



E. O. WILSON IN CONVERSATION WITH IRA FLATOW

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PAUL HOLDENGRÄBER: My name is Paul Holdenräber and I'm the Director of Public Programs here at the New York Public Library, known as LIVE from the New York Public Library. I was a little worried doing a science event at the New York Public Library, in this library, in particular, but I think there's really no reason for my worries. Science is well and alive, as it were. I think I understand Antonio Muñoz Molina's comment to me. Antonio Muñoz Molina, for those of you who don't know, and who only live in the realm of science, is one of the greatest Spanish writers, he told me recently that he had gone up to Bennington, I believe, to give a talk to students, and the students had asked him at one point, "If I begin writing, which books should I be reading, what will particularly inspire me, what will teach me how to write?" And he said, just read *The Ants*. **(laughter)**

So, E. O. Wilson is an inspiration for one of the greatest Spanish writers today, and I think I understand why. Recently having had two children, one now four and one, one year old, I had the pleasure of being in the countryside with them, and the pleasure of being in the countryside not only with my children but also with E. O. Wilson's book *The Creation*, and there's one chapter which I particularly like, it's Chapter Fifteen, "How to Raise a Naturalist," and if you don't mind, I will read a few lines from it. "The ascent to nature begins in childhood, and the science of biology is therefore ideally introduced in the

earliest years. Every child is a beginning explorer/naturalist, hunter, gatherer, scout, treasure-seeker, geographer, discoverer of more worlds—all these are present at the child’s inner core, in rudimentary, perhaps, but straining for expression. Through time immemorial, children were reared in intimate contact with natural environments. The survival of their tribe depended on a close, tactile knowledge of wild plants and animals.” And I think E. O. Wilson might tell us, if Ira Flatow actually probes him properly, **(laughter)** why, in fact, we need to be in tactile—why we need to have a tactile inebriation with nature, why it is so important, and why our artificial environment, as it were, now is creating great havoc in our childhoods and in our later years.

I was also noticing that the subtitle of E. O. Wilson’s book, which now is called—the title is *The Creation*, the subtitle, *An Appeal to Save Life on Earth*, used to be *A Meeting of Science and Religion*, and I’m very curious why that change? And I think the change may be due to the good hand of Bob Weil, whom I will bring on stage for a very brief introduction, much briefer I think than mine. I am kind of long-winded. I try to be brief, but I simply can’t. Let me tell you why I can’t be brief. **(laughter)** But in any event, I think it is due in part because this is *really* an appeal. E. O. Wilson is *really* trying to take on—by creating a dialogue with the evangelical right in America and how important it is for him to take on that particular group of people, who seem in one way or another to rule part of this nation, if not the world. So E. O. Wilson will be introduced properly by his editor, Bob Weil, an executive editor at Norton, and in my view the very best of his breed. And as I said, I would imagine that *maybe* he had something to do with the subtitle being changed, or maybe E. O. Wilson in fact changed it because he really felt that he had to have—that this book had to have a kind of a messianic impulse to change the way the Christian right thinks about the natural environment.

Before turning the words on—giving the microphone, as it were, to Bob Weil, I’d like to tell you a little bit about the program that’s upcoming. We have an event which is in a way closely connected to this one with Sam Harris, who wrote a book called *Letter to A Christian Nation*; he wrote a book previously, *The End of Faith*, which actually Norton published. Bill Moyers is coming, also, to talk about the environment and religion with Bill McKibben. His book is cheerfully called *Welcome to Doomsday*. I will also be interviewing Frank Rich and Jan Morris, probably the greatest single travel writer today. Jan Morris recently e-mailed me and said, “I’m happy to talk to you about *anything* but travel and sex.” You know, she had a sex change, and so it’s going to be quite the challenge to find a subject. **(laughter)** We

also have Cameron Sinclair coming. I invite you all to join our e-mail list. Anyone who is not on the e-mail list today and joins today will get two free tickets to *any* event in the next ten years. **(laughter)**

And Ira Flatow will be interviewing E. O. Wilson. I really miss Ira Flatow. I lived in the—

IRA FLATOW: I'm right here!

(laughter)

PAUL HOLDENGRABER: No, I know! I really miss Ira Flatow. I lived in Los Angeles for many years and was a hostage to my car. I loved the traffic jams because I could listen to National Public Radio. Actually, one of the things I noticed moving to New York is that in Los Angeles, everybody kept saying, "Did you hear? Did you hear?" and coming to New York you hear people saying "Did you see?" Or, "Did you read?" Well, it will be wonderful to hear Ira Flatow in the flesh but before we do, **(laughter)** just as a little hors d'oeuvre, I'm bringing Bob Weil to properly introduce why he thinks this book is important.

(applause)

BOB WEIL: Thank you Paul. I am Bob Weil. I am an executive editor at Norton. I also have the great privilege of being Ed Wilson's editor. And just to answer your question about the subtitle, it's much better to say a book is an "appeal," I think, than a "meeting." But this book is an appeal on many levels. This is an appeal for a boy as young as William Brock, who's sitting in the first row, to become a naturalist. This book is an appeal to save the environment. This book is an appeal for a political union of sorts. And that is what I just want to address my remarks very quickly to.

We seem hopelessly mired in a war of cultures. A recent *New York Times* article, I think it was about a month ago, pointed out that the country's divide between red and blue states, hawks and liberals, is more acrimonious *now* than it was even during the Vietnam War. So many of us, especially in places like New York and Ed Wilson's adopted city of Boston, grow so despondent about the trajectory of the nation. What is going on? There seems no hope of any sort of rapprochement between warring groups and that a

growing secession of ideas, a boiling fundamentalism on both sides, if we have the courage to look at ourselves, threaten to undo this very fragile cultural union. So intense seems this divide that not a few people when they learn of the premise of Ed's new book, *The Creation*, they *scoff*. And they don't even want to *look* at this book and they say, "Why I should look at a book which speaks to evangelicals, to ministers, to many on the *presumed* right?", assuming that all ministers and Christian evangelicals are on the right of the political spectrum.

But Wilson, a man who comes from Alabama, who as a young man, as he writes in his book, "took the waters," has never been afraid to take risks, to buck popular opinion, to make public statements that at first might seem vexing and controversial. While other leading scientists, pundits, writers seem eager to stoke our great national bonfire that's going on right now, that to fuel the conflagration that seems to have shredded the American culture in two, Wilson very surprisingly seems to have totally changed directions. His new book appears like a departure for a man never known for ecumenical philosophy or pacifying wisdom, but, if anything, *The Creation* could be his most revolutionary book, a book that attempts to build a bridge, a meeting as Paul remarked on, between scientists and the evangelicals, a book that challenges the rhetoric and hate which is going on right now. We can only hope, then, that this book with its with considerationate reason, coming at this troubled time will be a harbinger of things to come. One never knows as a book editor.

May *The Creation* force us not only to work and appeal to save the environment, whose existence is more imperiled than all of us think, and lead us out of a state of profound *denial*, but lead us to speak out with less derision for the other side. Perhaps *The Creation* can even serve as a building block providing a semblance of unity where *none* has been thought to exist in the past, that we might be willing, as Wilson writes, "to meet on the near side of metaphysics in order to deal with the real world we share." Thank you to all of you, and this is to introduce Ira Flatow and Professor Ed Wilson.

(applause)

IRA FLATOW: Thank you. Thank you, Bob, for that introduction. I'm Ira Flatow, that's Ed Wilson. I knew they'd get us mixed up. The first time I actually met Dr. Wilson was at a science meeting, about thirty years ago, in which a pitcher of cold ice water at a lectern was dumped on top of his head as he

was giving a talk, and I can't think of a better way to begin than for you—tell everybody what happened and why you were so well anointed that evening.

E. O. WILSON: I claim the historical distinction of being the only living scientist to be attacked for an idea. And the idea was that of sociobiology. In 1975, I published a book called *Sociobiology: A New Synthesis*. And in it I devoted page after page of this book which was, you know, meant to be my magnum opus—that's defined as a book heavy enough so that if dropped from a three-story house can kill a man. **(laughter)** But I went on and on, chapter after chapter, with glorious illustrations drawn with great accuracy by Sarah Landry, a fine scientific illustrator, on social animals of all kinds, I went from one end to the other. And that got a lot of favorable attention and critical review, because no one had ever done it quite that way before.

But then, I said, “You know, I can't leave this book without writing about the big kihano, the mammal, you know, us,” and so I had to write about humans and I then took that opportunity to address the human condition, the human social behavior, with the same ideas and concepts that had been developed for the rest of the world, and I thought it was a rather nice piece of pabulum that would introduce ideas that they hadn't heard of before to the social sciences, and then all would be well, but it was not to be, because I'd run up against the blank-slate culture. That's the culture that prevailed in the seventies. Not just on the left, where it was doctrine, neomarxist doctrine, then, but also throughout the social sciences, namely, that the mind is built as a product of culture and experience and contingency on a brain that is essentially a blank slate. Now, *all* the evidence pointed *against* that at the time, and I thought it was perfectly ordinary, maybe it would be even orthodox, to describe some of the traits of human nature that we'd begun to understand and could understand better with sociobiology.

Well, a storm hit, a total unexpected, to my dismay, and to the delight of Harvard University Press **(laughter)** and so it raged through the seventies as what was called the biggest intellectual controversy of the day. And if you asked students entering biology now, even graduate students in biology, about the sociobiology controversy, today, they would—a large percentage, maybe a majority—would say, “Well, I haven't heard of that,” or “I've heard of it but I don't know what it was all about,” and so on. The blank slate died as an idea twenty-five, thirty years ago, but, and I'm being very long-winded about this, because I'm trying to build up my courage for this evening.

IRA FLATOW: You're doing very well, sir.

E. O. WILSON: Okay. Well, I arrived at the AAAS meetings, that one that you attended, of which no tape recording was made, no video was made, interesting, there was no one there in a large crowd, much larger—

IRA FLATOW: You know, we may actually—we covered it. NPR covered it. I was there. We may actually have that somewhere.

E. O. WILSON: Hey, check that out, will you? **(laughter)**

IRA FLATOW: It may be in a basement underwater someplace. That's where all the old NPR tapes are.

E. O. WILSON: Well, if you pull it out, I'll get Harvard to pay for the restoration.

(laughter)

IRA FLATOW: They actually bake it in an oven.

E. O. WILSON: All right. But anyway. There was a radical group there.

IRA FLATOW: Science for the People.

E. O. WILSON: It was Science for the People, actually it was International Committee against Racism, and they had bought the idea from some of these blank-slate people that not only was this a *wrong* idea, but that it was politically dangerous because if you allow for *instinct* in human beings, if then you allow for a genetic basis of human behavior, it's *not* just culture, *not* just experience. And then if you allow for that, and if you've followed the tortured logic up to this point, that means you would allow for genetic *differences* between people, in personality, intelligence and so on, of course all of that was textbook

stuff in the seventies already, in books on human genetics and behavior, and so on. But that's what incensed them, and they wanted to set an example by dousing a scientist, and they took over the stage and dumped the water on me, and then, while I was drying myself off, proclaimed the goals of the new world.

IRA FLATOW: They said you were all wet, Dr. Wilson. Something like that.

E. O. WILSON: Yeah, they did. I *was*, too.

(laughter)

IRA FLATOW: You've said to me that things prevail, new ideas prevail, because—or they don't prevail—because they outlive their critics, they outlive their critics.

E. O. WILSON: Actually I was quoting Niels Bohr. That was earlier in our conversation before.

IRA FLATOW: Was this that kind of idea that prevailed, because you have outlived your critics.

E. O. WILSON: Oh yes, I have. **(laughter)** As Paul Samuelson said, "Funeral by funeral, theory advances." **(laughter)** He said it, I didn't.

IRA FLATOW: You wish you had said it.

E. O. WILSON: Niels Bohr said frankly that his theory, the atom theory and so on, all these things are in hot dispute. Scientists are among, *you* don't see it, but scientists are among the most combative people outside of the African spotted hyena. **(laughter)** At any rate—

IRA FLATOW: Can we quote you on that one? I'll quote you on that one.

E. O. WILSON: Okay, please do. But Bohr did say that the reason why the atom theory which, you know, every textbook ever studied by anybody doing the physical sciences, was succeeded because he outlived his critics.

IRA FLATOW: Right. Do you think this book, *The Creation*, is another rabble-rousing book?

E. O. WILSON: The opposite, Ira.

IRA FLATOW: Tell me about it.

E. O. WILSON: I am calling my brethren to the river for a meeting, and it is not, it is as my distinguished editor, who is so responsible for much of the organization of this book, has noted, this is irenic. It is meant to bring peace and my real *deep* goal—it's not the only one, and all the others, it's not a pretext. But the real goal is saving the Creation. And it dawned on me that saving the Creation, saving biodiversity, is a rather *complicated* business and it's an idea that you can't easily get your mind around. I mean, not very many people are going to get worked up and contribute to the World Wildlife Fund because a species of parrot dies in the Upper Amazon. They understand climate change—the figure I've seen is eighty-five percent of Americans now accept that climate change is happening and it's a serious problem, and it is opposed only by a small number of experts, like Rush Limbaugh. **(laughter)**

But, note, there's not much of a consciousness about what I consider the problem that will matter the most to people a hundred years from now, and a thousand years from now, namely that we are pauperizing the earth in an irreversible way, and ecosystems are being wiped out, can never be reconstituted, species are being lost at an accelerating rate, and that's well documented, and that's what I've spent a lifetime studying, and this is a concern primarily of a small—you know, proportionate to the huge American and world population—a quite small number of people who are devoted conservationists and conservation scientists, and professionals, and real hardcore environmentalists in our midst, and *they're* doing a wonderful job as best they can, but they only represent a very small percentage of the public. And as I went along, I was worrying about this, you know, I think my colleagues keep thinking that maybe “one more book, one more book,” like General Haig at Verdun, **(laughter)** “one more charge, one more battalion of men and we'll break through, one more charge,” and it hasn't been

happening. The atmosphere has been changing very well, Americans are becoming green, I mean, generally.

But it occurred to me that there is one *enormous* group of people in this country that really should, and probably do if you ask them, care about the Creation, and that of course is the great, well, I started to say Christian, Judeo-Christian, but why not just say those of the Abrahamic religions, it includes Islam, they *care*, but they don't have it articulated, and furthermore they just don't seem—they don't see the need to really move on this one now. If they could be recruited, if even a *tiny fraction* could be recruited, then, it could tip the balance, this could be a tipping point. Well, that was my dream and that we shall see what happens. And I might say that, because what I'm calling for is irenic, and it is meant to be an exchange of mutual respect on common ground, the hopes that we *will* get this kind of engagement are high.

IRA FLATOW: Now, you start your book out—and the book is basically a long—it starts out, the first chapter—“Letter to a Southern Baptist Pastor.”

E. O. WILSON: Yeah.

IRA FLATOW: Why did you pick a Southern Baptist pastor?

E. O. WILSON: I grew up a Southern Baptist pastor, I've wandered a bit. **(laughter)**

IRA FLATOW: So you felt safe in that.

E. O. WILSON: So let me say that if I had been a young fellow of Jewish persuasion from Brooklyn—

IRA FLATOW: You're looking at me when you say this. **(laughter)** Which is exactly right.

E. O. WILSON: I want you to *join* us at the *river*, Ira. **(laughter)** The point is somehow, this would have created a little bit of a disjunction in the original thing, but that's why I selected evangelicals. I also selected evangelicals because of what I call the New York effect. And that is, if you can make it in New

York, you can make it anywhere. If you can make it with the evangelicals, you know, the fundamentalists included, you can make it with the rest of the religious community.

IRA FLATOW: Well, to give our audience a flavor of the kind of—it's a terrific book, I'm going to ask you to read the first page and a half.

E. O. WILSON: The first page and a half?

IRA FLATOW: Yeah, I have a little mark where, so you could also probably read the whole thing to us, but turn the page, there's this little mark over there, so read over from the beginning to that point.

E. O. WILSON: All right, fine. I knew that—I *know* my people, I grew up in Alabama. And I knew, furthermore, and it's just common sense, that if unless you enter into a discourse of this kind, unless you put—first you put the cards face up on the table, and you don't get mealy-mouthed about anything, but present it exactly as it is, as you see it, and the second thing you do when that is done, is you extend the hand of friendship, of mutual respect, as every one of them deserves, and so:

“Dear Pastor, we have not yet met, yet I feel I know you well enough to call you “friend.” First of all, we grew up in the same faith. As a boy, I answered the altar call, I went under the water. Although I no longer belong to that faith, I am confident that if we met and spoke privately of our deepest beliefs, it would be in a spirit of mutual respect and goodwill. I know we share many precepts of moral behavior. Perhaps it also matters that we are both Americans and insofar as it might still affect civility and good manners, we are both Southerners”—passé, New Yorkers—

(laughter)

IRA FLATOW: I didn't see that in that book—editing as you go!

(laughter)

E. O. WILSON: I wanted to keep goodwill here. “I write to you now for your counsel and help. Of course, in doing so, I see no way to avoid the fundamental differences in our respective worldviews. You are a literalist interpreter of Christian holy scripture. You reject the conclusion of science that mankind evolved from lower forms. You believe that each person’s soul is immortal, making this planet a way station to a second eternal life. Salvation is assured those who are redeemed in Christ.

I am a secular humanist. I think existence is what we make of it as individuals, there is no guarantee of life after death, and heaven and hell are what we create for ourselves on this planet. There is no other home. Humanity originated here by evolution from lower forms over millions of years, and yes, I will speak plain. Our ancestors were apelike animals. The human species has adapted physically and mentally to life on earth and no place else. Ethics is the code of behavior we share on the basis of reason, law, honor, and an inborn sense of decency, even as some ascribe it to God’s will.

For you, the glory of unseen divinity. For me, the glory of the universe revealed at last. For you, the belief in God made flesh to save mankind. For me the belief in Promethean fire seized to set men free. You have found your final truth. I am searching. I may be wrong. You may be wrong. We may be both partly right.”

IRA FLATOW: Very good. Thank you. Does this say that there is room for compromise? Do you think that it’s going to take compromise on both sides?

E. O. WILSON: No, there is no room for compromise. **(laughter)** Let’s be perfectly clear about that. It’s my view that the gap between the two worldviews is wider than it’s ever been. It’s widened all the time by the growth and the compelling nature of scientific evidence. It would be foolish, in my perception, to try to—to try to paper that over. *But* that doesn’t stop us. Americans, in particular, have always gotten along with radically different views and achieved great things together. Why should we have to have some sort of compromise in our metaphysical views before we got busy and *did* something?

IRA FLATOW: So we can agree to disagree, but we have to save the planet, is the goal.

E. O. WILSON: Yeah, that's right. I think I'm the first to actually take this approach. And I believe that the reason is, just, you know, for taxonomy, say.

IRA FLATOW: Of course.

E. O. WILSON: I like to divide the scientists who have—the ones who come mainly from science, who *have* addressed the issue of the relation between science and religion, into two groups. They are the warriors and the wimps. **(laughter)** And the warriors include Dan Dennett and Richard Dawkins, and they believe that the way you settle the science-and-religion dispute is the way a Vietnam general in the Air Force once said we could win the Vietnam War: “Bomb 'em until you see the rubble bounce.” And that's what a lot of their books are, they're just—oh, Sam Harris, who will be coming here shortly, I think takes that approach. It's *all* foolishness, it's *all* delusion, the point is you just slam it and expose it until finally it just goes away. That is based on a *massive* misunderstanding of human nature and of the *deep* roots and fundamental role of religion in society, and I won't go into that because we could spend the whole night—

IRA FLATOW: So who are the wimps? Then who are the wimps?

(laughter)

E. O. WILSON: Ah, the wimps. And I'll name them.

IRA FLATOW: Just between you and me.

(laughter)

E. O. WILSON: Okay. They included Steve Gould, you know, who said, “Oh, we'll never solve this.” Yes we can solve it. Who was the Pope in 1503, it was, that divided the world, the known world then, down the middle, this was to be Brazilian—this was to be Spanish and the other to be Portuguese,” and Steve said, “We'll just divide the universe, reality, you know, thought, everything, into two parts. Religion shall have the supernatural and moral reasoning and spirituality to a large extent, and science

will investigate the real world. That solves the problem.” The other wimp I’ll mention—in this regard, these are good people, of course, in other ways, but in this way of thinking I’ll call them that, is Francis Collins, the one who led the public part of the DNA, decoding, the human DNA decoding.

IRA FLATOW: He just wrote a new book about this, he just wrote a new book about his views—

E. O. WILSON: Yes, that’s why I’m referring *to* him. **(laughter)** Bu there are a lot like this, that say—a few like this—that say that, “Hey, the worldviews aren’t that different, after all. King David’s scribes, or whoever it was, you know, that wrote Genesis, really saw a lot of truth and could see into the future, and you can think of a lot of what they wrote about as being the metaphorical equivalent of science,” and so on. Well, I don’t buy that.

IRA FLATOW: He said, though, that God was outside Nature. He said that—

E. O. WILSON: Of course, he would have to be.

IRA FLATOW: God was outside of nature and that there were times when God would poke into nature and create miracles.

E. O. WILSON: It’s true. Yeah, that’s true. I mean, it’s true he said that.

(laughter)

IRA FLATOW: Glad you qualified that. We could see the quotes in the paper tomorrow. “E. O. Wilson said it was true.” Let’s talk about *spirituality*. That doesn’t mean that as someone who is not still a practicing Baptist, you cannot be spiritual.

E. O. WILSON: Yes, you know, I think most deeply religious and even fundamentalist believers would agree with that. Spirituality is something that’s basic to humankind and is expressed in every religion but it’s also expressed just as strongly by the nonreligious, by the secularist, and it is a quality—please don’t press me to try to frame it—but it is a quality of mind, an optimism, a joy, even, shall we say, an

eagerness about embracing the world and coming to see it more and more fully, the meaning of the environment into which we are born.

In many ways, secularists, perhaps see it better, particularly coming out of science, because we recognize that with our senses we only perceive a minute part of what is around us in the world, the universe in which we live. We only see a minute fraction, an almost infinitesimal segment of the electromagnetic spectrum. We call it light and we think that it's everything. We hear only a tiny part of the range of sound wavelengths. And we now know that there are elephants that are grumbling at one another below what we can hear, except maybe we feel the vibration, and that bats, and many other animals, are communicating by ultrasound—beyond us. We have to use instruments to see this. There are electric fish that actually communicate and mate through electrical signals and they have electrical receptors. We are not even *aware* that such a thing as electricity exists, you know, physically, except when you get a bad shock, and all of this world is all around us, and it's pulsating all around us, and it has been *science* that has opened it up to *fuller* and *fuller* view, and as our knowledge expands and this is still expanding, into the realm of life as well as, you know, out to the edge of the universe. We are getting a view of reality that surely *matches*, if it doesn't transcend, the best that the Old Testament poets could have given us.

IRA FLATOW: Do you think that there is any room for addressing Creation in the classroom? I mean, is it not a teaching opportunity in a science class? I'll play devil's advocate, because I think there's something *to* this, that if a student asks, "Why *not* God?" then you can show, you can show how there are questions that science can answer, and there's questions that science can't answer.

E. O. WILSON: No, I don't think there's any place for it, and I think it would be actually *dangerous* to science to so—I mean, to religion, to so intrude it. I've even written, and this may have inspired you to ask me this question, an extraordinarily long opinion piece in *USA Today*—I was invited, and it was long because they don't usually allow, you know, more than three or four paragraphs (**laughter**), and I pointed out, and I did it in, you know, in a congenial manner.

IRA FLATOW: You are. You are nothing if not congenial.

E. O. WILSON: Okay, respectful. I was brought up right. **(laughter)** That by saying, “Look here, this isn’t science, because it’s based on a default argument,” and a default argument in their case, in this case, is to point to something that has not been *solved* yet, that we don’t fully understanding in science yet, such as some extremely complex systems, and that’s—and *then* to make the argument, a huge leap of faith as it is, says the intelligent designer, IDer, “It *can’t* be explained. Science hasn’t explained it yet. It can’t be explained. Therefore, we have to find an ‘alternative theory,’ and that would be, of course, supernatural intervention.” And you can’t do that, you don’t do that in science.

Besides, you have to have an alternative explanation, and so to pursue it in that manner is dangerous. And this is the first way it’s dangerous. Because we have been knocking off complex systems. That’s what we do for a living, scientists, you know, is solve complex systems, and we’ve been knocking off one after the other. They’ve pointed to the eye as too complicated to explain by the two laws of biology, which are, you know, physical, chemical basis of life, and evolution by natural selection, and we’ve done that long ago, we’ve explained it very well. They point to the spinning cilium of the bacterium. “How on earth do you ever *evolve* something like that?” Well, we’ll get there. We do—that’s what we do for a living and we’re very *good* at it. So if you were to try to—you were trying to pull religion into science, it’s going to get badly bruised, and if you do that in the presence of students, it’s going to—it could be lethal.

But there’s another reason why this is dangerous for the fundamentalists, you know, who want to close out, or bring it in, intelligent design. And that is, it’s sort of based upon an assumption, sometimes made it explicit, that scientists are in a kind of conspiracy to try to prevent Intelligent Design from being brought in to the classroom, that we fear it. My goodness. Nothing could be farther from the truth. You see the problem with intelligent design is that it—besides there’s not a shred of evidence, but there’s not even a *theory*. As one physicist once famously said about one of his more modestly endowed colleagues, he said of his theory, “Why, it’s not even *wrong*.” **(laughter)**

In other words, it couldn’t—they can’t even imagine how you go from a supernatural—outside nature—force, in and transcribe that into the physical processes of random mutation and so on, it hasn’t even been imagined, dreamed of, and let me assure you that if someone did it, and actually came up with a *testable* idea, it would be regarded as potentially the most important scientific discovery in history, and

there would be a *stampede* of scientists to get in on that, because the business of science, its currency, its gold and its silver, are discoveries. If you make a discovery, then you're a scientist. You make a great discovery, you're a great scientist. You can be a complete jerk after that (**laughter**)—and you're still, it will never be taken away from you, you're always going to be a scientist or a great scientist.

IRA FLATOW: I know a few of those. I'm sure you know more than I do.

E. O. WILSON: I will not be naming names.

IRA FLATOW: Present company excluded.

E. O. WILSON: I've gone on too long, but I thought this was a very important question.

IRA FLATOW: But I also—just as you laid it out, could it not be discussed this way in science class, just read what E. O. Wilson has written about this, and as a way of discussing it in science class.

E. O. WILSON: Yeah, but I think most science teachers in this country would want to bring it in as to show students how not to think about science, talk about science, or not to think of as science, the way I did it.

IRA FLATOW: Yes. Do you feel, writing this book, that you talked a little bit about the reasons, but do you feel this is something that you *had* to do? I mean, is this “I'm E. O. Wilson and I have to lend my weight of my person, my eight-hundred-pound-gorilla-ish part of me as a person, to try to move this ahead,” did you feel that it was your responsibility to do this?

E. O. WILSON: Move what ahead?

IRA FLATOW: Well, the dialogue. To create this—

E. O. WILSON: You mean, with religion? No, no.

IRA FLATOW: Yes, to create—“If no one else is going to do it, I have to do this.” Did you feel that way?

E. O. WILSON: No, I never felt that. I didn’t particularly care to get into this subject. I have too many relatives in Alabama. **(laughter)** But, quite apart from that—

IRA FLATOW: Details, details.

E. O. WILSON: I’ve got enough battle ribbons already from previous controversies. No, I got into this because pure and simple I wanted to save the Creation. And then I also moved into it easily because I do genuinely have a deep respect and, indeed, love for the people that I grew up among. They are wonderful people. They are not the—what did Mencken called them, the booboisie—whatever. At any rate, they are not as depicted in scathing accounts of the past, that way anymore, and I simply was not particularly interested in. There are enough warriors, shall I say, among the scientists, to take care of that battle.

IRA FLATOW: So have you found someone on the other side who’s ready to write something like this?

E. O. WILSON: My goodness, have I. Oh, you mean on the other—opposing that?

IRA FLATOW: No, no, the clergy on the religious side.

E. O. WILSON: On the religious side, oh, yes, before this book came out. When did it come out, Bob?

BOB WEIL: Last week.

E. O. WILSON: Last week?

IRA FLATOW: Last week.

(laughter)

E. O. WILSON: Before it even came out, the word was getting around.

IRA FLATOW: That Internet's something, isn't it?

E. O. WILSON: And I started getting mail and calls from Baptist ministers and when your colleague in *On Point*. It wasn't Mr. Ashcroft [sic], it was a substitute for that day. He and his merry crew up there in WBUR, decided—they had me on to talk about it. They decided they would get a *real* Southern Baptist.

IRA FLATOW: You're not good, a *real* one.

E. O. WILSON: A real one. So they picked up this—I don't know how they found him, a marvelous—

IRA FLATOW: In Boston!

E. O. WILSON: No, he was in Atlanta. An African American in charge of one of these really *big* congregations, and he apparently has recently become engaged in the environment, although he hadn't, you know, heard of much of *this* stuff and we got on the phone, on the air together, total strangers, and had a simply marvelous exchange. But I can tell you that at the present time I'm talking with people in the National Association of Evangelicals, and that there's a lot of talk of meetings, of common examination of these subjects. I have received and spoken directly to quite a few—mostly Evangelicals, but now a leading Catholic theologian, others Protestant, mainline Protestants. I have heard nothing so far but very favorable, even enthusiastic, response. So I think there's a button that's—

IRA FLATOW: A tipping point.

E. O. WILSON: It's a button to be pushed that will make a tipping point. I think so. I'm hopeful.

IRA FLATOW: You know, you have this quiet demeanor about you, you're very quiet, but underneath here—you see, he's looking at me—like there's this volcano, **(laughter)** waiting for the right button to be pushed, right? You get pretty upset about things.

E. O. WILSON: I'm very enthusiastic.

IRA FLATOW: I can see that.

(laughter)

E. O. WILSON: I'm *tired* of going down to the tropics where I started my career and, you know, seeing yet one more area of rain forest clear cut for palm oil trees or for soybeans.

IRA FLATOW: It's getting old.

E. O. WILSON: Because I *know* what's being lost.

IRA FLATOW: You have that unique perspective because you go down there and actually watch—

E. O. WILSON: I've watched it unfold over the last fifty years. And I have colleagues who have followed it for decades who tell me that in what we call the hot spots of biodiversity many of these places there's been a major wiping-out.

IRA FLATOW: How do you stop the rainforest destruction? Is there anything that you can do?

E. O. WILSON: A lot's been tried, and, you know, we made real strides in the 1992 Rio Conference. Awareness certainly has risen *dramatically* around the world and actual research programs have been instituted in many of the developing countries and *strengthened* here. New parks *have* been created, and this is especially welcome in countries like Gabon and Madagascar, where there was a risk of the whole thing just going to zero.

IRA FLATOW: But you never get—this is not on the radar screen in this country.

E. O. WILSON: But, yeah, it's not, you know, compared to the total global picture, it's not a lot, and you're right, it's not on the radar screen. We really need to have this somehow get into the media, but that's—

IRA FLATOW: But that's a whole other story.

E. O. WILSON: Well, no, I was about to say, that's your job.

(laughter)

IRA FLATOW: That's my job. I've got to put on my Junior Media Man button to do that. But I could talk for hours about the media, don't get me started. This is your night.

E. O. WILSON: No, no, I'm not laying this on you. You're terrific.

IRA FLATOW: Well, okay, thanks.

E. O. WILSON: But the media, generally, have not handled this domain of human concern very felicitously and science generally, but that's another subject. That's another evening, reporting in science.

IRA FLATOW: Don't get me started. We've—we're going to start. If you have a question for Dr. Wilson, there's a microphone that's going to be—a couple of microphones, two of them. Treat them nicely, they're your friends. We'll be passing them through the audience. While we're doing that, let me ask you about this Pluto thing. **(laughter)** You know, here we are in a city that was so far ahead, the city that doesn't sleep, that already has the Rose Center, they already took Pluto out of there years ago. What do you think? Was this a tempest in a teapot, or you think this is something that's important?

E. O. WILSON: Well, after thinking about it a great deal, I think it's a tempest in a teapot. **(laughter)** Well, actually, it is, obviously. This is an example of something that's hard for us to let go of. I mean, how many of *you* had to memorize the planets in the solar system? You had that under your *belt*, I mean, I think you could rattle them right off, and then, the word was that we were going to add three more planets here—you remember that? Ceres, and I've forgotten the other two already.

IRA FLATOW: Xena is one. Ceres.

E. O. WILSON: Xena. Then comes the news that no, they're going to get demoted, or at least Pluto, poor little Pluto, demoted to a dwarf planet. And, you know, that's good science. Get used to it.

(laughter)

IRA FLATOW: All right, who's got the first question? If you've got the microphone—if you've got the mic? Yes, sir.

Q: You didn't say what your appeal was to the evangelicals. What *is* your argument that you present in the book? I'll read the book, anyhow.

E. O. WILSON: Okay, yeah. I was holding back and hoping you would. **(laughter)** Where are you?

IRA FLATOW: He's right over here.

E. O. WILSON: Oh, here. There you are, sir. Sorry. The argument is *exceedingly* simple and it is that—it's why we're addressing evangelicals: "You are a follower and a believer in sacred scripture—Judeo-Christian sacred scripture. You have every reason in the world to accept your role as a Christian or a Jew as steward of the environment." Oh, I *know*, there's a place or two where the Lord instructs us to take *dominion* over the world, but the Lord also says "let the waters teem with living creatures and let the birds fly across the earth beneath the vault of the heaven"—Genesis, and it's perfectly obvious in the context that we are to be stewards. As Billy Graham said, not long ago, "Just to take dominion over the earth doesn't mean that we have to trash it."

So the point is that this should be a mandate, it seems to me, of Judeo-Christian belief and, for that reason, saving the Creation is the right thing to do. The scientists, the secularists, and most scientists are secularists, have discovered—and this is what we *do*, you know, this is our work—have discovered the peril that the biodiversity is in and what we bring to the whole subject is a documentation of what's happening, and what it will mean, and what the loss consists of, and how to possibly fix it. So we come in from radically different directions and then, providentially, we arrive together on an area that is neutral. Common ground where we can put aside how we arrived at this conclusion, but combine, as I like to put it, in an elementary way the fundamental knowledge and the appeal that arises from that scientific knowledge of the condition of the Creation, with the spiritual and moral strength and fervor of committed believers in Judeo-Christian religion. And that's in a nutshell the argument.

IRA FLATOW: And it's interesting that you use the word Creation, which is a biblical word.

E. O. WILSON: Oh, yes.

IRA FLATOW: But also you can use it as a non-biblical word, and that's sort of the meeting of—

E. O. WILSON: Yeah, that was the idea. **(laughter)** I wanted to flip it back and forth, make it easy to speak—in other words, I wanted the scientists to be able to speak of the Creation without having their colleagues looking at them out of the corner of their eye, and thinking maybe they were losing it.

IRA FLATOW: Who's got the mic? Over here? He's next, give him the mic and he'll go next.

Q: A large number of the millions of species that are threatened with extinction are single-celled creatures that we can't really see that presumably don't have sentience of any kind. How do you communicate to people why it matters that they don't go extinct? And how much of the kind of the sorrow, the pain that you feel about their extinction would be eased by us capturing that information about them, their DNA code, before they went extinct? Is this about information preservation? Help us understand that.

E. O. WILSON: I just traditionally—I mean, myself, habitually, I should say, use three separate arguments. And I believe that when you make the case for saving life that all three should be presented, because they have a different impact on different people, initially, but all three should be taken into account. And let me say how awkward I feel that somehow I and other environmentalists and scientists should be expected to *plead* for the rest of life on earth like defense attorneys, you know, making a case to leave alive this entity. It's quite extraordinary. I think it's a commentary that we have to go through this exercise constantly.

But, anyway, the three reasons are first of all utilitarian. That's for the Republicans. **(laughter)** And you can show just chapter after chapter, book after book, the enormous real benefit that we receive from having, you know, in our economic system that we have, a natural environment, wild species, and all the products that we can get from them, we have gotten from them, case after case in the pharmaceutical industry, for example, of wild species, once they were studied carefully, yielded new pharmaceuticals, whole classes of pharmaceuticals that saves people, nowadays in certain kinds of cancer, allow us to have a balanced portfolio in the fight against malaria, on and on and on, and so that alone, and you can put that into dollars and cents.

The second reason is ecosystem services. Wild environments, it's not appreciated, give humanity scot-free, and this is a 1997 estimate by biologists and economists who studied it, services that include pollination, water purification, water management, automatic water management, the restoration of soil, the very creation and purification of the atmosphere, that could be, if you had to put a dollar and cent amount on it, that could come—in 1997 dollars—thirty trillion a year, which is roughly the gross world product, that's the combined gross domestic products of all the countries in the world, we get that scot-free.

And, finally, and this is to me the clincher. The clincher. And that is, this is spiritually enormously important that we save the rest of life. You can take that out of personal religious belief, or you can take it out of our increasing understanding of human nature, which suggests more and more as a result of a new field called environmental psychology, being put to practice in a new movement called biophilic architecture, and on and on it's coming into our culture. That we are hard-wired to *need* the existence of the rest of life, you know, and an untrammled part of the world that's independent of us and to which

we can refer to in many, many ways, including spirituality. So if I haven't convinced the most hardcore Secretary of the Interior with this argument, nothing will.

IRA FLATOW: Okay, who has the mic? Yes, sir.

Q: I do have a question, it may take a minute to get to it, and I hope I don't make a fool out of myself while I get to it. The problem I have with the book and with this meeting is that we do not have a real sense of how *dangerous* this situation is. This situation has to do a great deal with global warming and what we are able to do about it—if we ever do something about it, and how *significant* it is. It's not just creatures in the jungle that are disappearing. In time, if we don't solve this problem, it is hundreds of millions of us and the people in the future that are either not going to be born or are going to disappear. That's going to happen if we don't get this under control. This is not a Y2K problem, this is not a chlorofluoro problem, those things were cakewalks. This thing is something that we have to do because we have to overcome a lot about what human nature is, and we've got to get that message across. And it is so difficult. I'm going to ask you to comment, if you will, on Siberia, what's going on with the permafrost in Siberia and to the extent that that almost makes this problem, if we get on it now, hopeless. And I think that's what's going to happen is that we now consider talking, or the scientists talking about how to solve the problem, if we don't solve the problem within ten years what we will be asking ourselves is "How do we live with it?" And "How do we live with it?" is extremely difficult.

And I ask this question, it's called just in case. Just in case mankind doesn't alter his religious views, just in case mankind's greed and shortsightedness remains unchanged, just in case the biosphere's feedback loops *really* kick in—learn about those things—just in case the environmental Armageddon has begun, just in case the earth becomes our Easter Island, other than stock up on duct tape and bottled water and don't live on an island, what survival tips would *you* give us?

(laughter)

E. O. WILSON: Worst-case scenario, I think, that you're describing there. Well, you know, I can't answer that. That's too complex a question. May I simply enter a note of optimism in this, of cautious

optimism, by quoting Abba Eban, foreign minister of Israel during the 1967 War. When that particular period of madness was underway, he said, “When all else fails, men turn to reason.” **(laughter)**

And you know, I have a feeling that it’s not going to get as bad as you fear. I believe that there *is* such a thing as a tipping point in environmental awareness and of the action that people will demand to meet these crises as they become more aware of what the threats really are, and given that politics, political change of the real importance does *not* come from the top down in a democracy, does *not* come, anymore, from an inspired leadership, federal leadership, it comes from the bottom up, and the leadership is formed and expressed as a response to that. So we really have to have bottom-up pressure.

IRA FLATOW: Are you talking about November this year, Dr. Wilson?

E. O. WILSON: What’s happening in November? **(laughter)** Of course. Well. No. I’m not going to get political. I’m just saying that what we need to do is to get the environment back on to the political stage, and get it into the mainstream, and I hope we’ll have political leaders with the courage in that election, and on ahead, who will make it part of their agenda and be *bold* about it.

Q: Dr. Wilson, could you just—

IRA FLATOW: Wait, no, no, no.

E. O. WILSON: We’ll schmooze later.

IRA FLATOW: Who’s got the microphone? Whoever’s got the microphone stand up and use it. There you go.

Q: I was wondering how this book is being marketed to the evangelical community.

E. O. WILSON: Could you speak a little more loudly, please?

Q: I was wondering, sorry, how this book is being marketed to the evangelical community?

IRA FLATOW: How's it being marketed to the evangelical community?

E. O. WILSON: How has it been marketed there?

IRA FLATOW: Ask your publisher.

E. O. WILSON: Rachel? Let's see, where is she?

IRA FLATOW: In other, words, is it being marketed—

E. O. WILSON: There! Well, we were just—I won't put her on the spot—we were just talking about it. We're hopeful of getting, would you agree, of getting this more or better known in the publications of the and in the venues generally of—not just the evangelicals, but other religious information groups, and I'm hopeful.

IRA FLATOW: Is Bill O'Reilly going to ask you to come on his show?

E. O. WILSON: Who?

IRA FLATOW: Bill O'Reilly.

(laughter)

E. O. WILSON: You know, that's an interesting point. What on earth—

PAUL HOLDENGRÄBER: You should do it. I will host it. **(laughter)**

E. O. WILSON: You've got my imagination raging. What on earth would he say?

IRA FLATOW: Well, how about something, somebody really influential, like Oprah? If Oprah would put her—

E. O. WILSON: That would be better. **(laughter)** But Bill O'Reilly, what would he say? Would he say, "Are you *crazy*? Make peace between science and religion?"

IRA FLATOW: But he has said some positive things about global warming.

E. O. WILSON: He has? Okay, I didn't know that. Well, anyway. Next question, quick.

Q: Hi. Alan Miller from the *NY Salon*. You spoke very beautifully about science in your description and depiction of it and it's very inspiring actually. But my question to you is that it seems today there's a very misanthropic view about *humans* and about *science* and the idea that we're mad and bad and dangerous and out of control. And my question to you is that once we can all recognize there are problems, the discussion about sustainable development, about having gone too far, the idea that we're out of control, seems to depict a world in which humans are just greedy and avaricious and nasty and pernicious, and actually seems to undermine the very idea that we can move forward through innovation, through science, through technology, through a belief in our creative endeavors, to transform things in a positive fashion, and instead what we have to do is to go back and revert to some notion, which is actually a mythological notion, of a sustainable past.

So my question, really, to you, is—you know, because often people will say, "Well, if India or China carries on like America, that will be *it* for us," and what they're really saying is we can't have development there. So my question to you is, how do we overcome some of the problems we think exist, which are still contested somewhat, but how do we overcome them if we are so averse to the idea of development and technology and innovation in pursuing these ends?

E. O. WILSON: Well, I don't think we are that way. I think that's a rather grim and unfair picture of humanity. I personally love people. *Homo sapiens* is my favorite species. **(laughter)** Saving biodiversity, saving the natural environment, is necessary to vouchsafe the future of our beloved species, and I think that all of those goals that you were mentioning that we should have are the ones that we are

bound to seek, that are being formulated by a lot of smart people, and it's a matter of finally getting them across and getting them into public and economic policy.

IRA FLATOW: Do you think Chinese and the Indians—

E. O. WILSON: What?

IRA FLATOW: Do you think the big new economies on the block—China and India—have the environment in mind?

E. O. WILSON: Oh, they have a *terrible* environment. Particularly China. I mean, it's in awful condition.

IRA FLATOW: So, what are they doing about it? He made a point about that. What about—do they put that in their ledger, like you say, you know, when they think about the future?

E. O. WILSON: Not yet, but I think it's inevitable that they will. I mean, China in particular. You know—well, India, has now, I understand, become less than self-sustaining in agriculture, but China is approaching the crunch point in its water supply. Its groundwater is disappearing, it's desperate to—it's got to engineer the entire country in order to get sufficient water supply and its pollution is the worst in the world. So a lot of smart people in China are aware of this. And there are more and more conferences going on between American scientists, European scientists, and the Chinese.

I don't want to sound like a Pollyanna, but there is another aspect to all this that is worth thinking. *Homo omnivorous, omnivora*. We are *homo sapiens*, "wise people." We won't stay *Homo omnivora*, that is, consuming everything until it's all gone and then *we* go, because the latest United Nations—that I'm aware of—United Nations projection for the human population *peaking* is about nine billion. We're at 6.5 billion now, we're talking about a forty percent increase in the number of people. We are also, however, talking about a rapidly rising per capita consumption around the world. We will peak. China will then join those countries, be joining those countries that have declining population, probably by the early twenty-second century, and if we can also find a way to reduce our dependence—you know,

reduce our energy and materials consumption, and it can be done. If anything proved that, it's the success of the information technology revolution—we *can* reduce it while actually increasing the quality of life. So that is what we should be doing. I like to say that science and technology and the Paleolithic obstinacy of human beings, combined with an inadequate, you know, global ethic, has got us where we are. Now science and technology, combined with a *healthy* ethic and awareness, it can help bring us out.

IRA FLATOW: But will it? Is it too late? Is there going to be a point where it's too late, where we reach that point, the nine billion people, and what happens after you reach nine billion people and we try to continue to grow and use the resources up, they start dying off.

E. O. WILSON: Well, I think that there will be negative and feedback loops in this and that we will find a way to slow it. We will lose a lot of biodiversity, that's in the cards. I don't know how much, but a *lot*, but I think we can pull it off.

IRA FLATOW: Yes, gentleman.

Q: Unlike people in religion, scientists use numbers. If you go over to the American Museum of Natural History and you look at all these species that have died, I think it's 99.5 or something, all species that died before human beings ever came to earth, so it wasn't us that killed—you and I, anyway—that killed most of the species that ever existed. Is that figure accurate for one thing?

E. O. WILSON: Yes, it is.

Q: Well, so you maybe don't feel so bad about it.

E. O. WILSON: Well, I do.

Q: Well, I'll ask you another question. How many species are there on earth today of various kinds of animals? Again, I like numbers.

IRA FLATOW: Let me just rephrase that a little bit. You say—there are people who say that there have been these huge die-offs before, it's a natural thing to happen, so what?

E. O. WILSON: Okay. That problem is the single most common question that I'm asked. It is true that more than 99 percent of species that have ever lived have died. But remember that's over several *billion* years, and we know, thanks to the fossil record interpreted by paleontologists, that these species before humanity came along were going extinct at the very low rate of about one species per million species per year. And new ones were being born at the rate of one species per million species per year, about the same, so there was a very rough equilibrium.

And with the coming of humanity, we now have, as a very conservative figure, an increase in the extinction rate of order of magnitude one hundred and probably rapidly approaching a thousand order of magnitude and it may there now. With every prospect of going, if the whole process is left unabated, to ten thousand, well into this century, resulting in the extinction, or bringing to the brink of extinction, half the known species of plants and animals in the world. So this is what we're talking about here. There was a—and while we have to slam the brakes on now as much as we can, if we don't want to lose a very large part of what's left of the rest of life, of course in roughly one-hundred-million-year intervals, there have been these *big* meteorite or comet strikes—there have been a lot of small ones too—but the big ones, the big kahunas, come about once every hundred million years and when that happened, then most of the species on earth were extinguished. And it took—the last one was sixty-five million years ago, of course that was the end of the age of the dinosaurs, and it took, in each case, somewhere between five million and ten million years for a natural evolution to restore it. Now if our descendents are told that what we're doing right now means that it will all be healed in five to ten million years, they're going to be peeved. **(laughter)**

How many species of plants and animals on earth? We do not know to the nearest order of magnitude. This is a relatively unexplored planet. We have put scientific names, given a diagnosis and put scientific names on about 1.8 million species. But the *actual* number, as best we can estimate it, out there, is somewhere—again, we do not know to the nearest order of magnitude. It may be as low as ten million, but it may be as high as a hundred million when you add the microorganisms.

That's a very good point you've given me the opportunity to bring up. Part of saving biodiversity, the Creation, is going to be exploring it. And one thing I've tried to emphasize in this book, *The Creation*, is that a large part of biology of the future is certainly going to be the exploration of Planet Earth, and, you know, with it the mapping, the understanding, better and better understandings of all the species here. Because until we get that knowledge, we're going to be very inexact in handling the environment and we are going to be flying blind in a lot of situations where we do not want to fly blind.

IRA FLATOW: Next question, while you're getting the microphone. You describe it in the book as "We are that next big meteorite." We, humanity is that next big meteorite.

E. O. WILSON: That's the point, since we've jacked it up to a hundred times of baseline, and we're on our way up to a thousand, maybe even ten thousand, sure, and this is taking place in just a few centuries, and speeding up, so you know the big impact will come within this century. Then we are, in the magnitude of effect, we are the sixth great meteorite.

IRA FLATOW: Who has the mic? Yes?

Q: I just have a comment. In the most recent Environmental Defense newsletter, it mentioned that a lot of Christian fundamental and evangelical groups are actually involved in environmental causes now. So I just thought I'd mention that to you.

E. O. WILSON: You'll have to help me out on that.

IRA FLATOW: She said, she pointed out that the Christian and fundamentalist groups already are coming—

E. O. WILSON: Yes, thank you, that would have been an important omission if I had not mentioned that. You know, the religious organizations, denominations and the organizations within them, include many that are very actively concerned with the environment and that's growing *rapidly* and includes evangelicals. Groups like the Green Cross and the Evangelical Environmental Coalition and many others. Some are cross-denominational and they involve almost every major denomination. The

difference is—however, this is still relatively small compared to the full engagement of the religious communities in secular affairs, you know, aside from religious practices. It's still really small, it's growing, though, and it's a very hopeful sign.

The other problem with it is, that for reasons which I was describing earlier, there's still a lack of appreciation of the living environment. Most of the emphasis is so far, as it is in the general media, in the media and in the general public, has been on the *physical* environment. And climate warming, of course we're focused on that now, and that is really an extraordinary crisis for humanity, but that is mainly the physical environment, and we should understand that *that* is going to have a huge impact on the living environment. But just our continuous wanton destruction of habitats is even more ruinous for the living environment. I hope the religious groups will get a better grip on that, and as they expand their activities, and I'm sure they are, that it's going to be including conservation more.

IRA FLATOW: One more question, I have—who's got the mic? Someone have the microphone? Yes, go ahead—stand up.

Q: About ten minutes ago you said something about a link, about technology and information, and I'm not quite sure what you meant by that. It seemed as if you could take it to an interesting place, as if some of the trouble that we're in came out of technology and the explosion of information, but also some of the ways out of the problem could come from that as well.

E.O. WILSON: Yeah, you say it well. **(laughter)** Now you want me to expatiate?

Q: Yes, please.

E.O. WILSON: Well, you know, Paleolithic humanity was doing pretty well as far as the environment was concerned, up until the Neolithic revolution occurred, about ten to twelve thousand years ago. And because we were a species in our natural environment, we occupied in nature—we were savannah dwellers, we were low in population density, we were on the **(inaudible)** that had picked up a lot on predation and all of those things. But, we weren't wiping out the rest of the environment, we weren't modifying anything in a strong way. With the Neolithic revolution of the first great advance in

technology, then we began to wipe it out big-time. We began to convert the forest and grasslands into the savannah—we called them agricultural fields and lawns and so on, that we need, up here. And then of course with each major technological advance came the capacity to have more and more dense populations. And dense populations and advances in science and technology meant more ability to produce more food, in the smaller and smaller areas. So the result has been humanization of the environment and continuing conversion of the wild environment to a wholly humanized environment. That's where science and technology in the broad sense have brought us. And of course it's true that we can't go back to the farm, now. There are too many of us. We can't form communes and have recyclable waste, and water collected in cisterns and all those great things. We can't do that anymore. We have to do this.

IRA FLATOW: Thank you all. The book is *The Creation*.

(applause)