

This bell is from France. Good evening. I am Stewart Brian from Long Now Foundation. The introduction to the speaker is on the cards that you have, so I am not going to give one. I would always say that these cards are more functional than that. On the back, there is a space where you can write questions for the speaker and anytime during the talk or during the Q&A session, just pass it down the _____ someone wearing yellow card, one of the volunteers, and they will pass it up and I will process them and then raise your questions with Peter at the end. We ask you to put your name on the questions, so when I use the question at the hemispheres, I will call your name. This is helpful for Peter if you stand up at that point, so he can see whom to, kind of direct his answer to and we can all see, who amazing questioner is and then we will go ahead with the answer and we will see what happens. They are also good for putting your e-mail address on the bottom, whether or not whether or not you have a question in case you just want to get notices for these further talks as they go along. There is going to be one every one month on the second Friday somewhere here at Fort Mason for the rest of this year and we hope further and an easy way to keep track of that is through e-mail and we will send you book references and things like that. One advantage of doing a series as you can keep improving, the production values or the way it works at the timing or some of the amenities, and so if you want to make suggestions, your comments are there and handed in, that also would be very well welcome. They all will be carefully read. There is one slight bug, which Kevin Kelly here has pointed out, which is that when you write something on there and handed in, then you no longer have this wonderful schedule over the next talks, so you are allowed and encouraged to trade for a blank one with the volunteer or someone next to you. I should mention that the next talk is the second Friday of the January, which January 9, 2004, and it would be George Dyson, who is a pretty much formal scholar now of computer history, and like Peter Schwartz tonight, is bending his thought in completely new areas, and looking at how very large scale computing is going to effect very long term thinking, and that talk is called "There is plenty of room at the top". That one will not be here. Unfortunately, this is a beautiful space, but we cannot get it every month, and one of the reasons for the shoe slide outside besides making the rain beautiful is to write e-mail where the venue is at Fort Mason on each second Friday. That one is going to be back by the very entrance, where you come in to Fort Mason area. I think it is called the Golden Gate, somebody correct me if it is wrong, and it is right at the very front of the first row of buildings as you come in. That is where George Dyson would be on January 9, 2004. I think that is all for the right now and we will come back with questions and good things later. In the meantime, please welcome Peter Schwartz.

Thank you Stewart. As you can imagine, it is a real privilege having Stewart as a friend and collaborator over the last several decades. Stewart remains one of the most important and creative assets of the San Francisco Bay Area and it is real treat for me to be here this evening as a result. Before I get into what I am going talk about, just tell how many of you were here last month for Brian Stock. Yes, so this is a heavy Brian _____ crowd. That is great. What I mean is that you have not heard me saying things a hundred times before. Some of my friends are out there and they are going to sleeping for about seven or eight minutes. I have never given this particular talk before, but the one thing I wanted to say, Brian of course is also a very close friend and he talked last month about something called big hear along with the big as a long now

and he talked about the example of having gone to a party in the New York and feeling that the hear was a very small hear and that in his community, he wanted to feel a big hear, and just, you know, if not be yes, you go for a walk with Brian in his neighborhood, which Kathleen, my wife and I, and Stewart Bryan, and a I am sure Kevin have all done, and everywhere you walk everyone knows Brian and Brian knows everyone. Of course, everywhere, you can imagine, at every café, at every shop, at every bookstore, everywhere you walk, Brian is a part of his community. He is not a reclusive rock star hiding behind walls and bodyguards. He is very much in the big hear of his community, so he lives what he talks about. Okay, what I am going to talk about is this idea of really long view and why. Well, for those of you who may not have noticed down the lobby, there is a book called *The Art of the Long View*, which I wrote a little over a decade ago, in which I sat out some ideas about how to think about the future and that comes from the work that I have been doing over many years, mostly with large organizations, lots of companies, some governments, some foundations, with Stewart and a number of other people and a company called Global Business Network before that it shell, in which we had a process called scenario planning, that was about taking the long view, but in the course of the development of the Long Now and Long Now Foundation and the kind of things that we were engaged with, we begun to think beyond what is the normal time frame of most organizations, which at best is measured in the few decades. More typically a few years, even less in recent years, but the long view for a lot of places is 5, 10, 15, and maybe 20 or 25 years if you really foresight it, but we are really trying to take a much longer time frame, so when Stewart asked me to give this talk and we talked about I should talk about, he said, well you know, had you take that really long view. What you do if we really want you to take long view seriously and so I set out to try and rethink the ways in which I approach the future if one takes a much longer time frame seriously, centuries, millennium maybe, rather than a decade or two or three or four. So I am going to try and set out to notions about how one approaches that problem. What do you think about why, and had you do it and what you do about it as a result. And I think it is a kind of fundamental premise that, you know, the future exists, but it exists in our mind. The future that actually is the future we believe about the future. You know, what is going to happen tomorrow. You know, may be some day physics will discover that yes you can go in the future, actually it exists out there somewhere and you could travel in time. I believe, you know, it not too hard for me to imagine that the past actually exists, but in fact the past is no more substantial than the future exists at the moment only in our mind and it is irretrievably gone the moment a few seconds ago has gone and the future has not happen yet and so both the past and the future are there in our minds and we act only in the present based impart on our experience of that now imaginary past and that future that has yet to come to be. So all of this is really in the end about the present. It is about what we draw from the past and what we imagine about the future and how that influences what we do right now. So that is what this is really all about. I ask the question then, so, why bother thinking about all these. Well, I mean it is the most Monday level, the world can be a better place or worse place in the future. You know, most of you believe that is the bottom line of it that we want to make a better future. But what do we mean by better, first of all. Well, first of all, I mean it in personal sense, you know, it is level of the individual, at least in two ways. A better material life and the usual sorts of things, health, security, comfort, pleasure, you know, the kind of things that money can buy to some extent as it were and then a better inner life if you will, purpose, community, sense of belonging, intimacy, all of those things that make a person feel like life is worth living. So it is, you know, the combination of those

things in a personal sense, but better is not enough if it is just, you know, life is pretty good for me, but, you know, screw the rest. Well, that is obviously not what we mean. What we also mean is better in a social sense, in a much larger sense, and here I mean one idea above all else with a long run as opposed to in the world immediately at hand and that is better means having more options for the future, creating more options for the future. Put most simply, it is living the future as good or better than we found it. Okay? It is about leaving the future preferably better than we found it and this is where a lot of follows come from because we may actually be failing at this test. Our forefathers and my parents gave me a great future. And in the future that I inherited is really fabulous and I am not at all convinced that the future I am passing on to my son is a great future and I think that is the part what we are worried about. You know, there have been other generations that have screwed up, you know, the generation that probably created and then settled World War I. They deserve a lot of blame for what happened over the next several decades and you know _____, depression, and World War II and factious and all that kind of stuff. Then they blew it and so they left a pretty bad future behind them. We are at risk of doing the same thing, of not leaving a better future for our children. So then the next question is if that is the what you are really trying to accomplish, can you actually do any thing about it. You know, those what we do actually matter. The human faith actually matters. We had a little seminar last night of some of the sponsors of this series and some of the Long Now people and Denny Hillis put it very well. He said, we might as well do something about the future because it is only thing we can anything about. I mean just the most Monday level that he is absolutely true. Now whether we can do anything about the future really depends upon what our view of history is, how we understand, how and why the world happen as it does, and here in part is how long is you now and how big is your hear. That is the part of one stage to take into account, and as I said earlier, it really is, in my case tonight, centuries, may be in the few millennium, not decades, and how many of you are old Whole Earthies?

Yes there are some hands. Some of you may remember the name, Dick Raymond. Dick was the founder of something called the Portola Institute in the 1960s and it was the kind of first institutional home for the Whole Earth Catalog. Dick said something very wise. He said, this was a while ago, he said, you know, if it does take 50 years, it is not worth do it, and more recently, he said if it does take 200 years, it is not worth doing. I think that is actually very important idea because it takes once ego out of it. Somebody just brought me a great idea for changing the world and said, you know, this is going to be done right now, you know, this is the moment it is going to be done, and there is only one reason that this is the moment it is going to be done, it is this is moment, but his now is very short, very short. And the things that really matter take a long time and as far as whether human agency actually makes a difference, one of the kinds of actual history that I enjoy is virtual history. You know, asking the question what if it had been different. There is a British historian Neil Ferguson, very controversial and conservative, wrote the book Empire arguing why the British Empire was a good thing and why we ought to have an empire, but we are lousy at it, so you Americans cannot do empire is his hypothesis, but he wrote in earlier book called the Pity of War, and in the Pity of War, he asked a very interesting question. He said what would have happened if Briton had not entered World War I and he basically comes to the conclusion, interesting enough, you would agree with him or not is another question, but it begins to address the question of human agency and that is, he says, alright suppose they had not entered the war. Well, what would happen? Germany

probably would have won and unified Europe and then gotten EU, may be a German speaking in EU, but an EU 50 years earlier. The Brits would have kept their empire 600,000 young British men, creative energies and talents would have been applied to the further fruits of British Society. Britain would not be impoverished, no _____, no depression, no factious, no holocausts, no Hitler, etc., etc. Really bad choice to go into World War I, was not it. Well of course at that moment one could not see it that way, but it does say something about human choice and how one frames the problem, how one frames the context, and what it means in the long run. I am not arguing that he is right. I am simply arguing that it raises fundamental questions about some of the kinds of long term places that we make. Now, I would say that the history of the last millennium and certainly the last probably 10,000 years suggested what people do matters. That by and large we have made progress. I mean just think about, would you have like to going to dentist a hundred years ago and you would answer that one pretty quick. On the other hand think about this, my babies you much prefer to go with dentist a hundred years from now too then today. Human progress I think is very real, it is very real. It has been true for the last ten thousand years. It is been true for the last thousand years. It has probably been true for the last hundred years. Now we would begin to questions, many elements of that, but by and large more people live better today then ever they lived well in the human history. Literally several billion people despite the fact that several billion people live in desperate poverty, several billion people are living reasonably well. Now in Bryan's talk, he suggested various categories at the great pictures of the pessimist, the Pollyanna and so on. Now in fact we can read one of sponsors of these last night said, somebody really quit wonderfully said denial is a special case of optimism. I really liked that. I am the other kind of optimist. I think I myself is realistic optimist. I am realist optimist, but I am optimistic, you know, I was born refugee camp in Germany. My parents were concentration camp survivors. Life is infinitely better for me, my son, you know what I have been living through versus what my parents lived through, you know its real hard not to be optimistic when you have that kind of context you got be a real cynic if you don't see life as progress after you live that kind of history. Now having said all of that about you know the fundamental impetus of history you need a theory of the history, why things happened, the way they did do, and in this sense, some of your probably science-fiction fends, the enterprise were engaged, and here is a little bit like the foundation trilogy and Harry seldom, so you can think that as the long know of literature and argol like there is a nudge to the future a little bit. Now in the title of my talk it says it's the art of long view, so I am concerned about the methodology. How you actually think about it? And so that is one of my purposes is to think about how one thinks about the future. I do something called scenario planning, this is a tool, which has been around for a while, number of decades, it organizations thinking contingently about the future. That's what its about thing where different possibilities a great rocket scientist. So I can say that with absolute authority I am actually rocket scientist by education. This is not rocket science. Any view, who get the New York Times may have seen a piece in the opted page on Monday by film, Barbit on why the white house ought to have been doing scenario planning. What if we got it wrong in the rack, just for example. And what we tonight is not scenario planning, but most of the ways of looking at the future having something in common, and this is true for the kind of work that I do as well. Every time you look at the future wonder for whats the question. You know, what you are trying to answer, very simple idea. What are the long-term forces and how do they interact? What are big uncertainties, how do these forces play out and light up these uncertainties. What all might that mean and what should I do as a

result of all that. So in this particular context what we need is the theory of long-term dynamics, why do things happen the way they do. Some ways to play those out and validate those theories, you need some kind of senses of what the consequences of all that are, and then what should I do as a result. So I am going actually going to try through that tonight and try to answers some of those questions. What is this way of thinking about the long-term future, how my goals are play out and what should we do? So first of all, here with history, I get a lot of sense of dynamics. I read a lot of histories, I read history and science. Those are the two things I like of read. I see history as a long run struggle, in which humanity is involved in this constant struggle to create human systems that help us to avoid killing each other too much, sometimes its not a bad idea. Exceeding the ecological carrying capacity we get avoid doing that. We have to give meaning to life and enabling us to do great things, the struggle, you know don't kill each other too much. Learn to live with the ecological capacities, give meaning to human life and be able to do really cool things. Built the feeder of going of the moon, do great art, etc. Now my hypothesis is not novel, it is very obvious one that over the long run it is powerful and sometimes even good ideas that have been humanities most powerful weapon in this never ending struggle. Now that's not a new idea. Lots of people have argued that I mean haggled, etc. in philosophy and many others they did that really human progress is really about the progress of ideas. Ideas about nature, how nature works, ideas about how societies are to be organized and about the nature of human beings and a lots more. So its really about the history of ideas and if you think back historically then we get lots of examples from history. Imagine the first guys to in cave painting and mixing pigments. Means one think when you take you know a slab of kind of rough chalk and you spit on the wall, but one day something sat down, and said, you know, if I take this occur and this hematite and this charcoal and chalk and I mix it together I can go cool paintings on the cave. And if you have seen, even though at Lascaux, you get to see is a fake Lascaux, it is still an astonishing and surprising and amazing and think about the act of what it was like to sit there 14 to 15 thousand years ago. We were reminding if pigments 42 thousand years ago in Africa. That somebody was sitting was mixing pigments and putting out on the wall. The first counting device was 37 thousand years ago. The first tools 40 to 50 thousand years ago. We got stone block building 10 thousand years ago in Persia and India. Bow and arrow about the same, agriculture in Asia about the same time, the ploughs is happening then. Domestic sheep in a rack about that time in 8700 BC. Now all of that interesting enough by the way of course triggered by global warming. Global warming is beginning of civilization, may be the end of civilization but is also the beginning on civilization, coming out the ice age, being able to settle down create agriculture, create cities and villages and so on for the first time. Set a fleeing glaziers all the time. And before that we were living in very voluble climate, so in fact global warming triggered modern civilization. Around 5000 BC we got first cities or riding in Sumer 3500 BC. Hieroglyphs in Egypt soon thereafter. The wheel, 3000 in Mesopotamia after life in Egypt comes long about same time. Hammurabi comes up with basically the written code in Babylon in 1790 BC. One of the interesting inventions, we will come back to them later on, I mean how kept the forth pics the god autumn is the sole god in 1000 BC. And then of course, you know, these great ideas, they vanished. The mid ovens revealed the remarkable civilization truly height of civilization, bad luck however they live on a island with a volcano. Now I think, our equivalent might be the asteroid, we will come back to this later on, but you know you can have great ideas and bad luck which is what have to be in mid ovens. In this senses will some ideas matter a lot in terms of what we imagine in the history. Cosmology actually matters in the long

run. I mean in the geocentric universe, you did one set of things, suddenly when the sun is the center you are going around the sun, you start answering to those questions differently, you imagine different possibilities, the future looks very different. And of course once you discover that the sun is one of many suns and that it's part of the galaxy in part of galaxy of the many galaxies and now you are into a real universe. It's a really big thing. You have sense of who you are is now very different. Now or even it may be multi versus right, you thought either staler travel either universal travel wooh. So cosmology actually does matter. You think about the space route for going around the universe I mean with the laws of physics or different. Really interesting problem. Now, another list of these kinds of ideas which is suggestive is a new book by Charles Murray, Human Accomplishment, I don't pretty like the book. It's basically a statistical defense of dead white European males. Why they are the source of most good ideas? Not surprising comic from Charles Murray, but his lists of interesting ideas is interesting and this is part of list argued with the rest, but from the art, artistic realism, linear perspective, artistic abstraction, polyphony, drama, the novel, meditation, logic, ethics, aerobic numerals is not yet oh list up there. The mathematical proof, the calibration of uncertainty, I really like that one statistics. The secular observation of the nature and scientific methods, all of these equaled major inventions because they elaborate other inventions. They enable people to do more with them, they are not static inventions or so. So this is part of what we are talking about, what we talked about, we talked about the evolution of ideas. Now in the volume of ideas, I want to talk about, what we actually think about, not instinctual behaviors. So the divinely and the outking versus the top dog in the try. You know the guy who got the records was bigger than me and than everybody else as supposed to the king to inherit his medal from his father who inherited the guards, and was all story about. So its that kind of different. Agriculture versus hunting and gathering. So I plant these seeds that thing grows as supposed to Ohh that breed the thing on the tree, it is really cool. You know different model. So its that actually cognitive thought process so for where developmental process, what I mean by well built ideas. And were interested in two classes of ideas, powerful ideas and good ideas, they are not necessarily the same. Powerful ideas persist and spread over centuries, that is one of the important characteristics that they take hold for infections. Sometimes these powerful ideas cooperate with other ideas and sometimes they compete successfully or not with other ideas. Science and technology mostly cooperate. New scientific principles, create new ways of discovering new science, so you learn about optics, you make telescopes, you discover astronomy so on. So they feed on each other. In that world, of course, the religion is simply the objective control and apology, but science and religion mostly compete and in that world science lives in side of much bigger box that it cannot explain called religion. Very different views of nature of both of these and the relationship depending on which way approach him. Now in terms powerful ideas were interested very much in evolutionarily powerful ideas. These increased options and they have to be many and diverse, so if you really want a lot of powerful ideas we need lots of them. We want evolution, their isn't just one set of good ideas and it be highly competitive, and of course we also need to protect the options we already have as well as to create new ones. But it is important to realize the powerful ideas or not necessarily the good ideas, indeed very bad ideas could be very powerful. Consider the kind of collective hallucination if you will. Friends and 911 just to take an example, a lot of friends. And if you will know better a book is very popular friends that explains 911 in very different terms. A Kathleen would remember the dinner we had with the very dear friend. The prominent French

businessman, well education, travels the world, speaks English fluently, written several books, vice chairman of one of the France's largest companies. A man of enormous sophistication, married to a Korean wife at that time, well we get the dinner, you don't really think that airplane flew into the Pentagon, do you. What do you do mean Robera. This is well, of course it was the CIA, central cruise missiles, this is actually an internal war between the CIA and the defensive department. That what really happened and the Americans are under a profound delusion, that this was the Arabs, they could have done this. You know, this is the man you have profound, this is the bad idea, very powerful bad idea. The culture of victimization in the Arab world, the final solution, Maoism dooring the call for revolution, colonialism. Colonialism tells us about how bad ideas changed. But of course one could have argued, I wouldn't, but some would, that colonialism was a good idea for while, but how did it end. It ended when we dually germinated the ideas, we stopped believing at it. Somewhere in the 1930s colonialism from being legitimating institution, which governments could organized the world, they do no longer remain legitimate, and the people stopped defending colonialism. It only became a matter of how quickly and by what means you decolonialize. The idea became delegitimated and that's what happens to ideas and powerful ideas, they become legitimate, oh yeah. It was the CIA that attacked building in France, or they become delegitimated as in colonialism for example. So by the good target for delegitimizing now is intelligent design, it is one the list. Another bad idea. So good ideas on other hand improve a lot the human host that host these ideas in terms of better, I mean all the things over there are about better, and what would really trying to do is increase the good options and help human hopes to that over the long run. That is really what's about and good ideas are affirmed over the long time. They reveal reality they are not a hallucination. Reality ultimately confirms to the ideas of wise person but, the ache that the kind of collective hallucination. Now for a good idea, it also has to be powerful, so you need powerful good ideas and examples of science, art, law, these are all-powerful good ideas. Now if that is the case, so where do ideas come from. Why and how do ideas develop. Well obviously one thing is they come from the ideas before them. Were sitting on the big map of ideas. Alright.

We do not have to worry about where the original idea was the OOOHH! Ideas. Somewhere X thousand of years ago in the past somebody had an idea. We will be on that point. We do not have to worry about that. But, the past dependency of ideas is important. That is the sequence of development of ideas. You cannot get the molecular biology until you had biology in chemistry. You need both to be able to create molecular biology. So, the history of idea is a long and we are going to come back to that in terms of what we think we all to be doing. Now another source of big ideas of course is the problems to be solved. So, where did the moon go when it disappeared? Why did that tree grow or you know how are babies made? You know why should I protect those other people. We asked ourselves lots of questions over human history and that is where a lot of ideas come from trying to find answers to those questions, the problems to be solved, some practical some theoretical.

From where the thunder comes from?

What are those big lights come from?

Either they going down or up?

I do not know.

No other important words the guide use other new tools. You know you could not do a lot of astronomy till you had a telescope or microbiology without microscope, but tools could be conceptual. Einstein needed modern mathematics to do general relativity to get some special relativity to general relativity, a friend taught him Romanian geometry until he had those tools he could not literally develop the mathematics of general relativity. Many viewers read recently about the work at Carl on the celebrating expense from the universe. One the biggest discoveries of the last century. Why you need Hubble telescope to be able to do that. You need the Keck telescope. You need the supercomputers to count the supernova and so on. So, the new instruments conceptual and physical give us new ways of developing ideas. And here I am not going to say too much more about the future because we can be pretty confident going few you know on well into the future that our conceptual tools will become ever more sophisticated for mathematics, more complex, more subtle, higher dimensionality, and so on. And our instruments, things like microscopes, and telescopes, cameras, and so on will enable to see much further. They will see things that happen much faster, much smaller, in more dimensions, and so on. So we can be confident that over the decades ahead we will see all of those kinds apparatus, conceptual and physical of the science continue to get much, much better. Stuart and I worked on the DARPA strategy for quantum computing, and the computer revolutions hardly begun, started to begun, it's certainly not over. We are only seeing the first step, we are at the cart, you know the horse and cart before the jet plane, and gone even the jet plane, might be the automobile. So think about your PC has horse and cart of the computer era. And then of course finally the source of big ideas is Eureka moment of an individual, "Wow! What a big idea". And a wonderful book, if you haven't read; it is Einstein's clocks, and Poincaré's maps by Peter Galison from Norton Press. And it has helped both Einstein thinking about time and motion, and Poincaré's thinking about maps and time, or trying to map time on the globe. Came to the concept of relativity and absolute time same time mathematically in almost identical ways in two entirely different contexts, but within a few years of each other, operating one in Paris and the other in Zurich. It's a wonderful tale of that Eureka moment of an individual, but happening at the same time, and it says something about the context of ideas. So, all of that is to set up in a sense that the theory of history and ideas, and now where does that take us going forward? What would we do with that sort of concepts? Well, I said what I think is for me that the tool that one wants to use conceptually for trying to explore really long-term future and that is the challenges and problems that we need to solve. Where are the great big ideas that we need, that we don't have? That will set the agenda. So what I want to talk about now basically are the ideas that we need that we have not got yet. And that will help us shape some of the evolution of ideas. Now, I think physical ideas, which will spent a little bit of time are easier to deal with here. Because what we believe matters, you know, if I drop or break, most of the time it will fall and we get pretty confident about that, but social idea is much harder because what we believe matters, what we believe about the gravity doesn't influence gravity. What we believe about friends, neighbors, family, identity, self, society actually does matter. Do we believe everybody has human rights? Well then we might actually have human rights. If we believe slavery is appropriate, well we will have slaves. So what we believe actually matters, and that makes it much harder, because reality is valuable in that world. Reality in Afghanistan about what

constitute human rights, not long ago was very different than what we believe about human rights here in America. Reality in that sense is valuable. Now an interesting way to think about this is that I have always found very helpful, was what Paul R. Ehrlich said many, many years ago. And he came up with the fundamental equation that I think frames a lot of long-term challenges. I think in a very simple, elegant, and articulate way, and he said the impact of human activity, environmental impact of human activity is the product of three forces; population, the number of people, affluence, how well they are living, and the technology they using to live. So, how many people you got? How do they live, and with what technology? And that tells you a lot about the environmental impact, you are going to have a few people, living very simply, with very little technology, not much impact. Within a lot of people, with lot of technology, with very efficient, and also not with impact, but a lot of people with crude technology, and trying to live high is a lot of impact. So, that is the basic concept, and you can begin to organize a number of fundamental challenges if you think about each of those elements over the long term. So, how we answer each of the questions that are now going to pose in terms of the Ehrlich equation, which just $I = PAT$, population x affluence x technology. So first of all the population. How many people? Well, of course interestingly enough for when I was seeing is that the near future is probably taken care of. As we talked about last night, our generation is probably the only generation in human history that will ever experience doubling of the species in our life time, except may be the number one or two, your know couple of hundred thousand years ago. They might have experienced, but we are the only ones in all other generations doubling took longer than a single life time. We are the only ones since roughly 1950 who doubled, we will not get doubled again, we are the only ones who did it. Says something about our how prolific we are. But it also says something about absolute numbers. So in fact the likely scenario over the next two or three hundred years is one of peaking and decline, and the question is will 200 years from now we will have enough people, not to if to many people. But if you really think about the long run, you can come up with kind of four different possibilities. One is a world of very high population, 50 to 100 billion people, lots of people. That's the population density in which basically the whole world looks like Switzerland, okay? Think anyway you got Europe, France, UK, the whole world looks like you know Europe, and maybe at its best if you is going to think about it that way, but that's what the whole planet will have to be like. That population density on every square foot of land on the planet for it to reach something on that order magnitude. Second very different feature is the world of say a few billion people one to two billion, sort of like now, maybe a little less, maybe a little more, but about like now. But one can easily imagine a future of course, and which is much smaller, a million people, you know. That might be a bad future with the survivors or might be we just got to an ultimately very low level of population, and with highly sustainable we got you know 100 thousand-acre Hosianders to live on. And then of course for complete list one has to look at the scenario where the answer of population is zero, nada, okay we could wipe ourselves out in next 10 thousand years and there is a long history of that. So those of the four population scenarios that one wants to think about, very big, sort of like now, quite a bit smaller, and zero. The next question one wants to answer is the question of human nature. Is bad behavior the result of evil or poor mental health? Put more simply, was Hitler evil or sick, right? Very different view of what the human condition is and where would it going to end up as a result of the answer to that question? You know if is the answer better mental health or stronger religious values? To solve the future do you try to become more adept with psychology or do you pray more? And it makes the big difference. Because if it is mental

health, well then you can imagine you solve this problem in the long run. And that poses one kind of challenge. But if it is evil then that's going to be a struggle between God and Satan, and we will be dealing with it 200 years, 500 years, 5000, 10,000 years from now. It will still be on the agenda. And those are 2 very different visions of the future. Is it all about God versus Satan or is it all about solving the problem of better mental health? Not claiming I know the answer to that question, I have my own view. But that's a different question. Related to it is the issue of reason versus faith. Is the future going to be mostly a world of faith? And if you look at the numbers today, you will have to say that's where we are headed. The guys with the faith are having more babies so the demographics are on their side. The reason by the way United States will become much more religious is all the moderate sex stopped having kids, and all the really militant sex kept having babies lots of them. You know the Southern Baptist and the Evangelicals are all having kids, and all the Methodist and Presbyterians stopped. It's true. Just look at the numbers. That's why we have a very religious society in America, and the Europeans stopped having babies too. But the Moslems haven't. And so the people of really passionate faith are the ones who are growing in number. So it is not impossible to imagine a world of, in fact if you actually look at this, this is a really wonderful example of the forecast that I do not think can happen. If you look at the growth rate of Mormons, by 2085 everybody in America will be a Mormon, right? That is not a criticism of Mormons, you just look at the size of Mormon family, look at the growth rate and just project it up at roughly 85 years, and 100 percent of US population will be Mormons. I don't think that is going to happen, but you know who knows. So you could have a world mainly of faith, you could also have a world mainly of reason. So finally the religion is really a kind of an interesting artifact of history and it's time to move on, which is where most of the Europeans are today, part of their cultural heritage, but 14 percent of people goes to church as compared to 75 percent of Americans. What are you going to do if both reason and faith in distant future, anyway we have read science fiction. It is a wonderful novel called "High Period" in which the distant future, the Catholic Church is still really added. It's a wonderful set of politics built around the role of the Catholic Church, thousands of years in the future. They had been around for thousands of years, they might still be around for thousands of years yet to come. But you need a very different vision in the future, depending upon how you answer that question of reason versus faith, good and evil versus mental health. It will lead you to question, and you think about good ideas and powerful ideas, "Was God a Good Idea", is wonderful book biography of God if you have read it, I recommend it. Certainly God was a very powerful idea, it is mainly a western idea. The dove is not the monotheistic God. Buddha wasn't a monotheistic God. This is really our God. Earlier on it was certainly almost certainly a helpful idea. Thou shall not kill, Thou shall not steal, all those kinds of good stuff, and God will smite you if you don't. But unfortunately God also was about smiting the nonbelievers, and there was awful lot of smiting going on, and even still we do awful lot of smiting in name of God. Now that might lead you to the question of maybe it is more harmful now, the idea of God, unless you are into the world of good and evil, in which case you have to recapitulate this new regeneration every kid has to get on board with God and Satan all that, and so God remains as a good idea. So you come to very different conclusions in terms of your theory of reality here. Another big issue that we have to solve is citizenship and governance in mega societies. You know I really enjoyed the San Francisco Mayor election. Right now I don't live in San Francisco, I live in Berkeley, where you know we recently had a shift to the right city council, the _____ has throw out the mallets, and the Leninist have now

got the Scepter, but in San Francisco, actually this was a great election, it felt like democracy really at its best. You could even argue the recall, I wouldn't, but you could argue the recall was an example of that, but it was democracy to scale which where people could really relate to the communities to the choices. There was a meaningful sense of democratic participation. Gosh, it is really hard in America to feel that at the national scale, and essentially impossible so far to feel that really at a global scale. How do you create real global citizens? How do you create institutions at a global scale? When we created the constitution with three million people, 13 colonies, Europe might be more interesting example. Here they are creating a new system of governance with 500 million people, highly developed, and in a continent that was used to killing each other in a very large numbers for most of the last couple of centuries, and really the European union is about peace and war not about economics, that most Americans don't realize. It is about the friendship not killing the Germans and the white persons. That's really what it's about. It is about war, it about talk, rather than killing. It is about binding the Germans and French together and ways to keep the Napoleons, and the Hitlers at bay. And still do and that was the European union is all about. It is about peace and war, but we have not developed those kinds of mechanisms at the global level and I think that is one of the really big problem. How do you develop that? How do you build countries and how do you fix broken ones. You know, we have that problem that now, we broke it, now we got to fix it in a rack, so we do not know how to do that, another big problem. I think one of the really big ones for the long run is that we need an equivalent of the rule of law for human relationships to ecosystem. We develop the rule of law to organize and constrain relationship among people. Law defiance and it shows our basic rights. Tells about what human rights are, it prevents the strong from dominating the weak and embodies the sense of fairness. It embodies a view of the human condition, divinely endowed rights for example. This was really brought home to me a few years ago, Catherine and I and _____ and _____ Harvey were travelling in, what was then Soviet Union? Some of you, all loved to remember the Soviet Union. Eurine Boscow just has to Gorbachev and come to power. Late one night we are meeting with a Soviet resident, a rock musician and I asked him question, how would you know that Gorbachev revolution had been successful and he said they would publish the laws and I said "what do you mean?" Right now power is arbitrary. If I read a book and they do not want me to read it they can put me in jail and I did not even know it was illegal to read the book. Law is about breaking the theory of arbitrary power and right now our relationship to ecosystems is arbitrary in that sense we do not have a theory of law and underpinning of relationship to those ecosystems, and sustainability maybe the objective, but we do not know what that really means except for increasing options, I think it is evangelical for the environment. I have the right answer, you know, they shall not destroy God's creation, you know that is the kind of statement of law. If you believe in God and you believe in that, that can be kind of relationship, maybe they got the right answer, but history tell us that conflicts arise among people for three reasons fundamentally. Honor, fear, and interest. About honor, about fear, and about interest. We want to read about Donald Kagan's book on the origins of war gets into this length. Now the rule of law in a conventional deal sense deals with the first and third. We can deal with the honor, we can deal with the interests with respect to law, but the fear. Fear is really about exceeding our carrying capacity, not having enough, and a wonderful book that Stuart Brand has just turn me on to in and everybody is "Constant Battles" by Steven LeBlanc in the below and it is about the history exceeding out carrying capacity and going to war as a result and that has been a normal human condition. So I am not really worried about the near term, I

think we can deal with lot of our short-term problems with technology, but it is really a long run, where we need a fundamental nuisance of the equivalent of the set of law of the rule of law and this I consider one of the great intellectual problems that we need to address. The idea, the really big idea that we do not have. I think another interesting one is knowledge organization and access, you know just learning so much. When I was an engineering student, I was an astronautical engineering student, but I had to learn fair amount of computer science and you know we still had slide rules, but we were the first to have IBM system 360, that was really big deal really going and punch cards and all that stuff. So any engineering student learn computers. Well I have been the part of the National Commission on the future of engineering as part of the National Academy of Engineering, called Engineer 2020 and where we some inclusion that an educated engineer of 2020 not only needs to learn computing, but he is to learn life sciences. I took no biology when I was an astronautical engineering student. Now if you want to be a literate engineer you need to understand the processes, mechanisms, models, metaphors embedded in life science as much as you do computer sciences if you are going to be a capable engineering going forward and that just going to keep happening more and more. They are fortunately I think a lot of this will get taking care of the blue force by AIs, so this is not a problem that I worry too much about. Now there are numbers of science and technology questions on the real kind of needy-greedy science side that we need to address. There are five that are at the top of my list that will pose the problems for the long run that if we saw of will have very different kind of future. A number one that was obvious is the control of matter, energy in biology, making it increasingly a matter of choice, so that have been the trend over the last several thousand years, but the question is to be really in hold of control of matter at the atomic and subatomic level to be really hold of energy in fundamental level and they will really manage to get control of biology. The future is very different if that happens and my guess is the answer is yes then that all of those will happen in the matter of the near few centuries. The next one is understanding the long-term and short-term dynamics of climate change. Climate change is probably the biggest crisis we face in the near future as a civilization. We maybe seeing global warming, I doubt it, more likely it is that we are going to see warming leading to abrupt cooling, a possible another ice age that I consider more likely scenario, but I am not clear. Many of you may have seen the report of the New York Times earlier this week that maybe the human agriculture 8000 years ago already began to produce enough CO₂ to begin to change human climate and we have been actually warming the world for the last 5000 years and avoiding another ice age because of putting CO₂ in the atmosphere. So, maybe we are going to burn all those hydrocarbons and prevent another ice age. Maybe we get rid of hydrocarbon really fast and prevent another ice age and I do not know which it is. We got to answer that one real soon and that are really big one, because getting that one right matters a lot. The impact of abrupt cooling would be the lower the carrying capacity of the world by probably 50% that is about what the impact, so that is the second one. The third is real life extension. The world is going to be very different depending upon what happens there. We are going to square the curve for sure. What that means is the more and more people will live out to the maximum of human life span today, which is about 120 except by the cell doubling process. The maximize life span that we have ever measured is about 121, 122, there is 160 year old we know of now in Japan and we will certainly live more healthy, youthful lives all the way. They are more useful to do that, but the interesting question do we breakthrough the 120, 150, 180, 200, and immortality. Very different nature of the human species if we think about measuring our life span in many centuries

for essentially endlessly think with those for the human psyche and is it crazy when the last century the base of doubled human life expectancy. We went from roughly 40, 45 to 85, 90, think about if we just double that again in the next century at 160, 170 well beyond the normal maximum. So it is not doing any sense any more that we have already done. The next one is cheap clean energy. World is very different if we get a cheap clean energy if we do not and here I really want to take a really long view. What have really run out of hydrocarbons? We have got probably another century of oil and gas. We have another 500 years of coal, but so far we have to get the alternatives to hydrocarbon. Hydrocarbons are cheap and easy. They are dirty that is the part of the problem, so we need to get a clean alternative. We cannot probably solve the world's problem of solar, wind, or nuclear. So there is nothing on the horizon today that will power the world when we really start to run out of hydrocarbons and if you think in multi-century terms that is what we need to be thinking about. We do not understand the physics of fusion. There are all kinds of problems with nuclear. The energy density is associated with solar, I mean just how much energy falls on the earth. The amount of energy in the wind and so on that we can need the power of world of several billion people at least, we do not know what to do. This is a really big one. So figuring out what happens after hydrocarbons are gone, 500-year challenge. Then the final one is space life. Are we an earth-bound people or we space fairy. We do not have the answer of that one yet either, cheap space flight is not accessible. Firstly, we do not know how to get there cheaply and we have just discovered radiation turns out to be a bigger problem than we thought. We will have space colonies. Will we able to go faster than the speed of light or we stuck in our solar system or we are going to be galactic or intergalactic travelling people? Do we mean ETs or not. Are we along in the universe or not that is very different view of the future and do we protect ourselves against the asteroids. Rusty Striker is going to talk about this in a couple of speech. He is going to talk about this subject very important problem. One of them could be the wildcard that wipes out everything else. So those are you know my five candidates for the really big problems to control matter of energy in biology, long term and short term climate dynamics, life extension, cheap clean energy, and ultimate space flight. So what are the possibilities for the long-term future, what we can have high population high-tech world. Lots of people living well using very advanced technology that is one possible scenario. Another one is high population, how lots of people living miserably that also possible you know can control the population. Low population utopias, you know 100, 000 acre housing or the primitive survivors of say the asteroid collision and then of course the world that we are earth bound or galactic beyond, so what is that leave us in terms of what we should do. Well, in this wrapping it all up, first of all, I think we can help guide the ideas of the future. We can have debate and discussion. Stuart and I were the part of the process both for nanotechnology and hydrogen developments of laying out possible pathways in the future. What we did nanotechnology over a decade ago, it was bad science fiction as far as the most of the science community was, and even George Bush signed an act creating the national office of nanotechnology only two weeks ago. This was an idea that went from the crazy fringe to the dead center of science and technology in a decade. That is a very powerful act, so helping fraying the pathways of those ideas into the future something else we can do it. These discussions that we have here in San Francisco, this is one of the great centers of intellectual development of the world in San Francisco Bay Area. We help to shape those ideas, nanotechnology began here in the bay area. It is one of the great centers of it. You may have seen in today's paper, they picked 30 innovative companies in the world, the guys in Douglass.

Two of nanotechnology from the bay area, Nanosys and Nanomics, helping shape those ideas here is a very powerful thing to do. Focussing on what we think, I mean I may laid out my candidate, ideas of the big priority problems helping to shape better gender. How does that actually happened, well these kind of conversations that we are doing here some of you were learned the sciences will know the Gordon Conference taking place for many years that have helped shape the sciences in chemistry in biology and so on. These kinds of conversations shape the agenda over the long term. So we can meet from time to time to produce more and better ideas, help find the pathways forward, help to figure out what the really big problems are, where we should be headed now. It is the conversation of the long now if you will. So what I am basically suggesting is, when we morn better ideas, lets start and sustain that conversation lets act on what we just learned and if you do all of that then there is a chance that we too will live the future better than we found it. Thank you very much.

Ok we have got some questions here and more coming I hope. One from Alice Toi.

Question is what strategies can you recommend for helping the developing world to think that more of the long view? It seems like in many places media, the immediate needs of survival greatly overshadows any long-term thinking.

That is a very good and very hard question to be honest and I would not presume that frankly to be able to give a simple and easy answer to that question. That is something that the people have worried about for long time. What I would say is I think that the conditions are different in different parts of the developing world and the answer is not same everywhere. The challenges of the some the countries in Asia are very different than those from Latin America and are still different from those of Africa or Central Asia. I think those societies that have reasonably affective and functioning governments have at least the possibility and prospects of engaging in precise the kind of debate or discussions, what the kind of right strategies are and might make progress. You know, Brazil is a good example of a country like that. Mexico is the another example. South Africa is another example, but much of the world most of Central Africa, big parts of Central Asia have either corrupt or incompetent or essentially no governments. Liberia today effectively no government. Those parts of the world need something different and the answer for those parts of the world is not at all obvious. It is not simple and I do not claim that I know what the right answer is. So I guess my view is that it is very much on what happens on ground on those places, but the first thing you need is a functioning society, a functioning system of governance and if you do not have that you cannot get anywhere else. I think, and so the great challenge for example in Africa is recreating a fabric of society and recreating a fabric of nations of governance that know what to do, are confident, and not corrupted or not principally about violence and unfortunately a long way from that in most of Central Africa, but that is the real challenge I think in places like that. In Brazil, Mexico, Venezuela, Columbia, there I think the challenges very different. They are much more conventional, education, infrastructure, and traditional rule of law and so on. Honest courts, honest government and the answers are very straightforward and very simple and you see examples all over the developing world of countries have done a pretty good job of that. Now Costa Rica being a great example for it. So, the picture of what to do when you have a reasonably functioning government, I think it is pretty clear. It is the other cases that are much harder.

Peter, you were in the peace core in, I guess, Africa, still recommend that as a thing to do.

Yeah. I served in the peace core in Ghana in 1968. Yeah. In fact somebody just asked me that question. A good friend's daughter is about to go off to Senegal and so she asked me that I think it was a good idea and I said yes if you want to learn a lot. If you want to change the world and help Senegal, forget it. But if you are going there because you think you are going to learn a lot and come back a better human being for it, it is a great experience. If you think you are going to fix the problems of the developing world as a peace core volunteer, very unlikely. You may make a marginal difference and that may be worth doing, but if you think you are really having a significant impact on the societies, I do not believe it.

Do you say, I am sorry if you following this, but I think there is a threat here. Do you stay in touch with other peace core volunteer, veterans?

Yes. There is a whole society. How many PCVs here?

There you go. I am not surprised.

Peace core? Good luck. Ghana 7.

I think the peace core volunteers are amazing of subset of people out there. They know each other and have a sense of being able to make impossible things happen in impossible circumstances and they come back and they get in to public office and they get in school boards and thinks likes that and they are very effective. So I think it feeds around a lot.

Okay here is a question from Jim Alexander. Will you stand up? Thank you.

You expect that this would be intelligent design. Why is it a bad idea? He has switched dimensions or we are at the edge of discovering.

Well, you know, I could be wrong about that. So let me say right of the outside. I could be wrong. I stated a personal opinion, so I will grant that those of us who are basically atheist in which I would put myself, do not need a theory intelligent design to understand the evaluation of the history of life or the history of universe. That having been said, we could be wrong and the science might sit inside a much larger box in a simply inexplicable in the terms of science and I am prepared to admit that that could be true. It is not the world, which I see personally. Having said that, I believe that in fact the intrusion of that mode of explanation in to the science is neither constructive for religion nor for science. If people want to be believers, I respect believers and in their cosmology their view of reality is appropriate to that context. I do not think you need to bring that context to explain physics for example or biology. It is enough. You know there was a great cartoon a number of years ago, many of your would have seen it, it showed two professors, had a blackboard full of equations and so on, and then finally by half through the equations, he says, "and the miracle happens here" right? Well, that might be case, you know, and that might be true and those of us who do not see it that way might in the end

have to accept that a miracle happens here as far as the equation, but at the moment, I do not see it is necessary and I find it problematic where we try to make science work in the context of religion and vice versa. I am happy to take a response there if you would like.

Oh. No, no, I mean an ideological term. I do not mean better products. No, no, no. Sorry, miscommunicated here. Intelligent design is the new word for creationism in education. So instead of advocating creationism being taught in school, instead of Darwinism, we want to have intelligent design. See they really wanted God as such that was actually pulling strings. There was some kind of intelligent design in the whole thing and that's the evidence for some higher being behind it. No, no. Its not a better toaster.

Unintelligent design is an another whole subject. This one is from Jina Roccanova. This is topical period. California's Water Initiative System (Ooh! a lot guarantee in funding for poppies, I love poppies) that one seems to faster and institutionalized short-term narrow thinking. Is it possible for reform this system or we need to scrap it altogether in order to think long-term.

That is the great question, I think the referendum system the way we now operate has his problems. I could like the idea of the referendum, but the issue is not so much that we have the system, it is how people used it and how we manage that kind of debate or lack of it. So I would actually put the problem not with the referendum system as such, but the politicians, Howard, being a perfect example at Proposition XIII being the extreme case in modern California's history of, you know, really _____ till you die and without any concern it is solved one short-term problem. The problem of the elderly under property taxes by creating a vast problem for the future. The problem was not that we could vote on it, the problem was the communication process, and no politicians got up and said, this is a really bad idea and had the courage to do it and since in the last almost 30 years since it's passage, no one would get up and say that was a really bad idea and lets change it. So it is I think the issue of the referendum. It is the politicians who mold with almost no exceptions. Well, actually the one who tried to do long term thinking, quite a lot of flat forward of course was Jerry Brown and it became governor Moonbeam as a result.

Here is from George, neatly printed, will the evolution of the physical bodies fall behind technological advances.

I think it is a really interesting question. I think it has already happened. I think that is done deal. That is that, I think, human evolution is now functional of human choice, accidentally or consciously. That is that what we have already done and what we were going to do. I mean it is already happening. In fact we were discussing this just the other day. I think it was one of my Long Now colleague, but may not have been, might have been Kevin you said these about what happened in the early days in the first few centuries after we got organized agriculture, that is the human stature went down because we stopped eating the kind of things we did when you are hungry, you start eating corn and too much corn and too many sugars and so what and for several centuries we actually shrank and then what I reverse so I want to pack up again. The point is simple that we have already been the agents of lot of human evolution for the last 10,000 years. Now that we are more conscious of it, we can actually manipulate and enter the human genome

in variety of ways. It is done a deal. We are going to shape our future revolution. There is going to be multiple human species on the planet well before the end of this century and we are going to see a proliferation of types of humans and even if we do not want to do in America, it is going to happen all over the planet. So if you think about thousand of years, there will be many forms of humans they would be mostly of human design.

Do you believe we can reengineer ourselves and our nature to ensure more ideas and better a future in your terms.

Well reengineer that is less clear to me if that one means in a very literal physical sense. It is obviously clear that we have already as society created institutions, education, institutions of higher learning, research organizations, financial incentives to develop new ideas. I am a venture capitalist. You make lot of money with new ideas, you get powerful with new ideas, you get girls with good ideas. You know I mean good ideas are very powerful. So we have lots of incentives with good ideas. So, we have created institutions already. Now if you are asking the questions whether we are going to in a sense re-engineer the human mind to make it more powerful, I think the answer is yes. I think in several important ways, I mean, one just simply cognitive powers, memory, simply ability to absorb and retain more information and I think that by the way is not distant, that is quite imminent. The drugs that are now have been developed for treatment of Alzheimer's for a person who is not deficient somehow, but would like to improve particular short-term memory. Variety of cognitive techniques that I think are likely to improve and then finally the perception. The part of what we deal with is the world that we see and hear, but we know that is only the part of the world. We have instruments to take us beyond that, an ultraviolet, infrared and so on, large, small. I would not be surprised to see us re-engineer our perceptual suite so that we can see things that we cannot see today, hear things we cannot hear today, feel things we cannot feel today and submit that it is a different thing to experience those than as to see it on a screen or read about it, or look the data field, but imagine what it is like when your eyes can see across a much wider spectrum or you can hear across a much wider frequency range. We can see at a much greater distance, thousands of miles for example. I suggest that we will be thinking differently when that happens and I think those are our inevitable, so I think we will get more intelligent, have better memory, and increase the range of human perception, and all of those will happen. Those may take a bit longer than life extension, because I there are some intellectual problems in that like how you see.

Here is the rest of that question away from anonymous who may not wish to stand up. With the increase of ideas and options, do we also need idea killers and option killers to avoid an overflow?

We got a lot of those. We have got so many idea killers and option killers, but what we do need actually is intelligent critic, because as I said there are lot of bad ideas, you know, there is lots of bad ideas. Simply having an ideas does not make it a good idea and so I think what you need in a society is in fact a really to open debate about ideas and you know healthy level of criticism. A part of the problem is Soviet Union was you could make ideas official. The Lamarckism become an official ideology of science that transformed and part of our problem now is we have faith-based foreign policy. Yes, the Iraqis will have love us and we have faith base science policy,

knows themselves are bad idea and so on and so on that clash I think is a very real. So, I think those kinds of transformations of the realm of ideas. I think as long as we have an open society and we do not let anyone particular sect dominate the critical realms, that I do not worry too much about it.

How do we hold futurists accountable.

That is a really good question. First of all, you have to ask the question to somebody about the listening, I mean accountable to live? I mean it is one thing for me if we to be flapping my mouth. It is another for anybody taking it seriously. I have been here for 31 years. We wrote a book on some of my early work and I think Paul and I would both agree and it is an embarrassment and we learned a lot along the way. I think the way you hold me accountable, look at what I said. Did it make any sense? Did it hold up? Did it have any value over the long run? Did anybody gain anything useful from it? Was it anyway helpful? Did about things before they happen in anyway influenced anybody to do anything better as a result? Even if you are curious about the future, but I am in this business because I want to make a difference today to make a better future, so the question is did any of that happen and that is the real measure of accountability. You know, do we make better choices as a result. It is not did you get the future rights. If you have multiple scenarios like I do, it easy to get the future rights. It is much harder to make a difference. The easy part is getting the future right. The hard part is getting about it to do anything. So, if anybody do it again, then you can be really held accountable.

What good will you do us to live 120 years and beyond if there will no pensions, no jobs, compensate for the lack of tensions.

Well, what I mean is that you have to actually work much longer. I am serious. Three years ago, the retirement age in America went up to first time in history. What up again this year? Now, the two reasons it is such happening, one is your 401 case or 201 case. So, people have less money and they are beginning to get the sense that they are going to have to live longer, but the other side of it is that the people are healthier, more vigorous, smarter, more able longer than why retired at age 65. They want to keep doing stuff. They want to be more vigorous. They want to start new careers. One of our partner is Nippier Collins. He is 75 years old. He retired from Shell at age 60. He then retired from a second company at age 64, and he opt to start in our company and there is no eminent sign of retirement. Does he need the money now? He has a passion for what he does and that is what also the lot of people are finding as they are getting older. They have passion, not for what their career was, so may be for something else, they do it. Some people have to work longer, so on. But people could have said that you know in 1910 what are people going to do if they live to be 70 and the answer was that was really important issue and we did not solve it.

In 1910 what are people going to do if they live to be 70 and the answer was that was a really important issue and we did really solve it till we got social security in the 1930s. So, we created new institutions of higher education, we changed our laws about retirement, and so long, and I think that is what will keep happening. I think this was one that we will adapt to and it actually would be huge virtue otherwise. The people will live longer, be more creative, more productive,

contribute more to society, our families will have more generations engage, our children will learn from the grandparents in ways that they have not. So, I think this is a great boon to society, not a step back and just as, you know, the fact that my mother-in-law is now 87 years old and got the chance because we started our family late to impart love of painting to my son who is 13 and sadly my mother who died at 65, and did not make it to 87, got to impart only nothing, but her genes to my son.

It is too late in knowing this so I will get both questionnaires standing Jeffrey Parone and Jim Carnell. Carnell's question itself has two questions.

In your experience, are the majority of corporations doing long-term planning as:

1. Financially responsible and pragmatic.
2. Some kind of moral imparity being pushed on them. The related question from Parone is Transnational Corporations are already in global institutions although flawed? How do you think the Internet will help create new ones, for example smart mobs that make a difference.

I will take the first one. Say again.

In your experience as a majority of corporations doing long-term planning is.....

So first of all, the majority of corporations do not do a long-term planning. Lets should be clear about that. That is the great majority. Is probably for those companies long term is measured in months, maybe a few years and that is probably 75% of companies, something of the 3/4 and 2/3 really do not do any serious long-term thinking. They might do a bid of capital investment planning that goes beyond a couple of years, where they are going to build the next factory or something to that effect and a bid in their R&D function, but very very few organization or companies do really serious long-term thinking. So, I would put it a somewhere like 25% to 30% of the total population of relatively large company.

What are examples of the corporations that do the long-term thinking and did well?

Shell that I used to work for BP, Toyota, Honda, and Sony.

They did, I am not sure they do right now. I am not close enough to know to be honest, Du Pont.

How about among government's to government's departments?

Well, the best long-term planning government in the world is Singapore. There is no question about that, best planned company in the planning. Singapore is very low in company, extremely happy shareholders, about 6 millions of them and very happy, but to answer this specific question, well the truth is that most companies, _____ you planning are driven by profits, they are driven about making money. There are a few beyond that who take a moral imperative seriously. Most of say that they do, but they do not think about it in the very serious way. Most would say we do not want to break the laws, we do not want to do immoral things, we do not

want to harm the environment, we do not want to hurt workers, so most would say that they do not want to do, but very few take that idea and go much deeper and more seriously and thinking about what this have really mean, how this would effect their behavior, how this would effect their operations, how this would effect their long-term future, what are they going to do to be seen and actually be in a sense a responsible organization and those you can count as a handful. You know, you can name most of them. They are not very obvious, and there are, you know, among smaller ones are many more, but among the large ones they are really, you know, may be a few dozen that fit in that category, say Fortune 1000 around the world and that might be exaggerating when I say a few dozen. It might be a dozen in that category. But I did not answer the second question.

Well, the second question was corporations are already extremely global though flawed, is the Internet going to bring new global institutions that make a difference?

Well, the Internet already is a global institution makes a difference, right the person should get going, you know in fact it was Gorbachev, in fact you were at the dinner, Stewart, when Gorbachev was here and somebody asked him why did the _____ and he said oh it was a PC in the satellite dish. You know, it was when our people suddenly had access to the world. So, you know, this is a nearly universal solvent of transparency and the Internet I think is, you know, irreversible in that respect.

There is a question from Mr. Steve McKinney. I am seeing this question since 1962. What is the future of work and leisure?

The leisure society....

Rather the leisure society and leisure revolution, what are we going to do with all in turn?

And the answer is, you know, I think that was flawed idea, the idea of a leisure society.

One of the things that we learnt is that our desires expand to fill the available resources?

We did not have to get big houses, we did not have to get second cars, we did not have to have nice vacations, you know, there was a choice we made and we developed the income to meet that standard of living. Nobody made us to go to the mall, you know, nobody made us get SUVs and as a result we now have a much higher need to work. Families have higher need for income, we have a standard of living that we have aspired to that requires that. You know, there are people who choose otherwise and as a result they have leisure, they work part-time, they work in varieties of ways, they do not work as much as others of us do. You know, few of us are fortunate work we love and, you know, work passionately because the things we really care about. You know, you can call Stewart on a Sunday afternoon and I know where I will find Stewart most Sunday afternoons is in his office. Is that because I am whipping him as a colleague, no, it is because somebody has just sent you something incredibly interesting to read, he has got to respond to it, and you know, he would not dream of not being there. So, there are

some people who are fortunate in that way, but for the rest they feel an obligation because of their lifestyle that they made a choice about.

Well the unemployment rate is now around 6%. The peak, you may remember in the last session was 9%, before that the previous peak was around 10% or 11%, so this is actually as low as we used to think it was going to get to and then we got it down to 2%. I think the current unemployment is largely a cyclical phenomenon and that within a fairly short order as it was only a few years ago, anybody who really wants a job would be able to get the job. The question is not why the people did not get jobs, the question is going to get jobs that matter, jobs that are in the sufficient income, job that generate sense of value, meaning, and purpose in life and income adequate to what they aspire to, that is a different question. Jobs as such

You know, the historical idea of kind, you know, gardening and self-development, someone will. We do not think about how many go to school part-time, you know there is a huge self development market, a very, very many source, so that has actually been true, that has been one of the big hunks of leisure that has actually developed is the self development. I think that is true. What we mean by work and what is a job is changing.

I forgot how to pronounce your last name, Paul. Unintended consequences played prognostication. It sounds like in the Latin. How do we model the effects of technologies, we don't understand, for example what does the scenario look like for the negative play of genetic engineering?

It is a great question and the answer is you have posed I think one of most difficult intellectual problems. I reasonably often get these things wrong is precise because the context itself is changed by the phenomena that we are trying to describe and you have named I think a wonderful example in terms of genetic engineering. Stewart and I were talking about, I posed a kind of example, he told me I was wrong, he is probably right, but he could be dumb down biological DNA so we end up with kind of a Gray Goo scenario that comes out of account of decay of natural DNA because human beings have so mucked about in the DNA of nature. Well, Stewart made the argument that now in fact there is an enormous amount of self correction in the system and that, yeah he may get some disruption, but eventually it will come back, that after even massive dial off we still get experiment.

You were trained as a rocket engineer, I was trained as a pilot, is not it? Rocket engineers do Gray Goo all time.

Exactly, we get it wrong, but having said that I think frankly what it really requires is inactive enormous imagination. To really try and imagine what it would be like if things change fundamentally. Some of you were know that Stewart and I and few others worked on a film called Minority Report in which we described the world of 2050 and we gorgeously excluded almost all the biological developments we thought it were going to happen in that timeframe because we thought people would find it so weird, so crazy that it would become the whole story a dominate everything and we wiped out. If you saw the movie, there is only a little bit of kind of real biology in there of some moving plants and so on, all the rest is fairly conventional. We

do a lot of other technology, but no really advanced biology. Quite unrealistic, but because we thought it would show freak people out frankly. In terms of reaction got serious about what are the things going to happen.

We are getting down the last couple of questions, here are the two late ones, starting with a Chris Rand, other is other than the Long Now Foundation, what are some other long-term looking, thinking organizations and another question of an enormous nature to stand. It is hard enough to organize people in the voting in election. How do you organize them into taking the long view?

Organizations, you know, I think there are a lot of interesting organizations Santa Fe Institute would be an example of somebody trying to break new ground in science and trying to raise fundamentally interesting questions, a lot of, you know, good research organizations which hold just in take one which is doing a lot of work and brought climate change. I think a lot of, let me call, activist organizations that I think have traveled done things that are really quite fundamental. I think the best among the best is Amnesty International Human Right watch that have really changed the contacts in which we, you know, confront human right around the world witness, another one started by Peter Gabriel. So, I think, you know, organizations that are doing good research, breaking really fundamental new ground in unconventional ways, I mean that is the only conventional research universities and so on, but the guys were really out there on the edge and then others who are doing what I think of is really good works, but in a way that is very simple and focused Amnesty as one purpose to expose human rights violations and torture around the world and you know they have been enormously effective as a result. So, I have a great admiration for those kinds of organizations.

The last question is actually a process question, which will close with. It is Eric Milik. So, it is can Bryan talk video be posted for the several hundred of us you did not make him to hearing and the relative question of course is people did not make it tonight for the traffic and the weather in the zone, do they get to see a video of your shots. The answer is they will all be posted in various streaming forms both in audio and video on the Long Now site, they are not yet, but stay tuned and also we hope to see many of you come back next month, January 09, 2004 for George Tyson and I hope you it will be around 2 p.m. Thank you very much.

You should be great.

Thanks a lot.