

THE ECONOMIC CLUB

O F W A S H I N G T O N, D. C.

Bill Gates, Chairman of the Board of Breakthrough Energy Ventures, discussed investment in technology to address climate change, and his work in global health and education.

**Bill Gates
Chairman of the Board
Breakthrough Energy Ventures
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DAVID M. RUBENSTEIN: For about 20 years or so, you've been the wealthiest man in the world. But because you've given away so much money, recently Jeff Bezos became wealthier. Do you think if you had stayed in college and gotten your college degree – [laughter] – I mean, you don't feel inadequate now, because – being only the second-wealthiest man in the world, is that right?

BILL GATES: No. I mean, it's a sign that I haven't given the money away fast enough to drop out of the top 10. [Applause.] You know, and the market's been strong.

MR. RUBENSTEIN: Actually, the market has been strong. Microsoft is up 35 percent this year. So, to what do you attribute that?

MR. GATES: The company, you know, is doing super well. Satya Nadella's a great CEO. You know, the whole dream of the importance of software has really come true. The five most valuable companies in the world are these technology companies. Microsoft, you know, has a good share of that. I get to spend – about a sixth of my time now is over at Microsoft.

MR. RUBENSTEIN: So recently you said that the biggest mistake you've made professionally was that Microsoft should have had the Android technology. Why was that the biggest mistake?

MR. GATES: Well, when you're in a field – you know, we were in the field of doing operating systems for personal computers. We knew the mobile phone would be very popular, so we were doing what was called Windows Mobile. We missed being the dominant mobile operating system by a very tiny amount. We were distracted during our antitrust trial; we didn't assign the best people to do the work. So, it's the biggest mistake I made in terms of something that was clearly within our skillset. We were clearly the company that should have achieved that. And we didn't. We allowed this Motorola design win, and therefore the software momentum to go to Android. And so, it became the dominant non-Apple mobile phone operating system globally.

MR. RUBENSTEIN: But today your market cap is the highest in the world. You're the only company over a trillion dollars. So how much better could you have been? [Laughter.]

MR. GATES: Well, market cap is only kind of an indirect thing that in an imperfect way will reflect what the company's doing. Microsoft would be far more valuable if we had won the mobile operating system competition. Android is a huge asset for Google.

MR. RUBENSTEIN: Recently I had a chance to interview your wife, Melinda, who, with you, is the co-chair of the foundation that you set up. I'll talk about that in a moment. And she described how you met. And she said that you approached her in a parking lot, and you asked her for a date. And you said: In three weeks, we could have a date. And she said that wasn't spontaneous enough. [Laughter.] And then she gave you her number, and then you called her right away and said: How about dinner tonight? Is that spontaneous enough? [Laughter.] And is that true? Or is that apocryphal?

MR. GATES: That's close to true. [Laughter.] I had a dinner that night that got done at about 10:00. So, I called her up and said: OK, let's meet after 10:00. Which apparently that was spontaneous enough.

MR. RUBENSTEIN: OK, so it worked out.

MR. GATES: Yeah, it did.

MR. RUBENSTEIN: OK. So, let's talk about what you most want to focus on today, which was Breakthrough Energy and what you're doing in the climate change area. And everyone, I think, knows that you've set up a foundation. We'll talk about it later. But your two main areas of focus are K-12 education in the United States and healthcare in the least-wealthy parts of the world. Recently, you decided to make another effort not necessarily through your foundation but through Breakthrough Energy to try to do something about climate change. Why are you so worried about climate change?

MR. GATES: Well, the – climate change is a problem that gets worse every year. And yet, what you have to do on a global basis is very dramatic in reshaping the entire physical economy that we have. The greatest suffering from climate change will be farmers in poor countries – that is, the droughts, the floods, the heat will cause the problems we already have of malnutrition and depravation to get substantially worse. And so, it's a very complex problem. And it's a problem that fits where I see my value added, which is looking at something through the lens of innovation. Not just the R&D part, but the creation of products and the deployment of products. And so, helping to educate people about, OK, what are the sources of these greenhouse gases and how do you get on a path of innovation so that you can get global adoption and actually bring emissions down dramatically? You know, I have that now as a priority, to articulate that along with those – the other two that you mentioned.

MR. RUBENSTEIN: But is that part of your foundation, or you're doing this outside your foundation?

MR. GATES: OK. The part where you mitigate and you help the poor countries with better seeds, and better policies, partly through development aid, that is through the foundation, that mitigation part. The part where you invent new ways of making fuels, electricity, cement, steel, meat – that is done directly by me with a lot of investments, including the fund that you mention, the so-called Breakthrough Energy Ventures is a fund that I assembled a group of 22 people to put money into companies that are trying to commercialize the breakthroughs.

MR. RUBENSTEIN: All right. But that's a fund of \$1 billion.

MR. GATES: Right.

MR. RUBENSTEIN: You put in \$250 million. So, can \$1 billion really make that much of a difference?

MR. GATES: A billion? It's actually been very catalytic. So far, they have 20 investments. Late next year we'll probably raise another billion to a billion and a half. You know, this is all about innovation, broadly defined. You know, we need to make these dramatic changes. And right now, the premium – if you said, OK, you have to make steel with no emissions, that steel would cost you four times what steel does today. Your electric bill would more than double if we just take the technology we have today. So, yes, supporting those companies, and drawing other investors in.

One thing Breakthrough Energy has done has gotten a lot of co-investors. Green investing didn't go very well in the first round, and so it looked like a field that might evaporate to some degree. Because these come in and have been able to bring a depth of understanding to these things, not only have they been able to invest, the first billion will be fully committed within the next year, but we've gotten other investors. So that's gone quite well. And the technology – they only invest in companies that have a chance of reducing greenhouse gas emissions by a half a percent, each company. And, you know, they've found 20 and I'm sure they'll find another 20.

MR. RUBENSTEIN: Now, I'm the smallest investor in that fund, I think. So, am I going to get my money back and make a return, or? [Laughter.] What would you say?

MR. GATES: I'd say it's – of the things you invest in, it's probably one of the higher risk things. It is being done on a commercial basis and we're likely to have a few significant successes. So, it's not philanthropic in the sense that you can deduct it. [Laughter.] But the timeframe of the returns and the riskiness of the returns are fairly high. So, we do expect to make a profit out of that fund.

MR. RUBENSTEIN: OK. So why do you think some people do not believe that there is such a thing as climate change. What is propelling them to say there's no climate change. Is it scientific evidence or some other political reason? I won't mention anybody, but there are some people who don't think that there is climate change. [Laughter.]

MR. GATES: Well, you know, they must not have taken enough science courses or something. I don't know. [Laughter, applause.] The climate is a complex issue. And you know, just understanding how you do the abatement requires a lot of in-depth study. In the United States, it's become somewhat of a partisan issue, which is unfortunate. You know, it might make it harder to achieve the type of agreements we need here in the United States. But you know, we have two problems. We have the people who deny climate, and then we have the people who think it's easy to solve. And we need to help educate both of those groups.

MR. RUBENSTEIN: All right. On climate change, it used to be called global warming. Why was it changed from global warming to climate change?

MR. GATES: The problems caused by the greenhouse gases is worse than just the average temperature going up. It causes there to be extremes of precipitation – that is, more floods and more droughts. And so, people thought just that warming piece, it's too easy to think, hey, 2 degrees centigrade, big deal. I'll, you know, turn up my air conditioner. And so, the idea that

it's sea level rise, it's heat waves. These things are – climate change probably is a better term to capture the breadth of problems.

MR. RUBENSTEIN: But in the history of, you know, human civilization, is there any evidence that people will do things that will affect their great-great-grandchildren but that they won't see the benefit from? In other words, if you try to eliminate carbon in the atmosphere, you can't really do it in your lifetime because the carbon's kind of trapped there. So maybe if we change our policies 100 years from now there might be a reduction, or 40 years from now. But very rarely do people want to do something that's going to help their great-great-grand unborn grandchildren. So how do you motivate people to do something?

MR. GATES: Well, the United States actually, of all governments, has been willing to take on very difficult problems, like cancer, and make gigantic investments knowing that the real payoff would be many decades down the road. You know, when that was first being pushed, you know, people were saying, hey, this is important. Climate change is like that, where you've got to take a long-term perspective. And government at its best is when it's taking that long-term perspective and funding the basic R&D and the policies that lead to scale deployment.

MR. RUBENSTEIN: So today if we do nothing with respect to climate change, will the oceans rise up? And if you have oceanfront land is it going to be underwater in 20 or 30 years?

MR. GATES: Not – well, the uncertainties in these models are still fairly high. And so, for example, by 2100, the question of whether we have – do we have one meter of sea level rise or do we have two meters of sea level rise? That's within a level of uncertainty. Now, those numbers as it's been studied more and more have gone up. Before the IPCC¹ only took the most conservative view, which would have been about a half-meter. Now the understanding is, OK, it's at least a meter, and significant possibility that it's two meters.

MR. RUBENSTEIN: Now, a large part of the carbon we have in the atmosphere now is caused by the electricity grid, which is about 25 percent or so.

MR. GATES: Exactly.

MR. RUBENSTEIN: So, 24 percent, it comes from agriculture and forestry. Why is that causing such a big increase in carbon?

MR. GATES: Well, that category is a variety of things. When you clear land, you're taking the carbon that's stored, say, in the trees or plants there, and you're releasing all of that – like, burning the land, say, in Indonesia for palm oil plantations. Another thing is that cows and other grass-eating species have a digestion system that emits methane. And methane is a very powerful greenhouse gas. And so, cows alone account for about 6 percent of global emissions. And so, we need to change –

MR. RUBENSTEIN: Cows?

¹ IPCC - The Intergovernmental Panel on Climate Change is an intergovernmental body of the United Nations.

MR. GATES: Cows. Just cows alone. [Laughter.]

MR. RUBENSTEIN: How are we going to do that?

MR. GATES: Well, actually, of all the categories the one that is gone better than I would have expected five years ago is this work to make what's called artificial meat. And so, you have people like Impossible or Beyond Meat, both of which I invested in –

MR. RUBENSTEIN: Do you eat it as well? Or do you like it?

MR. GATES: Absolutely. You can go to Burger King and buy the Impossible burger.

MR. RUBENSTEIN: All right. Is it healthier for you, or just healthier for the atmosphere?

MR. GATES: It's slightly healthier for you in terms of less cholesterol. It's, of course, dramatic reduction in methane emissions, you know, animal cruelty, manure management, and the pressure that meat consumption puts on land use. You know, the main reason why we need to increase the agricultural output over the rest of this century is not the population increase. It's that as countries get richer, they eat more meat. And meat is a very inefficient way of creating calories. And so, it's super helpful.

MR. RUBENSTEIN: Now, with respect to solar, for example, is solar a solution to our problems?

MR. GATES: It is part of the solution. If the sun would shine 24 hours a day –

MR. RUBENSTEIN: It does.

MR. GATES: [Laughs.] Somewhere. Then that 25 percent, you'd have a solution. So, wind and solar are very helpful. And the fact that the price of those have come down quite a bit. But people think – may think that's a total solution to that electric sector. Electricity, unfortunately, has to be reliable. It's got to work during, you know, say, the 10-day period that Tokyo, who needs 23 gigawatts of electricity, has – you'd have no solar and no wind for, say, 10-day periods. And so, the need to have baseload generation, like nuclear, our others, or to have a miracle in storage so that you can save that energy is very high.

The final solution to climate change, when we really get to zero, a lot of things that use hydrocarbons today, like natural gas heating of buildings or homes, will shift over to use electricity. So, one of the necessary elements is to get electricity to zero. But the electric sector, even in the U.S., will have to more than double in size, because transportation, and buildings, and industrial applications that have used hydrocarbons directly will shift over to use electricity.

MR. RUBENSTEIN: Well, on the electric grids, that's been in the news lately, with respect to what we might have done in Russia. Do you worry that if we have these big electrical grids in the United States, they could be subject to being knocked out by some kind of cyber terrorism?

MR. GATES: Well, that's even true today. There are things like the internet and the electric grid that modern society is very dependent upon. And so, as we grow the electric sector, you know, we'll have to take that very seriously. The U.S. has not built substantial new transmission. Even some very obvious projects for a high-voltage line that was going to take power out of Oklahoma and take it into Tennessee – even that didn't get built. So, there's a real policy problem with transmission, which is a necessary piece of the eventual zero-emission electricity solution.

MR. RUBENSTEIN: You've been an investor in new types of nuclear technology. Is that the solution – nuclear – better nuclear plants?

MR. GATES: It is, for many, many locations, an important part of the solution to have energy that's available on demand. And today's nuclear plants, unfortunately, their safety characteristics, their costs, just don't make them competitive. So, the two that are still being built in the U.S., that will be fairly expensive electricity. So, the third generation of nuclear, which is what's being deployed right now, is way too expensive. The question is, can we create a new generation, fourth generation, advanced nuclear whose economics are over twice as good, you know, whose waste is a tenth, whose safety is much better? And the answer is, yes, we can, because we haven't done a new generation of nuclear, and we have a much better understanding of how to do that. Whether the United States will step up for the pilot plant for the fourth generation is a question.

MR. RUBENSTEIN: What about fusion? Is that an answer?

MR. GATES: Fusion is very exciting. It's very difficult to do. So, there's about seven companies that are messing around with fusion. Breakthrough Energies put money into the MIT-related one called Commonwealth Fusion Systems. That technologically is very, very difficult. No one has gotten to so-called energy break even, where you have to create 10 million degrees of temperature in order for this reaction in the sun, the fusion, to take place. And so, to do that economically and get net power output is a huge scientific challenge. It definitely should be funded, but unlike fission that's very straightforward engineering to build that next generation – doesn't require invention – fusion requires a lot of invention.

MR. RUBENSTEIN: What about electric cars? Do you think that's a solution?

MR. GATES: It absolutely – if you look at the transport sector –

MR. RUBENSTEIN: That's about 14 percent of –

MR. GATES: Passenger cars, with about another factor of 2-3 in battery improvement, which is possible, the mainstream for passenger cars can become electric. So, you have to make that transition. You've got to scale it up. You've got to make sure electricity is zero emission. But for trucks and planes, there's almost no chance the batteries will be good enough. And so there you'll still need to create liquid fuels either with electricity or biofuels in some way.

Fuels are amazing. You know, the energy density of gasoline is 30 times the energy density of the best battery we can make. And so, if you looked at, like, a container ship that crosses the ocean, having your fuel be 30 times less efficient would mean that 90 percent of the weight you're carrying would be the batteries instead of the cargo. And so, trucks, and planes, and boats – electrification is unlikely to work in those cases. So, we need ways of making fuels that are zero carbon.

MR. RUBENSTEIN: When you talk to heads of state about this, do they roll their eyes and say: We're happy to meet you, can I have a selfie with you, and so forth. [Laughter.] But do they really do anything? And what are you trying to get heads of state to do?

MR. GATES: Well, in the Paris climate conference one of the things that was missing was a focus on R&D. And so actually France said, yes, we want that to be for the first time at a COP² a real issue that gets discussed. And so, what was called Mission Innovation, which Prime Minister Modi³ got to pick that name, that idea – the commitment of over 30 governments to double their energy R&D was a significant milestone that came out of that conference. In order to get that commitment, I had to make a commitment that there would be breakthrough energy that would take things out of those labs and help get them into the marketplace.

So, there's been some progress. Climate is complicated enough that, you know, you don't want – you want a broad set of people in the government to understand the complexities. And in terms of the R&D work that needs to be done, unless the U.S. is deeply engaged it's unlikely to happen, because so much of the world's capacity to do that innovation is here in the United States.

MR. RUBENSTEIN: So, the United States pulled out, more or less, of the Paris accord – although not technically so for another year or so. Is that of concern to you? And do you think this is going to hurt the effort to change climate change around the world?

MR. GATES: Yeah, it's a huge step backwards. Even if you meet all the current commitments in that climate accord, you're still way over two degrees of warming. And most countries are behind the commitments they made. Those commitments were a set of reductions where you would compare your 2030 emissions to your 2005 emissions. And there's a little bit of that that's easy. The shift from coal to natural gas, which is a one-time thing, is a lot of that. And yet, the world is falling short. And so, to have people like the United States say okay – even that's not important, it just shows how daunting this is going to be. There's no way we'll get there without the U.S. coming back in in a strong way.

MR. RUBENSTEIN: Do you think if you met with President Trump you could convince him on Paris to maybe get back in? Or is that beyond your capabilities to do that? [Laughter.]

MR. GATES: Someone else should do that. [Laughter.]

²² COP - United Nations Climate Change Conference

³ Prime Minister Narendra Modi of India

MR. RUBENSTEIN: All right. So, let me go back for a moment to the early days. You famously dropped out of Harvard. And you then started your company. But you I think said subsequently that actually you thought the computer revolution was occurring, or the software revolution was occurring, but actually you were wrong. And if you'd stayed at Harvard for another two years or so, it wouldn't have made a big difference. Is that right or not?

MR. GATES: Yeah. The urgency that I felt, that if we didn't get Microsoft going right away that somebody would do a great job building a software company and we wouldn't have a chance – that probably ended up not being true, that I could have waited two or three years and the opportunity to do Microsoft still would be there. But, anyway, I felt a sense of urgency. And you know, it's not like – you know, I still get to take courses and learn things today. You know, things like The Learning Company and there's all sorts of great books. So, it's not like I missed some part of my education.

MR. RUBENSTEIN: Right. When you dropped out your father and mother said: Are you sure you know what you want to do? If one of your children dropped out of college to start a company, what would you say?

MR. GATES: Well, I'd have to say yes. [Laughter.] But the dropping out is not an irrevocable decision. You know, if you try and start a company and it doesn't go well, they always let you go back. And so if you don't have, you know, kids that you need to support, you know, it's a very low-risk thing, particularly in the culture of the United States where trying to start something and failing is not a black mark for the rest of your life.

MR. RUBENSTEIN: So, when you were starting Microsoft, there were a lot of other software companies. And you were not number one at the beginning. I think there were others who were a little bit further ahead. What was it that enabled you to beat everybody else up in the software business? Was it Bill Gates; was it something else? What was the unique factor that made you the most successful?

MR. GATES: Yeah. We were actually the first. But there were companies. And they were all sort of single-product companies who got ahead of us in terms of sales. You know, by about 1991, we did become the largest of all of them. We were an engineering company. We were about how you hire smart people and how you use tools to develop software broadly. We were global, and we weren't about a single product. So, like, for example, WordPerfect was a word processor, somebody might remember. They did so well with that product that their gross sales rivaled ours when we were doing a broad set of products. As soon as graphics interface caught on, which was Windows that became mainstream in 1995, we became far larger than the other software companies. Now, subsequently – [laughs] – you know, Google, Apple, Amazon have become, you know, also extremely successful. But in the '90s, we were the strongest by far.

MR. RUBENSTEIN: OK. Now, the largest companies in the world – in the United States today are technology companies – Apple, Facebook, Google, Microsoft, and so forth. Do you worry that there's too much power and too much data in the hands of these technology companies? And are you surprised the government hasn't done something more than they've done today about this?

MR. GATES: Well, technology has become so central that government has to think, OK, what does that mean about elections? What does it mean about bullying? What does it mean about wiretapping authorities that let you find out what's going on financially or, you know, drug money laundering, things like that? So, yes, the government needs to get involved. I, for the early years of Microsoft, bragged to people that I didn't have an office in Washington, D.C. And eventually I came to regret that statement because it was kind of almost like taunting Washington, D.C. [Laughter.]

And so now the technology companies, partly because of the lesson of Microsoft – of course, you know, they could have seen that lesson through AT&T, or IBM, or Kodak, or a lot of innovators as well – they're very engaged. There will be more regulation of the tech sector. Things like privacy, I'm sure they'll – and there should be at some point federal regulation that relates to that. The fact that now this is the way people consume media, you know, has really brought it into a realm that, you know, we need to shape it so that the benefits outweigh the negatives.

MR. RUBENSTEIN: All right. So, it's said that when Facebook was coming along, you tried to buy Facebook. Do you regret not paying a higher price to buy it then, because you could have bought it maybe for a billion or \$2 billion?

MR. GATES: No. I mean, we bought a small part of Facebook, and that was a super-successful investment. What Mark⁴ did wasn't within our ambit. You know, unlike mobile operating system, that absolutely was because of our engineering culture. Doing the social network and thing – we weren't destined to be the leader in that. Now we – through an acquisition we have LinkedIn, which for professional communication and networking is in a very strong position and has lots of growth opportunity.

MR. RUBENSTEIN: Now, there was a company that was started in Seattle near you, a company called Amazon. And they were supposed to be selling books over the internet, and then later other things. But then they started a web services cloud business. How did Microsoft miss that business of cloud, and you're now number two in it? But were you surprised that you were kind of beaten to that game by a company that wasn't really a software company?

MR. GATES: Well, the natural companies to do the cloud would have been your classic enterprise vendors – IBM, Oracle, SAP – who really in terms of the true horizontal cloud aren't there at all. It is a surprise. And it's a huge credit to Jeff Bezos and his team that they got out in front and, with AWS, did the best cloud product. Today, Microsoft is a strong number two, and a huge distance to number three. And so, it is a source of strength for Microsoft. But, yes, there are many companies, including Microsoft, who should feel bad that they – that they didn't get ahead of Amazon in doing that work.

MR. RUBENSTEIN: So, if you were 20 years old today and you wanted to start a new company, drop out of Harvard, what company – or what area would you want to start it in?

⁴ Mark Zuckerberg, co-founder, chairman, and chief executive office of Facebook

MR. GATES: Well, this is a great time to be doing innovation, because the tools of innovation are so much better. There are lots of things in biology that are very interesting. There are lots of things in energy that are interesting. Given my background, I would start an AI⁵ company whose goal would be to teach computers how to read so that they can absorb and understand all the written knowledge of the world. That's an area where AI has yet to make progress. And it will be quite profound when we achieve that goal.

MR. RUBENSTEIN: So, are you worried about the power of AI to disrupt our civilization, and put people out of work, those kinds of things?

MR. GATES: The increased productivity that will come from AI will create dilemmas about what should people do with that extra time. And you've got to consider that a good thing, even though it will be an interesting set of adjustments that have to take place.

MR. RUBENSTEIN: So, most people over the last 200 years or so, whoever they – the wealthiest person in the world was – didn't usually work that hard when they got to be 60 or so. They kind of took life easy. You seem to be working pretty hard. What motivates you to still work so hard?

MR. GATES: Well, I love my work. The work of the foundation is super interesting. I get to meet with the scientists. I get to go out in the field. I do think your habits are sort of set in your 20s and 30s. And my standards of 20s – you know, I didn't believe in weekends back then, not to mention vacations. So, I'm fairly lazy compared to myself in my 20s, where I was a true fanatic. You know, all I believed in was working on software night and day. And for my 20s, that was perfect. I didn't have a wife or family at all. And my rule was very hands-on rule.

You know, I'm very lucky that my foundation work, the part-time work I do for Microsoft, I see that extending, you know, for decades into the future. And having an understanding of innovation – you know, I think shaping innovation in many of these areas – there is unique role that I can – I can help play.

MR. RUBENSTEIN: OK. So, but being Bill Gates, and pretty famous, over the past quarter century or so, can you go to a restaurant and people don't bother you?

MR. GATES: People are pretty nice about that, particularly if I'm with my family. People are reasonably discrete. So, it's not a problem.

MR. RUBENSTEIN: And you're driving a car, do people ever stare at you, saying what is he driving that car?

MR. GATES: Sure. [Laughter.] Sure. Sure. That's OK. [Laughs.]

MR. RUBENSTEIN: And your sport now is tennis, right?

MR. GATES: That's right.

⁵ Artificial intelligence

MR. RUBENSTEIN: So, you've played with some of the best players, Robert Federer and others. You get a lot of points off of those players, or? [Laughter.]

MR. GATES: Not if they're playing full out, no, not a chance.

MR. RUBENSTEIN: And you've given up golf? That was one of your other sports? Or you don't play –

MR. GATES: Largely given it up. I still play a little bit.

MR. RUBENSTEIN: And what about bridge? Are you still a big bridge player?

MR. GATES: I love playing bridge. It's a game that the players are aging quite a bit. [Laughter.] It hasn't caught on with young people.

MR. RUBENSTEIN: Is that good or bad? Because you –

MR. GATES: No, it's unfortunate because it's a great game. But –

MR. RUBENSTEIN: OK. So, when you want to go buy something, can you go, like, in a department store and buy anything? Or how do you shop? Do you shop online? Or do you just go buy anything? And do you have to use a credit card or cash? Or what do you do? [Laughter.]

MR. GATES: Yeah. I – you know, for a while I didn't do that much. But it's something one of my daughters enjoys doing, is helping pick clothes for me. So, we go out and go shopping together. And, you know, she's got good taste, so it's a neat father-daughter activity.

MR. RUBENSTEIN: One time your wife told me that when you dropped your daughter off at college the first day, at Stanford, she's graduated now, the roommate didn't know that she was going to be the roommate. And then you needed things to fix up the room. And you went to Lowes to buy things in Lowes. Was it unusual for you to go into Lowes? Do people stare at you? Do you go into Lowes or Walmart very much, or things like that?

MR. GATES: No. I was actually kind of hard to assemble some of that stuff. [Laughter.] You know, I wanted augmented reality to help show me how to put the pieces together properly. But you know, people are very nice. You know, overall, super nice.

MR. RUBENSTEIN: So, when you're relaxing today, is it to go on a trip with your family? Go someplace you've never been before? Go on a boat? Play tennis? What is the best way that you relax?

MR. GATES: You know, travelling, and then I get to do quite a bit of reading on that case.

MR. RUBENSTEIN: And you read how many books a year? You try to read –

MR. GATES: Fifty.

MR. RUBENSTEIN: Fifty books a year, OK. And do you comment on those books, do you recommend those books, and?

MR. GATES: Probably 15 a year I do serious reviews of. You know, I mentioned at lunch, I'm reading this Jill Lepore, "These Truths," which is this great history of the United States. But there's so many fantastic books.

MR. RUBENSTEIN: Well, I have one coming out. Could you review that? [Laughter.]

MR. GATES: I will. I will.

MR. RUBENSTEIN: OK. All right. It's a history book. OK. Let's go back to your foundation.

MR. GATES: OK.

MR. RUBENSTEIN: I ask people all the time – I say to them: Suppose you had the problem of Bill Gates and Melinda Gates. You have \$100 billion, or whatever it might be. And then you say, OK, I give you \$100 billion. And then you go buy a yacht, and a plane, or a house. Then you've got \$99.5 billion left. What do you do with that? [Laughter.] And to the problem – you had that problem. And you assessed the two most urgent issues were K-12 in the United States and health in the less-developed areas. How did you pick those two? Any regrets about picking those two? And have you paid progress on either of those two?

MR. GATES: Well, global health is our biggest area. And there, the progress has been really unbelievable, not just because of our work but our partners, that include the U.S. government spending on PEPFAR,⁶ the European donors who've really stepped up on these health issues. One of the metrics of importance is the number of children in the world who die before the age of five. When we got started, in the year 2000, that was over 10 million a year. Now it's about 5 million a year. And so, you know, it's just mind blowing. And people aren't as aware of it as you'd like them to be. Those deaths, because of getting out vaccines and understanding a bit more about nutrition, those deaths have been cut in half. Now the goal is to cut them in half again by 2030. And we do have a pipeline of new vaccines and new tools, particularly in nutrition, that give us an opportunity to do that. So, our global health work, because of the partnerships we've had, because of the innovation, has been more successful than we expected.

Our U.S. education work, that is not just K-12 but includes higher ed as well, there the key metrics – drop-out rates, math and verbal achievement – those metrics have moved essentially not at all. And even as the U.S. is spending more resources on education. We spend by far more than any country in the world, and yet our results are quite a bit worse than almost all the other rich countries, and even some middle-income countries. You know, even Vietnam

⁶ PEPFAR - U.S. President's Emergency Plan for AIDS Relief

now is passing us in terms of their math results. So there the field as a whole, and our work, has not had the impact we hoped for.

MR. RUBENSTEIN: Part of what you try to do in the education area is having something called Common Core. And that was very controversial, but now it's largely been adopted?

MR. GATES: Yeah. So, the – in the United States there were some very strange things. That is, our math textbooks were twice the size of the other countries'. In fact, three times the size of Singapore, which has the best math education in the world. And that had come about because of this process where the textbook companies always wanted adoption of new textbooks, so they didn't have to compete with the used textbooks. Anyway, they just got thicker and thicker. And so, the U.S. would tend to try to teach too much in a year, instead of really cementing the basic knowledge.

And so, the idea of the Common Core was to say: What math should you learn in various grades? Make sure that by high school graduation you have reasonable math skills. And so, it became more rigorous. It matched what the best standards in the U.S. were, which were in Massachusetts. And it meant that all the online material, and kids who move between different school systems, you'd have this alignment. And, you know, it's the world's most logical thing, and yet it was super attacked – you know, as though math in one state is different than math in another state. But, anyway, it's largely succeeded, almost as a subtle thing.

MR. RUBENSTEIN: So, Warren Buffett, can you describe your relationship with him? He is a little bit older than you. And you developed this close relationship. And then ultimately, he gave you a large part of his fortune for your foundation. How did that come about? And were you surprised that he did that?

MR. GATES: Yes. Warren's 25 years older than I am. You know, he's absolutely an amazing person. And was lucky enough to meet him in 1991. I didn't –

MR. RUBENSTEIN: Reluctantly.

MR. GATES: Yeah. I didn't think I wanted to meet him, because I don't think of buying and selling of stocks as a value-added part of society.

MR. RUBENSTEIN: Except for private equity. [Laughter.]

MR. GATES: [Laughs.] I'm more involved in the innovation part. But when I met Warren, the fact that he had this model of how the world worked – you know, he asked me: Why can't IBM put you out of business? Which is a very smart question, you know, because at the time IBM was 10,000 times our size, and yet, you know, we would go in terms of software innovation and even value of the company to surpass IBM, who was the dominant computer company when I was growing up, by huge amounts.

MR. RUBENSTEIN: Well, wouldn't – well, their mistake was when you developed the software for their IBM pc, they should have bought it from you, as opposed to licensing it, is that right?

MR. GATES: That would have helped them. [Laughter.] But the – it wouldn't have really changed things. I mean, what's happened in computing required really thinking about the microprocessor and software in a very different way than they did with the mainframe. And it really is kind of an innovator's dilemma thing, that this very low-end way of looking at computing, personal computing, the technologies that came out of that now dominate everything – corporate computing, cloud computing –

MR. RUBENSTEIN: So, Warren Buffett. So, he – you developed a relationship with him. And he – you know, became a bridge player with him, and golfer, and so forth.

MR. GATES: Yeah. Yeah.

MR. RUBENSTEIN: And one day he calls you and says: Guess what? I've got an extra \$100 billion I don't know what to do with. I'm going to give it to you. What did you say?

MR. GATES: Well, it was unbelievable that he chose a substantial part – he created five foundations that are – that he's giving substantial money to. A high percentage of that went to our foundation, that basically doubled our ambition. And so, you know, going after malaria eradication, going after new seeds. We added an agricultural thing. We added sanitation, because of the incredible resources he –

MR. RUBENSTEIN: He didn't want his name on it?

MR. GATES: We asked him, and he said no. Anyway, Warren is an unbelievable person. I've learned immense amounts from Warren.

MR. RUBENSTEIN: So today people come to you all the time for money, I assume. Everywhere you go people say: By the way, I have this thing you should invest in. I have a couple myself I'll mention later. No, no, just kidding. [Laughter.] No, a couple things you should invest in or should give money to. So how do you resist it? You have some person who says no for you? Or how do you do that?

MR. GATES: Many people.

MR. RUBENSTEIN: Many people say no.

MR. GATES: Well, once you pick what you care about, if somebody has something that can make a difference in global health, we're super interested and we have staff of 1,500 people. And if it's to do with global health, some of those people will come out and talk through with you whatever your innovation is, and how we can partner with you on that. You know, so that's clearly in our area. If it's something that can substantially improve K-12 education, then we are

going to be very interested in it. If people are asking outside of those things then, you know, fortunately you can say no, because focus is key to philanthropy.

MR. RUBENSTEIN: So, people have recognized over the years that raising children is difficult. Jackie Kennedy famously said if you mess up raising your children nothing else matters. You have three children, seem to be well-adjusted, and you've kept them out of the newspapers and so forth. How did you do that? And has that been more of a challenge, raising healthy kids with the wealthy background that you have? How do you avoid spoiling kids like that?

MR. GATES: I think that's a huge problem. You know, obviously our kids have benefitted from having a great education, and an opportunity to travel, and – you know, so they're very lucky in that sense. Making sure that the visibility or the way people treat them is not unnatural. There's some challenges that come with that. So far, they've handled it well. You know, Melinda is the one who deserves any – or, certainly almost all the credit for the kids so far doing very well. You know, our kids, we've said to them that, you know, the money is going to the foundation. And so, they don't think of themselves as sort of aristocratic inheritors.

MR. RUBENSTEIN: But what do they say when you tell them that? They say, can't you give me a little bit, or something? [Laughter.] Or they don't ask for some?

MR. GATES: They'll get a little bit. [Laughter.]

MR. RUBENSTEIN: OK. But are they going to be involved in the foundation?

MR. GATES: No.

MR. RUBENSTEIN: And the foundation, you have a finite length of the foundation. I think it's – is it 20 years, or?

MR. GATES: After the last of us to go, yeah.

MR. RUBENSTEIN: So why not have a perpetual foundation?

MR. GATES: Well, Warren has influenced my thinking on this quite a bit. The idea – our foundation is aimed at eliminating the diseases that disproportionately affect the poor, to try to make it so no matter where you're born your chance of survival and living a long, healthy life are equal throughout the world. That should be achievable, you know, assume Melinda's going to live another, say, 40 years, that gives us 60 years to solve those problems. That's doable. And we should take all our money and put it against U.S. education and global health. And there will be problems in the future that at least from my grave I won't understand very well. And there will be rich people in the future – in fact, more rich people in the future than there are today. So, they should use their intelligence and understanding to go after those problems. Having a pile of my money left over to go after those problems just doesn't make any sense.

MR. RUBENSTEIN: How much money has your foundation given away to date?

MR. GATES: About \$40 billion.

MR. RUBENSTEIN: Forty billion?

MR. GATES: Yeah. We're now up to giving \$6 billion a year.

MR. RUBENSTEIN: OK, that's pretty good. [Applause.] So, do you have any regrets about not having started philanthropy earlier? Because I think you didn't retire from Microsoft full time till you were about 50 or so, is that right?

MR. GATES: Yeah. So, I – until the year 2000, I had not done significant philanthropy as a percentage of my wealth. I'd given, you know, a few hundred million dollars. In the year 2000, I put \$20 billion into the foundation. And so that's when we got serious.

MR. RUBENSTEIN: I'd say so. That was –

MR. GATES: I was part time on the foundation work from 2000 to 2009 – 2008, sorry, when I retired from Microsoft. And then I flipped so that I was full time at the foundation and part time at Microsoft. And that's worked out well for me. You know, some of these issues, yes, I wish, like, for an HIV vaccine we had started sooner, because we'd be further along. But anyway, the timing has worked out well.

MR. RUBENSTEIN: So, do you have any regrets in your life? You seem to have a life that most people would love to live. You got a happy family, great marriage, foundation, business success. Is there anything – can you make us feel good by saying you've done something that didn't work out? [Laughter.] Or just make us – because all of us feel bad, because we look at you and we can't do what you've done. So, tell us something that's bad that you've done, or you feel inadequate about. [Laughter.] Something. There must be something.

MR. GATES: I am super lucky. You know, to marry Melinda, the experience at Microsoft that, although it had its ups and downs, was phenomenal, the work of the foundation. And –

MR. RUBENSTEIN: No regrets about anything?

MR. GATES: I wouldn't try and go back and change anything. I mean, for example, the antitrust lawsuit against Microsoft, you know, was bad for the company. It created a lot of distraction. We would have done a lot of things, including the mobile operating system, better if it hadn't been for that. But in a way, it was a lesson for me. And you know, so it – and it probably accelerated my retirement by five or six years, which overall for me was probably a good thing. You know, I don't think it was a principled set of activities, but that's another story.

MR. RUBENSTEIN: OK. So today the greatest pleasure of your life is when you're doing what? Is it – other than being interviewed by me or something like that? [Laughter.] What is the greatest pleasure of your life?

MR. GATES: You know, time with kids, time with scientists, time when I'm reading and things are making sense, you know, going out and seeing the impact of the foundation's work, meeting with scientists who think we can make breakthroughs to help solve climate. You know, these are super interesting problems. And you know, having a broad set of system thinking applied to these problems is going to be necessary to orchestrate the resources and policies behind them. So, you know, I love my work.

MR. RUBENSTEIN: So, your children are not married, I think, is that right?

MR. GATES: Not yet, no.

MR. RUBENSTEIN: So, when they are, do you look forward to having grandchildren?

MR. GATES: Absolutely.

MR. RUBENSTEIN: And you're going to try to teach them software. Or how would you – [laughter] –

MR. GATES: [Laughs] No, I don't think of Microsoft as a dynastic organization. [Laughter.]

MR. RUBENSTEIN: So finally, if people are watching now and they say, all right, I want to do something about climate change. But I'm just one person. I don't have the resources that Bill Gates does. What can any average person do to have some impact on climate change, in your view?

MR. GATES: Well, certainly they – as a consumer – can take things, like these new meat products or how they buy electricity, and they can help drive up the scale of the green solutions. The most important thing at this stage is their political voice. There's going to be a need to put substantial resources into this effort. And you know, we'll need a bipartisan solution. And to send the right signal to the market, you actually don't – if you just win one year and then it gets repealed, that doesn't help at all. The key is what people see the policies will be over the next 30 years on a consistent basis. And that means it's a much higher bar than just a one-time victory.

MR. RUBENSTEIN: I should have asked you. You started The Giving Pledge with Melinda and Warren Buffett. And we won't have time to go through that, but right now if you were to convey one message to people about philanthropy, what you would like the average person who's not of your wealth, to do on philanthropy, what would you ask the average person to do?

MR. GATES: Well, the best thing is to pick a couple of causes that you believe in deeply and find organizations that you can get involved in. The social services in local communities, the charter schools in local communities, there's a host of very high-impact, important local things. The dollars you give to global needs actually will have substantially more impact per dollar, because the – you know, if you – you can save a life for \$1,000 if you just fund measles vaccination or polio eradication. Those things are, you know, pretty mind blowing in terms of the difference they can make.

But, you know, it's all – philanthropy is not based on picking – you know, comparing every single cause and picking the most impactful. It has to be something that connects with you personally. Even, you know, the climate area, whether it's advocacy, or high-risk investing, or behavior as a consumer, there's lots that people can do that give us – will increase our chance of success.

MR. RUBENSTEIN: So, Bill, I want to thank you for taking time.



As chairman of Breakthrough Energy Ventures, Bill Gates is committed to accelerating innovation by bringing together governments, businesses and thought leaders to develop and deploy new technologies that will stop the impacts of climate change. The Breakthrough Energy Coalition, made up of an influential group of investors and institutions, also leads BEV, a fund designed to finance emerging technology with the potential to deliver affordable, reliable, zero-carbon energy. Spearheaded by Gates, BEV has more than \$1 billion in committed capital to support entrepreneurs building companies that can significantly reduce emissions.

Gates also serves as co-chair of the Bill & Melinda Gates Foundation, which helps reduce inequities in health and education in the United States and around the world. He is also co-founder, technology advisor and board member of Microsoft. He and his wife Melinda Gates, along with Warren Buffett, founded the Giving Pledge, an effort to encourage the wealthiest families and individuals to publicly commit more than half of their wealth to philanthropic causes and charitable organizations.