlessness and that could become anarchy. And – like the dark ages. But in fact I see – and this goes back to the notion of complexity – a complex network, adaptive learning systems, bottoms up emerging system, not top down imperial system of many actors, governments and multinationals, small businesses, NGOs, supernatural institutions, in a complex web of power, not an empire. And then finally the climate challenge which I put on the table. You know this is a very urgent issue. Some of you were here last year when I debated Ralph Kavan on nuclear power; I think this is a global crisis of great urgency. And it's not hard to imagine how it could become a source of conflict; the history could easily be there. Imagine if the Tibetan highlands begin to dry up, the Mekong begins to dry up, the Chinese dams begin to affect the Vietnamese downstream, and this is – you know here we have exact ingredients, you have talked about the Vietnamese and the Chinese don't like each other very much, and you could imagine a conflict over access to water.

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□□□□□□□□□□On the other hand climate change could be the shared threat that really unites us, that creates a new environment for collaboration. China and India and United States face the same challenge. We have huge technological resources and capabilities. I can easily imagine the scenario that we work together rather than we work apart, rather than conflict its collaboration. And that has happened in recent history as well. So I think many of the technology options in a world where we both want more electricity, more cars, are a plausible scenario, and particularly given the outcome of this election. All three candidates are in favor of dealing with the climate change. We could see a fundamental change in the very near future.

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□□□□□□□□□□So I see a very different future than I think the dark future that is implicit in The War of the World. I see a positive second half of the 20th century, leading to a remarkable 21st century, not Utopia but continued progress you know. I can see it being driven by increasing global integration, technology progress, the challenge of climate change and sustained economic growth with some ups and downs, but doubling per capita income by 2030, not at all impossible. New technologies like synthetic biology leading to a new industrial revolution. We had Craig Venter here last month, talking about how we were going to re-invent the industrial society and be able to essentially make the next several billion people rich without destroying the world's eco-systems using new biological production methods. In fact we just – at a meeting the other day seeing literally the first bacteria producing diesel fuel, bubbles of diesel coming out,

basically these bacterial should diesel, and not a distant dream, but already out there today. So we could see major developments in the new infrastructure of clean energy. It's a bit like war in that respect, but a war on climate change that spurs growth and leads to high employment leading to narrowing income gaps. See growth in China continued to widen and deepen and may be even spread to South America and Africa. US would back off perhaps our missile base in Europe that's pissing off the Russians. A big thing is the question of how many of the countries really work within the systems of international institutions. And once could even imagine the evolution of new security organizations that come out of NATO, including the BRIC's Brazil, Russia, India, China; may be even a new global EPA coming out of Asia. These things could contain and limit ethnic violence, perhaps even begin to shape new forms of support looking toward Africa and Latin America. The brilliant new book by Paul Collier called The Bottom Billion, in which he argues that we need the equivalent of a Marshall Plan for the poor of the world. And this includes not merely aid, but also security support, because obviously what's happening in Africa and the big parts of the world are the kind of conflict that I think you talk about and without security structures it would be impossible to have levels of development. But all of that happens best in a multilateral context which I think can actually develop.

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□□□□□□□□□□So I think you can see how the momentum of history I think the last half of the 20th Century perhaps may carry us forward toward greater progress. And perhaps at mid-century we would look back and say, the world is more peaceful, prosperous, equitable and sustainable. And would thank Niall Ferguson for making clear what the hurdles were ahead. And fortunately we would find that unlike his pessimism we were actually up to the challenge and a better world was the result; thank you.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Well, it was a great pleasure to listen to Peter. It's my duty now to throw some questions at you. My first one is your faith in technologies – is of course critical to your argument. Isn't one of the difficulties that war was in fact the great driver of technological innovation in the mid-century and it's far from clear that technology necessarily and always has benign, pacific outcomes? In fact technology is strangely neutral about our future as a species. It can be as capable of destroying us as of enriching us and making our lives more comfortable. How would you grapple with that genus faced character of technology in human history?

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well I think you are right. I mean it's a both end. In fact if you look at – I am an engineer by education, not a historian, and if you look at the history of engineering it began with fortifications. I mean that's what the first engineers were about, building forts and then in building things to break the fort. So that's basically what it was all about. And so it's not a surprise that the frontiers of the technology are at the frontiers of warfare as well. And indeed – you know there is no question that the downsides, both deliberately and potentially, accidentally of technology are obvious, whether they are – as we have seen, nuclear weapons or possible biological weapons or all the things we are yet to imagine. So I don't have any doubt that the destructive potentials both today and yet in the future of technology are very real. That having been said it is also the case that much of what we have today take to be a much better life is a result of technology. None of us would want to go to a dentist of 1900 today, you know – you only need to think about what drilling would be like without anesthesia, to imagine – just to see the smallest grain of technological progress. But I think one of the best examples you can see is what's happened – for example the environment. You know I think it is one of the challenges ahead. But if you look at what's happened as a result of things like the clean IRAC and technology that's come along equivalent in the UK and in the United States. Today the air in the Bay Area is much better than it was 30 years ago; the bay is cleaner than it was 30 years ago. The fishing in the tents which they couldn't do 15 or 20 years ago. The air in London is – you know it isn't perfect, but it isn't like the coal smog of the 1950's. And we have made the automobile of today 90 percent cleaner than the automobile of 25 years ago. So you know I think it's a both end, I think

human progress depends upon enormous continuing advance in technology. We can solve the climate change problem I don't think we can end poverty without doing it and so on. But we can get it wrong. The bio fuels mess that's creating some of the rice crisis that we are having right now is a good example of getting things wrong. So technology doesn't automatically guarantee a good outcome, what we do with it is obviously what's critical.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□You have to acknowledge thought that much of the progress in medical science, you mentioned dentistry, but – but the progress in anesthesia, progress in that field was again accelerated by warfare.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Absolutely.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□And this seems to be to be – to be one of the recurrent features of our predicament that's – it seems to take a massive cataclysm to make our technological innovation accelerate. But there is a piece of slice of hand that I want to pick you up on. You simplified my argument by dividing the 20th Century into two halves, a very destructive half and a relatively less destructive half. But the book actually tries to avoid that periodization by – by suggesting a period from around 1904 to 1953 of – of mega death. And then there is lower level conflict, the third world's war in actually less populous places. The problem is the period before it that you don't say anything about. Aren't you ever worried that you might be like one of those pre-1914 intellectuals who said war is now impossible?

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□It was Norman Angell, wasn't it?

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Norman Angell was one, there – there was a chap named Ivan Bloch who argued the war has now become technologically far too destructive to be sustainable for any length of time. In fact there were a whole group of people who came to the conclusion that the technological progress that actually made great power war highly unlikely. And indeed you could see why they thought that, because from the 1870's onwards the amount of war – particularly the risk of great power was seemed to be declining, something quite interesting, the financial markets were much less nervous in the decade before 1914 than they had been in the 1870's and 1880's. So if we go back a little bit earlier, isn't there a sort of alarmingly similar scenario? I hate to use the word scenario – a period in which a futurist, a Peter Schwartz would have said, its all going to be fine, technology is going to solve our problems. We are all going to live in peace. And then 1914 come along, and the books are over remaindered. How do you address that problem?

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□A; the best example we can see is Palm Beach in 2000 for the kinds of events that could deflect history. And so unquestionably – I think you are right on this one. And – and I see very much the risk here. Indeed if you had been here in 1908 you would have been enthralled by all the new technologies, the automobile, electricity, radio, the telephone, airplanes, you know and we would have just had Einstein published – you know his epic and the world was about to change, globalization was very real, you know travel – and there is a famous quote you – you have the quote from Keynes that you know soon that – a man could go anywhere in the British empire and you don't even need any money, because everywhere it was all – good British sterling was available. So I think the analogy is actually rather apt and it is worrying. I think it is genuinely worrying. But I think it is a matter of choice, that is I think what we saw then and I think your book rightly argues it, was staggering misperceptions and misjudgments on the part of political leaders.

Now, indeed I think we have just seen in one of those catastrophes of misjudgments and incompetence on the part of political leadership play out in Iraq. And indeed those events are genuinely worrying, and I think you rightly pointed to where the biggest risks in the world lie today. And we have certainly exacerbated it. But it may be an opportunity for the world and we to learn a lesson – at a fairly high price I might add, but not as catastrophic as say Vietnam was in human death from our point of view at least. But having said that I think the analogy ought to give us pause because I think there is enough merit in it and then we ought to be thinking hard about how we not follow that path of kind of cascading events and misperceptions into a war no one wanted.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Well, I am glad you acknowledged the part of my objective in writing a book like The War of the World, is precisely to make sure that I am wrong. In other words that the objective is to force people to think about the historical process in such a way that they avoid War of the World the sequel. But there is a – a part of your argument that I am puzzled by and that is your – your optimism about the question of climate change. When – when you make the point that things have got so much better in England or in California that's because the industrial world has been relocated to Asia. And anybody who spends any time in East Asia will tell you that the precipice of old London are nothing compared with the kind of pollution that's being created, as a fifth of humanity embarked on a far more rapid industrialization than English speakers ever dreamt off. I mean this is all being done at breakneck speed and it seems to me that the optimism that you have, that this is all going to be resolved by – I don't know, microbes – diesel – it's hard to -. I have to tell you that the idea that that's going to solve our problems is a stretch for me. I really struggle. Though I am sure Craig Venter is a very smart guy. The law of unintended consequences tells me that his diesel shooting microbes will end up destroying mankind taking over the world. I don't know – I don't like the scent of any of this at all. You know, I know what H.G. Wells would say about those microbes if he were here.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well the – the issue of China and the environment and pollution is – is probably is one of the biggest challenges, not only for China but for the world.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□And how do we solve that? Because you didn't really say that they – they don't – aren't part of this wonderful new democratic network system of global governance.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Yes, they are, I think they are as a matter of fact.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Oh, I missed that.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well, in fact – what?

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□You know I thought they were still ruled by a Communist Party with a one party state and –.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Yes they are, but they are also engaged in a great variety of efforts already dealing with the

consequences of climate change both in collaborative efforts right here at UC Berkley for example, and in a network of scientists and basically technical people in a variety of different domains trying to deal with the shared problems that we both face. And for them the biggest issue is coal. They have got to clean up their coal, they have got to find ways to capture it, the carbon and sequester it, they need clean vehicles, they have exactly the same needs for technology that we do. And so my view is fairly straight forward. There is no – it isn't a done deal by any means. But very much the same technology challenges that they face, we face, and that we are likely to be working together in one way or another, or competing you know. But then driving each other to do other in that sense – to develop the technologies of things like clean coal and clean cars, because neither one of us will make it without them. And one already sees at least the seeds of that – in collaborative efforts, beginning.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□What if there is another outcome though? Let's build a scenario in which something much more like the past recurs, in which rival empires fight over increasingly scarce natural resources and do not adopt new and more benign technologies because it's just too damn difficult. What makes you so sure that we won't be quarrelling over coal and oil, particularly oil and natural gas, much in the way that in previous eras meant for wars over coal – or for that matter sugar which was a great source of energy in the – in the 17th Century.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well look it was access to oil that triggered World War II, you know – with Japanese in particular. So I think the risks are very real, though interestingly enough I think the risks are greater between say China and Russia and access to Russian natural gas for reasons of substituting for dirty coal, cleaner natural gas and the issue of – you know who really owns Siberia may become an issue, and that one worries me as a source of conflict.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Well I think at this point that the – the time is up and that means that I have to now – it's really quite a challenge, this. Its – it's almost impossible for anybody with jetlag to – to do. But I have now got to summarize Peter's arguments in such a way that he will say 'you got it'. So my understanding is that – that your argument is as follows. First that we – we both methodologically are engaged in the same activity, we use our imaginations, and we use our imaginations to try to draw inferences from past's data. The inferences I drill are about how the dead have thought and the inferences you draw are about your imaginary friends. And I have a very good doctor that you can see about that. So that's the first point.

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□□□□□□□□□□In a sense we are both engaged in challenges that require our brains computational part, to do things that no other computational part can do. And we are not actually ever going to be tremendously effective in that sense. The China question is the interesting one. You put that down to a failure of imagination. I think we should try and talk more about that, because it seems to me to be at the very heart of we are discussing here. And I still don't really know – if had I asked myself that question with a somewhat different set of historical assumptions I would have come up with a better answer than you. So that's the first point.

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□□□□□□□□□□The second point is, I am a pessimist and you are an optimist. That's how I interpreted much of what you said, and though you take precisely the same data that I take from the 20th century and come to a fundamentally Panglossian conclusion, where as I am Cassandra and all I can do is predict, yes, more carnage. I think is a legitimate point, though it risks discrediting us both. If we are simply writing books that express our fundamentally different temperaments, you the cheerful West Coaster, me the gloomy, despondent Calvinist scoff, then – there may not be any need to read these books. You just look – look at our bios on Wiki and say, he is a pessimist, he is an optimist, that's all

you need to know.

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□□□□□□□□□□So that – that seems to me to be a somewhat problematic proposition. I hope that I try to transcend as best I can, my – my temperamental difficulties, the Calvinist legacy is one that it's hard to shake off. But that's I think at the heart of the second part of your argument. The third and final part of our argument is that technology is the driver. In your approach to scenario building you always list a bunch of drivers, they are usually about seven or eight, but it always seems to me that the one that you instinctively want to put at the top and give prior place to is technology, which I suppose is reflection of your background as an engineer. And hence the notion that out of all the troubles that we currently face, there will be technological solutions and that with one bound – one bacterium, we will be free. Is that a fair summary of your arguments?

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□What do you think? Well -.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□I think it's probably an unfair summary of your argument.

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Oh well no. Well – the truth is in substance of course it actually is, except I wouldn't say that – in fact I think it is Panglossian versus a kind of Doer Scott. I think it is actually the relative weight one gives to the novel versus the methods of history, that the force – not methods, the force of history, how much, how malleable is the human condition? How much can we really reinvent what is possible? And my impression is you would give greater weight to the force of history and those things that are enduring and I might give greater weight to those that are more novel and that challenge some of those things that have persisted for a very long time.

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Just this one little footnote which occurs to me, one point that you made recently very eloquently is that you may live to be a 150 which – which is an exciting thought, though I am not sure our debate would be that good in 50 years if – I can't promise to be anything other than gaga if I am still around. But – but you know, if that is possible you might think that it would radically change our argument condition. Yet the lesson of history is that making people live longer doesn't radically change the human condition. We actually already have done this, because life expectancy at the beginning of the 20th Century – average male life expectancy even in developed or relatively advanced European societies were still amazingly low on our standards.

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□□□□□□□□□□Peter Schwartz:

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□□□□□□□□□□Niall Ferguson:

□□□□□□□□□□Right, so we got from 37 to where we are now, which in – even the more deprived parts of Scotland is still in the upper 60s. It hasn't I think radically changed the world, that we have achieved this. I don't think that we are in fact significantly more benign, I don't think our societies are significantly improved by the fact that the people live a lot longer. So this seems to me to illustrate precisely the point that you make; big changes in our technological or biological circumstances seem to leave us unaltered us human beings, and the dark forces within us that incline people towards active violence or irrational political decisions, which are tremendously important that, they don't seem to – we don't seem to be any wiser, we are definitely older but I don't think that we are wiser.

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□□□□□□□□□□Peter Schwartz:
□□□□□□□□□□I am not sure, you know you have people now who lived multigenerational, in other words there are people today who remembered the worlds of the 50s and the 40s and even the 30s and I think we have that process and possibility of inter generational learning far more extensively and far more deeply than we have ever have before, more 90 year olds who are around teaching their great grandchildren something of the world in which they once encountered. So I think that there is an opportunity – not surely universally taken. But I do see it happening and I see it happening frequently of this kind of inter generational learning that – you know we have lots of forgetting as generation after generation died and that we have to repeat the crisis that happened again and again. And not to say that there is universal learning, but I think that there is a kind of adaptive process that as we live longer we learn more and more deeply.
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Which – it sounds like an argument for the 71 year old rather than the 46 year old in the presidential election. But I will leave politics out of that.
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□□□□□□□□□□Kevin Kelly:
□□□□□□□□□□Leave politics here. You guys have been characterizing each other and what hasn't been mentioned is that Peter is an old STS and basically a liberal at cellular level.
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□□□□□□□□□□Peter Schwartz:
□□□□□□□□□□I was in Columbia, yesterday was the day.
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□□□□□□□□□□Kevin Kelly:
□□□□□□□□□□There you go, and Niall for a while – you were the darling of the neo conservatives in this country.
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□I am not sure I was, I was rather uncomfortable company for them, we can talk about that.
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□□□□□□□□□□Kevin Kelly:
□□□□□□□□□□Hoover Institution, I remember you were recommending in some Op-ed that John Kerry should win because he was so inept, that he would soon be replaced by a good Republican.
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Well actually what I argued in that article was that the George W. Bush was so inept that we really should replace him and not give him a second term. That was one of the more Prussian pieces I wrote in 2004.
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□□□□□□□□□□Kevin Kelly:
□□□□□□□□□□But is there – does pessimism and conservatism blend at all? Does optimism and liberalism blend at all? Is this all part of – what we were talking about, the site engineers and other liberal arts guy?
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□□□□□□□□□□Niall Ferguson:
□□□□□□□□□□Well I think if we are going to talk about our – as it were ideological priors as well as our cultural background, which – which historians are trained to do. I mean one tries to put ones cards on the table, full disclosure. I have done that in all my book, full disclosure, my grandfather was in the highland regiments in the trenches on the

western front, full disclosure, my family has substantial contacts and involvement with the history of the British empire, full disclosure, it's not a secret, I was an ardent Thatcherite in the 1980s, and certainly been seen as being on the right since then. Though I don't think in American terms I am a conservative at all. But this is word that means quite different things on the two sides of the Atlantic. I am a liberal fundamentalist. I come from the 19th Century Gladstonian tradition in British politics, the 18th century tradition of Adam Smith and the Scottish enlightenment. And I tend to make my judgments about political parties and political leaders on a fairly pragmatic basis, are they in favor of the free markers, and are they prepared to defend political liberty against regimes that threaten us? Those were the two key questions in the 1980's. I think that this – the key questions today. So I am rather weary of being classified as a typical pessimistic conservative because I see myself more as a rather old fashioned liberal – a liberal in the Scottish 18th and 19th Centuries sense of the word rather that in the Barrack Obama sense of the word.

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□□□□□□□□□□Kevin Kelly:

□□□□□□□□□□And Peter – and what kind of liberal were you?

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□□□□□□□□□□Peter Schwartz:

□□□□□□□□□□Well you know I think you – you put your finger on part of my history, but not on what happened subsequently. Indeed yes, I was STS and – you know if in the 60's you weren't you were missing the game, right? And you know you were there in your own forma, your own barricades as it were. That having been said what I happen to be was a lot of learning along the way, but not in the sense of you know a liberal mugged by history as it were, and now a conservative. What I began to learn was the nature of complex dynamics. I took my background of fluid mechanics and tried to understand how actually history works, how the future unfolds. I spent 10 years at SRI and it would be hard to – and I can tell you, it was a remarkable moment when I was in the boardroom of Shell thinking back to those moments when we were occupied in Fairweather Hall at Columbia or when I was in the executive dining room of the CIA thinking back to those moments, because I think my – process evolved, not so much ideologically but in terms of methodology, how I approached the question. And it was when I really began to deal with the question of uncertainty, moving from a world that was predictable in its fashion to a world that was both malleable and uncertain. And indeed, you know my background – look I think my friends know. I was born in refugee camp in Germany, concentration camp survivors, slave laborers and you have to be pretty churlish not to be optimistic if you climbed out of that kind of background, you know that your parents suffered what my parents suffered and where I began my life and to see what I have experienced that the world at least afforded me the possibility of, which I to