



Woodrow Wilson
International
Center
for Scholars
Environmental Change and Security Program

Book Launch of
The Dominant Animal: Human Evolution and the Environment

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Edited Transcript—Paul Ehrlich

Thank you very much. I was five when Dennis was my post-doc. And actually I've come here at great sacrifice because I was planning to go -- I'm a pilot -- I was planning to go to Australia -- to Alaska with some friends and blow away some wolves from the air, get right into the political spirit of these days.

I've been asked to limit my talking to two hours so that we can have plenty of time for interchange afterwards and I'll try and do that. This is a sophisticated audience, so I'm going to try and just hit some high points and make some points and then open it up to a discussion and or tomato throwing or whatever.

Let me say a little bit about the origin of the book. Stanford University, as you all know, is the greatest university in the world. At the same time, you can get all the way through Stanford University if you choose your courses carefully, even if you don't, without knowing a thing about how the world works. We had a guy in the computer science department who thought that milk was manufactured. No way you can find out about agriculture at Stanford unless you take very, very special courses. I suspect if you stopped a thousand of our faculty in the street, there's not more than 10 of them could give you a coherent story of what the difference between ozone depletion and climate disruption is.

It's a sad situation and it's a situation that's reflected, for instance, some of you may have heard here in Washington that there's a thing here called the presidential election going on. I just spent -- I'm nine hours jet-lagged -- I spent substantial time in Norway and Sweden last week, this week, some week. Very embarrassing for an American to begin with, particularly with the people of the Beijer Institute of Ecological Economics and Arrow, one of the -- by acclamation -- the smartest economists on the planet. Whole bunch of similar people. Whole bunch of people in the Norwegian and Swedish governments.



environmental change & security program



Everybody is absolutely appalled, in other words, not just at our political situation, but at the fact that here we are, the dominant animal on the planet, we are faced by a series of horrendous crises and we're not doing a damn thing about it. And I'll come back to that a little bit when I say a few words about climate change, which is where we're doing most of the talking, putting more CO₂ into the atmosphere, but we don't have any plans to do anything sensible about it.

So, I decided at Stanford, since they've been now working for 10 years trying to find a way to inform students there about science, which is only, what, 50 percent of our culture? If you define our culture as I do, as our non-genetic information that we possess as a species or society. They've been working at it about 10 years. For those of you who are historians, I like to say, they operate on Council of Basel time. Do you all -- people all know about the Council of Basel? It was one of the big church councils, just before the Reformation. It met for I think 20 years. People came from all over Europe back and in and out and it accomplished absolutely nothing. And that's a typical university committee situation. The committee's been working on science for 10 years now, and has accomplished absolutely nothing.

And so I just -- one of the nice things about being at a place like Stanford: you want to give a course, you call up the department secretary and say, put Biology 1 in the catalog, no prerequisites, Human Evolution and the Environment. And I'd been teaching it for a few years and decided that I, since this is what every freshman at every university should buy 10 copies of and give it to all their friends. That was the basic plan for the book that Anne and I did.

And because we both feel that first of all, it's important to know where you come from if you want to figure out where you are and where you're going. It's important to know where you are and it's also important to know where you're going. Now actually, if you've read the "Millennium Ecosystem Assessment", where you're going is really easy. There's actually in many places in the East, you can find little models that demonstrate where we're going. There's one right down the hall here. You go into the room that says "Men" on it, and you go in there and you will find a thing on the floor that's made out of porcelain. And if you want to know where you're going, you stare into the thing where you'll see some water, and then you push a lever and that will tell you what's happening to our life support systems. So there's a little model available to everybody and we don't really need to go into detail on that.





But why know where you came from? Well, let me give you just one example. Early on, after mammals got a start when the dinosaurs were wiped out in the KT extinction 65 million years ago. If it wasn't for that, there'd be a velociraptor here giving you this lecture.

And we, sort of like Tarsiers, began to live in bushes and trees and snatch insects with our hands and eat them. And it turns out that if you are living in a tree trying to snatch insects and jump from branch to branch, you do better if you can see the branch rather than smell it. And natural selection therefore moved us more and more towards being sight animals because both those that tried to smell the next branch or smell the insect and catch it didn't do very well. They didn't reproduce as much. And so we're sight animals.

So why emphasize the fact that we're sight animals? What does that have to do with our situation today? Well, sight animals are struck by things that they can see, curiously enough, like skin color, hair type, body shape, hair length, and so as sight animals we begin to focus on those things. We're small group animals. We like to make distinctions between us and them, and so people focused particularly on skin color as an important factor.

Now, the actual -- scientists know everything, basically, about skin color. We were all black when we left Africa about 50,000 years ago, and in between as we moved around, around the planet our skin colors have changed because there's very strong selection for being able to synthesize vitamin D, but avoiding the UV damage to our folate systems, which are extremely important.

And so, for instance, if you've ever been to Australia, you'll see people who have moved too fast, light skinned people, into a very solar intensive area. And if you've ever noticed, Australians look like they've all been clipped: a piece of ear gone, a piece of nose gone, and so on. That's where they take off the basal cells and the melanomas. And so it's not a selection in Australia for people who have darker skin. Whereas the Pakistanis who are living in Scotland, have the opposite problem and they have to take a lot of pills and so on so that they get the proper vitamin D.

The answer is that our skin color's been changing all over the place, and there is not one teeny, weeny, tiny, little bit, shred of evidence that my colleague, the racist Shockley the Nobel Laureate who claimed that human beings are color-coded for quality. There is no relationship whatever between someone's skin color and their basic abilities. But, and I know this will come as a stunning surprise to you, we're having a presidential election in





which the determining factor may be the skin color of the candidates. And that's a really brilliant thing to do, particularly when the ones of the favorable skin color in our society are morons. And you know, so we may end up in a nuclear -- even in a nuclear war, because of skin color. It's important to know these things.

Same thing can be said about gender, you know. People see shape, see hair length, and so on; not a shred of evidence that there's any difference in basic abilities between people of different shapes and genders or sexual preferences. But curiously enough that's also a big thing.

One of the commonest questions that I get is about the debates going on in the presidential election. They say, "Do you think that gays should get married?" We're having a debate. The world is -- our civilization, the entire globe is faced with a collapse and people are asking questions like should gays be allowed to get married? My answer is very simple: hell, yes, why shouldn't they suffer like the rest of us? I mean, ridiculous question. But that's at issue in this election.

Okay. So I'm not going to go much further into why we should know where we're coming from but there are a lot of examples like that. We should understand, among other things, the consequences of us being small group animals trying to live in gigantic groups. And we can talk more about that if you want to.

I think more important, though, is to talk about our dominance, and I don't think this audience has to be given details on how we dominate the planet. But basically, we've changed every cubic centimeter of the entire biosphere of the habitable portion of the planet. We, as you all know, are altering the atmosphere. We've changed, essentially, the entire land surface. There's only about 30 percent of the land surface we haven't changed quite substantially and that's under ice or extreme desert or very high mountain. We now probably use about 50 percent of all of the food that's available to all the animals on the planet. That is a net primary productivity.

We control the planet, and we've done it through our cultural evolution. Not again, I won't go into detail here, but not through our genetic evolution. Unlike what you may read if you read Nick Wade in the *New York Times*, and that's always a big mistake, you weren't driven here today to hear this lecture by your genes. It's strictly cultural. It's strictly your non-genetic information. And we're now at this stage in our evolution where we've taken over the





entire planet. We control it, and that's where you come to the paradox of dominance. While our technological abilities have allowed us to dominate the planet, our evolution in ethics and how we treat other and how we treat the environment has been ridiculously slow.

Think about it for a minute. Suppose a Martian -- suppose we -- the society collapses and even *Homo sapiens* goes extinct, which is unlikely, but let's suppose it happens in the next 10 years and that a hundred years from now, a Martian archeologist -- or a thousand years -- comes down and excavates, say, London today, and Amsterdam in 1500. They'd obviously conclude that different genera, different species, different families, even, made the two technologies.

After all, if you excavate someplace in 1500, think of what you'd find: remains of a lot of horses, wooden wagons, very crude tools and so on. You excavate from today and you have computers and jet aircraft and so on and so forth. The technological evolution, cultural evolution, in the last few hundred years has been absolutely extraordinary.

What about if they could somehow excavate the ethics? You'd still find the issues that puzzled Plato very high on the ethicist list. We have made some progress, some progress ethically. We have a lot of slavery still, but at least we don't feature it, we don't think it's great, or most people don't think it's great. And we do treat animals better. But in general, the ethical issues of the days of the Greeks, for instance, are pretty much still with us.

And so here we are. We dominate the planet, but we're really backward ethically in terms of how we treat each other and we treat the environment. And this leads to a lot of problems, not the least of which is we're destroying our life support systems and were doing it extremely rapidly. As I said, you can go look at the model if you don't believe it. But the "Millennium Ecosystem Assessment," which was published by Allen Press in a set of books about that wide, spells it out very clearly.

So what's driving this destruction? The paradox again, we are dominant, we are brilliant. We got to be dominant by being brilliant, don't ever miss the point. But we're now turning our brilliance in the wrong direction, in my view, and that of every single one of my colleagues.

What are the drivers? Well it's the old IPAT equation most of you have heard about. The impact on our life support systems is a product of three things: The size of the population,





obviously, more people more impact, per-capita consumption or affluence, because we can support a lot more people living very simply that we can support living like Beverly Hills millionaires or the oil barons that run the United States, and the third factor is technologies. What technologies we are using to support our affluence and what social, economic and political systems we're using to run those technologies.

If you look at the population situation, you might be cheery, because there have been changes over the last 40 years in our understanding of what causes, what causes -- you know, what controls fertility rates and what can be done to change fertility rates and the basic answer is one I find a very good one, namely, the best thing you can do if you want to reduce fertility rates is improve the literacy rate of women, which is behind around the planet pretty much. Give women job opportunities. Give women education overall. And give them the means to control their fertility, and fertility comes way down, usually rapidly.

Sometimes, sometimes the administrators of programs don't understand it takes two to tango, and they'll leave too many macho males around and this is what happened in Costa Rica. They had a -- they did everything right for women and the birth rate plummeted, but not far enough, and then they realized -- we did a little study of it -- they realized that men were somehow involved in all this. And bureaucrats are very busy. They don't understand a lot of things. And they started to work on the men and the birth rates started down again.

As you may know in Europe, many countries are already on the verge of shrinkage or actually shrinking a little bit, and when you talk about shrinkage it draws immediate attention to the brains of their politicians, who are always arguing that we've got to raise the birth rate so we won't have a change in age structure. If any of you don't understand why that's a spherically senseless argument, I'll be glad to discuss it in the discussion period. But it's very, very common.

We even had -- there was once a great newspaper published in New York -- some of you may have heard of it, the *New York Times*, but they're now very conservative and pro-natalist and actually publish articles about the "birth dearth" and how much trouble we're going to have if we don't get the birth rate back up. The U.S., by the way, had 140 million people at the end of the Second World War. We now have 303 million. We're the third largest nation in the world in population. And the present projection is to go to 419, I believe it is, maybe somebody from PRB is here and can correct me, but I think the projection is 419 by 2050,





despite the fact no one has presented even a semi-sane argument for having more than 140 million Americans alive at one time. And the country celebrated going through 300 million.

Now, I say, the good news is that in Europe, which is where -- you want to have shrinkage in the rich countries because the affluence factor is so important than the damage we do, that it's much more important we have shrinkage in countries like United States and in Europe and Japan, than it is, say, in Bangladesh or Nigeria or what have you. So that's really good news.

The bad news is that even with that shrinkage, we are planning, if you look at the projections, and, by the way, I've often been criticized -- people say well, the population explosion that the Ehrlichs had predicted has never occurred. Well, interestingly, Anne and I have never predicted anything. We have always depended on the Population Reference Bureau, that well-known Communist organization, and their projections have been, I mean, they take the UN statistics and massage them so that the obvious lies, because the UN has to accept any numbers that come from the governments, and, you know, do the tests, their predictions have been extremely accurate.

That's one of the great organizations in this world. And they've been right on the ball and the projections now, again, going out a ways, are for something like going to 9 billion before we go over the top and hopefully start to gradually reduce our population size to one that's sustainable. There are a lot of things can happen in that course, of course, if we continue on our route, we probably will never reach 9 billion because the death rates will go up and one thing the UN has never considered is projections in which the death rates go up. But that's a very -- that's what many people think is the most likely result.

But the point is, if you even just look at the numbers, we're at 6.7 billion today. They're talking about adding another two, 2.3, something like that to the population. That's more people, 2.3, is more people that were alive on the entire planet when I was born. The growth since they wrote *The Population Bomb* has been more than the number of people who were on the planet was born. The growth has been absolutely extraordinary and what people have generally missed is that every increment is going to have more impact, on average, on our life-support systems than the last person.

Why is that? It's because we're brilliant. Curiously enough, when we, for instance, went into agriculture, people didn't go to the most marginal land and start farming it, and then slowly move towards the river valleys where the rich soils and the water was. Curiously





enough, they did it the other way around. And guess what? Our river valleys are now very thoroughly paved over.

I can remember I've seen it in Delhi, I've seen it in Manila, where great rich farmland is being put under strip malls. And so every person gets to be fed from more marginal land, on water that has to be transported further or pumped up more, or purified more. Again, you know, back there when we started using metals, people didn't go immediately to the copper ore that was one-half of one percent copper and start smelting it. They, for some weird reason, picked up the copper that was lying around on the surface at a hundred percent. And you just go down resource after resource, and we are having to use more energy and more effort to get everything, which means that the next two billion people are going to cause a lot more damage than the last two billion people, everything else being equal. And so far nothing's come up that looks like it's going to make it easier.

So the most serious thing about the population issue, besides the actual numbers, is that the disproportion, the disproportion of the impact is going to go up. Of course, if you listen to the dumb economists, they think we're going to be consuming something like 20 times as much per person by the end of the century. We're all going to be 20 times richer, that's where they get with that, that's how they excuse using positive discount rates on all sorts of things, because you don't want to do anything about climate -- not all of them, not the good economists -- you don't want to do anything about climate today because we'll let the people deal with it in 50 years when they're going to be 10 times as rich, and so will have more money to spend on it. What the concept of 10 times as rich, say, for people in this room means, is beyond me. Even -- if I were times as rich, I'd even be able to afford the '45 Moutant [spelled phonetically]. But that's not very ecologically destructive.

So the population situation is a mixed bag. We have many too many people now. We are overpopulated by standard definitions, and vastly overpopulated, because we're using up our natural capital. We're not living on the income from our capital. It's going to get much worse, but at least we know what the solution is.

Go to the consumption side, it's much more complicated. The economists I work with, people like Ken Arrow, Ken was the lead author on a paper entitled, "Are We Consuming Too Much?" If you know an economist, that's a stunning title. It was sent to the most prestigious U.S. economic journal, which publishes mostly nonsense, I have to say, I know its contents well. But, the funny thing is, Ken is so prominent that the word came back to us





that one of the editors said, "We've got to publish this article by Ken Arrow and his Communist friends." But economists are looking at it but think of the problems compared to the relatively easy solution of the population issue at the intellectual level.

We know what to do about population but in consumption, it's very different. First of all, a lot of people need to consume more in a decent world. There are a lot of people, maybe as many as two billion, who just do not get enough food and so on to be able to really contribute to solving our problems. There's an enormous inequity in our world.

So, on one hand, you want to increase the consumption of some people. On the other hand, you clearly want to restrict and reduce the over-consumption of the rich. And that's not a trivial issue either, because at one level it's simple. Who here -- anybody here have \$20 million in their pocket, burning a hole in it? I guess I can't use a local example, but it's easy. If you have \$20 million and your choice is buy executive jet or buy a Van Gogh, the Van Gogh is the better decision from the point of view of the composition of consumption. But when you go further along the pike, you get into real issues about a) how you would restrict consumption, and what particular consumption is best to try and restrict. And that's one thing that at least the economists are starting to look at but it's a very complicated question, and isn't even a question to the average politician or even the average economist.

What's the solution? We're having some financial problems. Maybe some of you have heard about it. In a country of whiners the neo-cons have very neatly taken all the regulation off, and they love it until they get into trouble and start losing a lot of their money and then their buddies in the White House come right in and they become socialists all of a sudden. There are strictly free-market people as long as they can steal from everybody else. The minute they get into trouble, they want us to come in and bail them out and that's what we're doing. No complication there all, but the basic thing is actually, I think Bush actually said, everybody should go out and buy another SUV to improve the economy. So consumption is viewed by many people as a solution to economic problems as opposed to one of our most serious problem, period, in terms of keeping our lives supports systems going.

I've only got an hour left. Okay, I won't harangue you anymore on that topic, except to say the basic issue is of course what the hell are we going to do about it, any of this? There's a whole series of things we need to do. As I said, the feeling of all the people at the meetings in Scandinavia where we're -- there's no way, we're just hopeless it's going to end. There's nothing at all we can do. I don't think that's true.





As I've said to many audiences, probably the one here before, we do know that societies can change very dramatically in a very short time if they really want to do so. And the examples are myriad, but the one most obvious here and for the younger people, is that not one of my super sophisticated political international relations friends said, oh boy, well next month the Berlin Wall is going to come down, the Soviet Union's going to collapse and fragment and so that was a total surprise to everybody, but it happened. And I think that it's possible that we can get the changes in our, excuse me, in our -- the rest of the system if we're willing to do it. It's a matter of changing our cultural evolution.

Oh, by the way, excuse me. I mentioned, I said I was going to say something about things like global warming. Let me run down a few things there, just to make points that you may not have heard before. First of all, we're now switching away from global warming which sounds too cozy, and talking about climate disruption. It's a more accurate term, and it gives you the right feel.

Now, mostly when you hear about it, you hear talk of the Himalayan glaciers are melting, and so people are going to not have enough water to drink and so on. Drinking water is not going to be a problem. Sea level rise will be a problem, but I almost guarantee you, I can't quite, that you'll be able to outwalk it. After a while, Florida's going to pretty much disappear, but small loss, and things like that. At least we won't have hanging chads to worry about.

But, the really, in my view, and that of my colleagues, the really serious issue in climate change is changing the patterns of precipitation over the entire planet. Not from losers to winners again, but a continuous change. In other words, we're going to have to be revising our water-handling infrastructure, if the climatologists are right, and I suspect they are, we're going to have to be revising it continuously over the next 800 to 1,000 years. It's going to be extraordinarily expensive, extraordinarily difficult but when you think, for example, that the loss of the Himalayan glaciers is going to disrupt the water supply to the agriculture that feeds 1.3 billion people, and that the plants that we're growing to eat there, the wheat, and the rice, are now within a degree or so of their maximum production temperature. They'll just stop producing after that.

We have defunded the CGIAR system, the Consultative Group on International Agricultural Research, which is the only outfit that can possibly solve that problem, if they're lucky,





because it's a matter of plant genetics. You can see why people are really worried about the climate change. And the main worry is that a lot of people are going to starve. And the people who are starving, of course, will also have nuclear weapons, which makes the whole situation a little dicier. But the other thing I want to say, so the main thing about climate change is don't worry so much about sea level rising, worry about where your food's going to come from.

The second thing is, climate change may not be the most serious problem, environmental problem, we face. The epidemiological environment's decay, which is very much fueled by increasing population size, could kill even more people than vast famines, and we can talk more about that later if you want.

The toxification of the planet may be worse. We are releasing huge numbers of toxic chemicals when we know almost nothing about their impact, one at a time, directly on human beings, or on ecological systems, where we know nothing about even their two-way interactions and let alone their 10,000 way interactions or more, because you have all these things all over the planet now interacting. Some of them are hormone mimics, which may have what are known technically as nonlinear dose response curves. All that really means is that they may be worse for you in tiny quantities than big quantities because it depends on how the receptors that they operate on are up regulated or down regulated by their presence.

Now, we've already seen all kinds of nasty signs: Polar bears' gonads dropping off, sub-arctic towns where there are twice as many female births as males, alligators that are intersexes, frogs with extra legs. And the interesting difference between this -- let's suppose that all of a sudden we discover that some mix of the chemicals is making, basically, all human beings sub-fertile, so that we're going to die out. We can't reproduce anymore. Now with climate change, if we don't do anything about it, at least we've got some nutcase plans for absolutely crazy things that we can try, like putting sun shields out between us and the sun, or dumping quadrillions of tons of iron filings into the ocean and so on. So at least we have crazy ideas about something we might do if we continue on our insane course. What are you going to do about the chemicals, get graduate students out there with forceps and pull out the molecules all over the planet that are the wrong kind?

So toxification may actually turn out to be worse than climate change. And as I say, so might the epidemiological environment where again, we are defunding the agencies and not doing any of the planning we ought to do, if for instance if a new really nasty flu strain shows up in





China where they have a regular system for creating nasty flu strains which they don't ever change or one of the Hantaviruses or the Marburg viruses, something from Africa skipping other primates to us and so on; really tricky.

Okay, we get back to the sorts of things that we need to do. I'm going to run down a short list and then I'm going to shut up and let you ask questions. One, of course, is bring births -- concern for births up to the same level of concern we have for deaths. We have intervened very effectively in human death rates, primarily in the death rates of young human beings but some in the older ones, changed the death rates dramatically and that's the source of the population explosion.

We are morally and ethically obliged, in my opinion, to also intervene in the birth rate. If you change one half of the equation, and you know the planet isn't infinite, then you've got to change the other half the equation, as I indicated in some detail. We know how to do that. And we can do it by improving the condition of women, which as far as I'm concerned that's a win-win right there.

Second thing is to bring conservation up to the same par as consumption. That is, to think about not just what we consume, but what we have to save in order to be able to consume in the future. To look -- we take very careful care to statistically analyze our human built capital, even, to a large degree, our human capital. But we do not pay attention or have not, until fairly recently, paid attention to our natural capital. When we've paid attention to our natural capital, it's turned out that the growth rates in a number of poor countries have been negative because while they have -- what they've been doing is getting rid of their natural capital as rapidly as they possibly could for fun and profit. So, change the relationship between consumption and conservation.

Related to that, is when we release -- when we deal with new technologies, and I can give you some beautiful examples, but will just give you the general principle: You've got to ask not just what they will do for people, you got to ask what they directly or indirectly will do to people. The freon example is the best one there, but I've just mentioned the toxic. If you knew what a lot of these chemicals are used for, you would say, why in hell are we making them and releasing them into the environment?

Classic example right now is bisphenol A, which was developed in laboratories in order to be a synthetic estrogen to be used in pills to be taken by women. Turned out that they weren't





quite powerful enough hormone or their hormone-like action wasn't quite powerful enough, so instead they put them in baby bottles, in the hard plastic in sports bottles. So we are cleverly feeding an artificial estrogen to our babies. What a wonderful idea. I often wonder, I think Linnaeus would have dropped the name *Homo sapiens* and found some -- *sapiens* meaning wise -- on the basis of that alone. So we have to pay, do much better cost benefit analyses on our technologies before we deploy them. And again the freons, the chlorofluorocarbons story is the classic there.

Then there is one consumption good that's non-rivalled, that one person can use and it doesn't reduce the amount available to anybody else, and that, of course, is education. Unfortunately we don't have time, and God knows, probably not the energy to make our educational systems halfway decent. They are really ghastly. We don't learn. We should start at kindergarten and instead of saying, see spot run, say, see the plant grow in the sun. In other words, start teaching kids about things like photosynthesis very early. But we haven't got the 35 years it might take, if you could revise the education system, which I have severe doubts about because we can't even revise Stanford University. We just don't have time for that so it means public education. And that's one of the things that the Wilson Center is involved in and so on, but we need a lot more of it, and we need to really get the basics out there.

We can't teach everybody everything. As I've said to a number people, some of you in this room, if I were presented with a pile of computer parts, a complete desktop computer, I couldn't possibly assemble it. You know, we just -- we are so specialized in everything. But I can tell you where your food came from. Unlike many Stanford people, I know it doesn't just come from the supermarket, which is the standard answer you get if you ask people, where does your food come from? So education is absolutely critical if you're, in my view, maybe it's just because I'm a pedant, if you're going to change our cultural evolution in the right direction, people must have some idea of where they came from, where they are and what they're doing.

Then, shifting away from that, and going more to the ethical side, I think that we very badly need to look at our discounting by distance and our discounting by time. That is, if any of you read Peter Singer, you know he can persuade you that you ought to care as much about a 12-year old starving in Darfur, as your 12-year old grandchild starving right here.

I am not sure we'll ever get to that point, but, we're a small group animal. We don't pay anywhere near enough attention to what's happening elsewhere even though our fates are





intimately tied together. And we also don't pay enough attention -- you know, all this stuff about how important our kids are, and so on. Well, as you know, the interest among a lot of people in our country is seeing to it that the kids that are born are the right color and that you make absolutely sure that every woman is forced to carry each conceptus to term, if she possibly can, and then you just ignore them. It's an interesting statistical thing that 20 years after *Roe versus Wade*, the crime rate started to go down dramatically in the United States. I'm sure you've read the literature, but every sign is, of course, that curiously enough, when you have wanted kids more than unwanted kids, they don't turn out so bad.

So we need to think a lot about people in distant places who are tied to us, and also people of distant generations. The economists have paid attention to that, to some degree, but intergenerational equity is a big issue and critical to this. And again, when people say to me, shouldn't somebody be allowed to have the number of kids they want? I say, people should be allowed to have the number of kids they think will be able to produce the kind of environment the kids, and the grandkids and the great-grandkids can grow up and have a decent life. You shouldn't worry about what you want, you should worry about what kind of life the kids are going to have.

Beyond that, the -- spreading the -- our interests beyond and trying to expand, reduce the size of our discounting by distance and by time, we need an international discussion and that's what I was talking about with various people in the Swedish and Norwegian governments particularly. We need a "Millennium Assessment of Human Behavior" which, among other things, will ask people questions like, what are people for? What kind of society should we have? What are the lifestyles we want? And what are possible?

For instance, and I think although we're wildly hated now for very good reasons, people would still imitate the United States. If people said, we made a major, major error after the Victorian industrial revolution and redesigned our country at the behest of a number of corporations so that it's built for automobiles rather than people, and that we're going to spend the next 70 years reversing that, and go back to building a country around people, I think that for instance, the Chinese would not all want to have automobiles.

Dennis -- as you know, Dennis Peragis wrote an op-ed in the *New York Times* in 1972 called "What if All the Chinese had Wheels?" There were only 500 million Chinese then, and now we have 1.3 billion and they're all trying to get wheels. This, despite the fact that their petroleum is running out, that they're having wars between the farmers and their oil industry





over water for secondary recovery. They're looking at the Caspian Basin for more oil. We have CENTCOM, which is designed to fight them over the Caspian Basin so we can get control of the oil. If you think we're building sophisticated jet fighters to fight al Qaida, you're wrong.

And this is just -- we're going to have to have a worldwide discussion of lifestyles. We're going to have to discuss things like the great mystery, the George Bush mystery of how did our oil get under their sand? Well, I mean, it's a big problem. Gretchen Daily, one of my colleagues, I think got into *Time* magazine saying when that invasion was being planned, do you really think we would invade Iraq if their major export were broccoli?

In other words, if you know anything about the history of the Middle East, even Greenspan said, I mean, it was crystal clear it was about oil. There were other peripheral factors, but the whole Middle East was designed around oil. That's where those countries came from. If you want to blame somebody, blame Churchill for putting the Royal Navy on -- you know, the real basis of the oil crisis is that Churchill figured out that battleships will run faster on oil and more importantly, if they get into combat, towards the end of one of their trips, it's much easier to pump oil and keep the thing going than shovel coal.

At the very end, you of course, the coal's stored in bunkers and what's left towards the end of the more distant bunker and in a battleship more than half the crew would often have to be shoveling coal to keep the thing going. So he converted the Royal Navy to oil and everybody followed and that's where the Gulbankian Agreement and the Red Line Agreement and the Pico-Sykes Agreement and so on to set up the Middle East came from. And yet weapons of mass destruction? We lived with the Russians when they had tens of thousands of them and managed to deter them but somehow Iraq, after attacking us, of course, terribly on 9/11, was going to be a threat.

Anyway, I won't go further in that. We need to have a worldwide discussion of how we live with each other, how we want to live, what's possible and so on. All my colleagues agree that we know more than enough about the science to know what directions we should be moving. We know we should be getting rid of racism, it's a waste of time and resources. We know we should be pushing down the CO2 emissions and everything. We're not doing any of it. We need to discuss it and then we need to discuss what form of governance you've got to have for a globe in the situation we're in today.





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We've only had stay -- human beings have been around, depending on how you define it, for hundreds of thousands or millions of years. States have only been around for a few thousand. And nation states in their current form have only been around for a few hundred, since the half -- it used to be a family affair, states, but now it's different. But it's only a few hundred years and it clearly isn't working. We need to find new ways to govern the globe. It's a big order, yeah, but let me tell you, if we don't change our ways, they're going to be changed for us and we're not going to like it. And so there are few possibly controversial things, and now we can have a discussion, I hope. And I'm going to sit down for a minute, anyway.



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