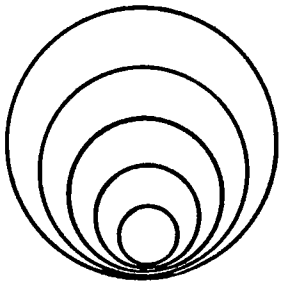

BILL MOYERS' WORLD OF IDEAS

Isaac Asimov — Part II

Producer: Betsy McCarthy

Executive Producer: Jack Sameth

Executive Editor: Bill Moyers

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Isaac Asimov - Part II

BILL MOYERS: *[on camera]* Good evening. I'm Bill Moyers. Not too many years ago, it all would have seemed like science fiction. A rocket weighing over two thousand tons blasts one hundred eighty-four miles into space and completes a full orbit of the earth in ninety minutes. One the same day twelve countries sign an agreement to build an orbiting space station. Of course it's all real, it all just happened. But as my guest tonight warns, if we're going to keep turning science fiction into scientific fact, we may have to rethink what we mean by education. And he should know. Join me for part two of a conversation with Isaac Asimov.

[voice-over] Isaac Asimov. Just about everyone who reads has read something of his. Science fiction, of course; his *Foundation* series is a classic. Science fact; chemistry, astronomy, physics, biology. Children's books. History. Math. One scientist calls Asimov the greatest explainer of the age. In this second part of our conversation in the Great Hall of Cooper Union in New York City, where American's have been debating ideas since the days of Abraham Lincoln, I talked to Dr. Asimov about science, education, and the universe.

[interviewing] Your book, your latest book, your three hundred and what—?

Dr. ISAAC ASIMOV: Well, 391 altogether.

MOYERS: Three hundred and ninety-one; *As Far As the Human Eye Could See*. How far can we see?

ASIMOV: It depends on what we're looking for. If we're looking at human history, we can't see very far, because human history is a chaotic thing. Small changes have big results, unpredictable in direction. But if we're looking at something that is essentially simple, such as stars and galaxies and things like that, then it is possible to look far, far ahead. We may be wrong, but it is possible to make a case for something that might happen ten to the hundred years in the future; one with a hundred zeros after it. In fact, that's what I do in the last essay. That's why I call it *As Far As the Human Eye Could See*. That comes from *Locksley Hall* by Tennyson, of course. "When I looked into the future far as human eye could see, saw the" something or the other "and the wonders yet to be," and so on. But you have to stick to very simple things.

MOYERS: Do you see wonders out there?

ASIMOV: Yes, in a way. I see a picture of the universe which somehow becomes infinite. It can expand and expand and expand until it is sufficiently thinly spaced to allow another universe to begin; and that perhaps surrounding our universe is the far, faint, faint remnant of another universe, and beyond that of another one even fainter, and so on infinitely. And if the universe doesn't expand forever, if it goes into a crunch and disappears, there may be a limitless, a really limitless ocean of vacuum out of which new universes are constantly arising like bubbles in boiling water; some large, some small, some with one set of laws, some with another. We just happen to be living in one that's suitable for life. In fact, there we get into the anthropic principal because we can only exist in one that's suitable for life, and the mere fact that we exist makes it suitable for life, you see. And there are people who argue that everything in the universe depends upon human observation. And then there are people who say, "Well, suppose there are no human beings, just frogs. Will a frog observation do the trick?" It's a game for modern scholastics. Instead of "how many angels can dance on the point of a pin," we try to argue out quantum weirdness. It's a lot of fun, but it makes you dizzy.

MOYERS: Do you think that we can educate ourselves? That any one of us, as you once said, at any time, can be educated in any subject that strikes our fancy?

ASIMOV: Well, the key words there are "that strikes our fancy." There are some things that simply don't strike my fancy, and I doubt that I can force myself to be educated in it. I have never really been interested in economics, for instance, or in psychology or in art as a non-spectator — to really know what art is all about. And, therefore, even if I try to read about it, it bounces off. On the other hand, when there's a subject I'm ferociously interested in, then it is easy for me to learn about it. I read it. I absorb it. I take it in gladly and cheerfully. I've written more books on astronomy than on any other science, and no one has ever complained that my astronomical books are wrong, silly, anything like that. I've never taken a course in astronomy. I'm completely self-trained in it. On the other hand, I've written relatively few books on

chemistry, which is my training. I've got a PhD in chemistry, but I know too much chemistry to get excited over it, whereas astronomy is different.

MOYERS: Excited. Learning really excites you, doesn't it?

ASIMOV: Oh, yes. I think it's the actual process of broadening yourself, of knowing there's now a little extra facet of the universe you know about and can think about and can understand. It seems to me that when it's time to die, and that will come to all of us, there'll be a certain pleasure in thinking that you had utilized your life well, that you had learned as much as you could, gathered in as much as possible of the universe, and enjoyed it. I mean, there's only this one universe and only this one lifetime to try to grasp it. And, while it is inconceivable that anyone can grasp more than a tiny portion of it, at least do that much. I mean, what a tragedy just to pass through and get nothing out of it.

MOYERS: Well, what happens to me when I learn something new, and it happens every day, is that I just feel a little more at home in this universe, a little more comfortable in the nest. I'm afraid that just about the time I'll begin to be really at home, it'll be over.

ASIMOV: Well, you know, I used to worry about that. I said, I'm gradually managing to cram my mind more and more full of things. I've got this beautiful mind and it's going to die, and it'll all be gone. And then I say, not in my case. Every idea I've ever had I've written down, and it's all there on paper. And I won't be gone; it'll be there.

MOYERS: Do you realize how— the possibility of that depressing the rest of us who can't write it down the way you can? Isn't it possible that one could say, "Well, since I can't write the way Isaac Asimov does, and know what Isaac Asimov knows, I won't do it at all"?

ASIMOV: Oh, I wouldn't want people to do that. A little is better than nothing. In fact, you might say that I overdo it. Lately I've been thinking that people must look upon me as some kind of a freak. There was a certain pleasure in writing 100 books, you know, I felt I've accomplished something, then 200. But now it stands at 391, it's liable to be 400 by the end of the year, and I have every intention of continuing because I enjoy the process. And, in the end, it seems to me nobody'll care what I write, just the number. Maybe I will have defeated myself in that way.

MOYERS: How do you explain yourself to yourself? What is it that caused a man to want to know so much that he would write 400 books?

ASIMOV: Well, I suppose it's sheer hedonism. I just enjoy it so.

MOYERS: Pleasure?

ASIMOV: Yes. I mean, what made Bing Crosby or Bob Hope play all that golf, you know? They enjoyed it, and that's the way it is with me.

MOYERS: Do you think it's possible that this contagion can be spread to ordinary folks out there? This passion for learning that you have, can we have a revolution in learning?

ASIMOV: Yes. I think not only we can, but I think we're going to have to. As computers take over more and more of the work that human beings shouldn't be doing in the first place because it doesn't utilize their brain, it stultifies and bores them to death, there's going to be nothing left for human beings to do but the more creative types of endeavor. And the only way we can indulge in the more creative types of endeavor is to have brains that aim at that from the start. You can't take a human being and put him to work at a job that underuses his brain and keep him working at it for decades and decades and then say, "Well, that job isn't there. Go do something more creative." You have beaten the creativity out of him. But if, from the start, children are educated into appreciating their own creativity, then probably we can, almost all of us, be creative. Just as, in the old days, very few people could read and write. Literacy was a very novel sort of thing and you thought that most people just didn't have it in them. But when you indulged in mass education, it turned out that most people could be taught to read and write.

In the same way, if instead of having mass education as we now have — must have — with a curriculum, once we have outlets, computer outlets in every home, each of them hooked up to enormous libraries where anyone can ask any question and be given answers, be given reference material, be something you're interested in knowing — from an early age, however silly it might seem to someone else, it's what you're interested in — then you ask, and you can find out, and you can follow it up, and you can do it in your own home, at your own speed, in your own direction, in your own time, then everyone will enjoy learning. Nowadays, what people call learning is forced on you and everyone is forced to learn the same thing on the same day at the same speed in class. And everyone is different. For some it goes too fast, for some too slow, for

some in the wrong direction. But give them a chance in addition to school — I don't say we abolish school, but in addition to school — to follow up their own bent from the start.

MOYERS: Well, I love the vision, but what about the argument that machines, computers dehumanize learning?

ASIMOV: Well, as a matter of fact, it's just the reverse. It seems to me that it's through this machine that, for the first time, we'll be able to have a one-to-one relationship between information source and information consumer, so to speak.

MOYERS: What do you mean?

ASIMOV: Well, in the old days you used to have tutors for children. A person who could afford it would hire a pedagogue, a tutor, and he would teach the children; and if he knew his job he could adapt his teaching to the tastes and abilities of the students, you see. But how many people could afford to hire a pedagogue? Most children went uneducated. Then we reached the point where it was absolutely necessary to educate everybody. The only way we could do it is to have one teacher for a great many students and, in order to organize the situation properly, we gave them a curriculum to teach from. So, how many teachers are good at this, too? Like in everything else, the number of teachers is far greater is far greater than the number of good teachers. So, we either have a one-to-one relationship for the very few, or a one-to-many relationship for the many. Now, there's a possibility of a one-to-one relationship for the many. Everyone can have a teacher in the form of access to the gathered knowledge of the human species.

MOYERS: Through the libraries that are connected to the computer on my desk in my home.

ASIMOV: That's right. Right.

MOYERS: I can sit there and call up— well, what if I want to learn only about baseball?

ASIMOV: Well, that's alright. You learn all you want about baseball, because the more you learn about baseball the more you might grow interested in mathematics to try to figure out what they mean by those earned run averages and the batting averages and so on. You might, in the end, become more interested in math than baseball if you follow your own bent, and you're not told. On the other hand, someone who is interested in mathematics may suddenly find himself very enticed by the problem of how you throw a curve ball. He may find himself engaged in sports physics, so to speak. Well, why not? Why not?

MOYERS: But you know, Dr. Asimov, we have such a spotty, in fact we have such a miserable, record in this country of providing, say, poor children even with good classrooms; and I wonder if our society can ever harness itself to provide everyone, including poor children, with good computers?

ASIMOV: Perhaps not at the very start, you know. But it's like asking yourself, "Is it possible to supply everybody in the nation with clean water?" Now, there are many nations where it is impossible to get clean water except under very unusual circumstances. That was one reason why people started drinking beer and wine, because the alcohol killed the germs. If you didn't drink that, you died of cholera. But there are places where you can supply clean water for nearly everyone. Now the United States probably supplies clean water for a larger percentage of its population than almost any other nation can. It's not that we would expect everybody to have a perfect computer right off, to have equal access to outlets. But you try for it. And, with time, I think more and more will. Just as, for goodness sakes, when I was young very few people had automobiles, very few people had telephones in the home. Almost nobody had an air conditioner. Now, these things are very common, indeed — almost universal. It might be the same way.

MOYERS: So, in a sense, every student has his or her own private school?

ASIMOV: Yes. And it belongs to him or her. He can be the sole dictator of what he is going to learn, what he is going to study. Now, mind you, this is not all he is going to do. He'll still be going to school for some things that he has to know.

MOYERS: Common knowledge, common data base.

ASIMOV: Right. And interaction with other students and with teachers — he can't get away from that. But he's got to look forward to the fun in life which is following his own bent.

MOYERS: This revolution you're talking about, personal learning, it's not just for the young, is it?

ASIMOV: No! That's a good point. No, it's not just for the young. That's another trouble with

education as we now have it. It is for the young, and people think of education as something that they can finish. And what's more, when they finish, that's a right of passage into manhood.

MOYERS: Real world. I'm finished with—

ASIMOV: Right. I'm finished with school. I'm no more a child. And, therefore, anything that reminds you of school — reading books, having ideas, asking questions — that's kids' stuff. Now you're an adult, you don't do that sort of thing anymore, you see.

MOYERS: And in fact, like prison, the reward of school is getting out.

ASIMOV: Exactly.

MOYERS: Kids begin to say, "When are you getting out?"

ASIMOV: And every kid knows that. Every kid knows the only reason he's in school is because he's a kid and little and weak, and as soon as he— and, in fact, if he manages to get out early, if he drops out, why he's just a premature man.

MOYERS: Yes. So that's exactly right. I've talked to some of these drop-outs and they think they're there. They think they've become men because they're out of school.

ASIMOV: That's right.

MOYERS: What's wrong with this?

ASIMOV: Well, what's wrong with it is you have everybody looking forward to no longer learning, and you make them ashamed, afterwards, of going back to learning. If you have something like this than anyone, any age, can learn by himself, can continue to be interested, there's no reason then, if you enjoy learning, why you should stop at a given age. People don't stop things they enjoy doing just because they reach a certain age. They don't stop playing tennis just because they turn 40. They don't stop with sex just because they turn 40. They keep it up as long as they can, if they enjoy it. And learning will be the same thing. The trouble with learning is most people don't enjoy it because of the circumstances. Make it possible for them to enjoy learning, and they'll keep it up. There's a famous story about Oliver Wendell Holmes, who lived to be well into his 90s. He was in a hospital one time — he had not long to live, he was over 90 already — and President Roosevelt came to see him. And there was Oliver Wendell Holmes reading Greek grammar. And Roosevelt said, "Why are you reading Greek grammar, Mr. Holmes?" And Mr. Holmes said, "To improve my mind, Mr. President." I mean, that he hadn't stopped.

MOYERS: Are we romanticising this, or do you really think that Saul Bellow's character Herzog was correct when he said, "The people who come to evening classes are only ostensibly after culture. What they're really seeking is clarity, good sense and truth — even an atom of it. People," he said, are dying. It is no metaphor for the lack of something real at the end of the day"?

ASIMOV: Well, I'd like to think that was so. I'd like to think that people who were given the chance at learning facts, at broadening their knowledge of the universe, wouldn't seek so avidly after mysticism. I wonder how many people, how many people go for these mystical, nonsensical things simply because they must go for something, and this is the only thing available.

MOYERS: Mysticism. What bothers you about mysticism?

ASIMOV: Well, the same thing bothers me about mysticism that would bother me about con-men. I mean, it doesn't seem to me to be right to sell a person phony stock and take money for it. And this is what mystics are doing. They're selling people phony knowledge and taking money for it. And even if people feel good about it, and I can well imagine that a person who really believes in astrology is going to have a feeling of security because he knows that this is a bad day so he'll stay at home, but nevertheless, a guy who's got phony stock may look at it, and it's nice and shiny, and scrolls, and old gold lettering and stuff, and as long as he doesn't have to do anything with it he feels real rich looking at it. But that's no excuse. He still has phony stock. And the person who buys mysticism still has phony knowledge, and it bothers me.

MOYERS: What's the real knowledge?

ASIMOV: Well, we can't be absolutely certain. Science doesn't purvey absolute truth. Science is a mechanism. It's a way of trying to improve your knowledge of nature. It's a system for testing your thoughts against the universe and seeing whether they match. And this works, not just for the ordinary aspects of science, but for all of life. I should think people would want to know that what they know is truly what the universe is like, or at least as close as they can get to

it.

MOYERS: You wrote, a few years ago, that the decline in America's world power is, in part, brought about by our diminishing status as a world science leader. Do you still think that's so?

ASIMOV: Yes, I do. We're still probably well up there technologically, you know, but what margins we do have are slimmer, narrower, and we're being overtaken.

MOYERS: Why? Why have we neglected science?

ASIMOV: Well, partly because of oversuccess. I mean, if you're so convinced that— I suppose the most damaging statement that the United States has ever been subjected to is the phrase, "Yankee know-how." You get the feeling, somehow, that Americans, just by the fact that they're Americans, are somehow smarter and more ingenious than other people, which really is not so. It causes you to rest on your laurels. And actually it was first used in connection with the atomic bomb that I know of. The atomic bomb was invented and brought to fruition by bunch of European refugees. You can go down the list of names; that's the "Yankee know-how." But also there's this feeling that somehow, because we have a, what we consider, a decent economic system, freedom, free enterprise, all that — which I'm all in favor of — that that alone will do it for us. And, I admit, that helps out in some ways, but not if we're lazy about it. It's not going to do it for us if we don't do anything, you see.

MOYERS: And yet there's always been a bias in this society against science.

ASIMOV: Well, it's against intellectuality. I mean, when nominee Bush can castigate Dukakis for going to Harvard, whereas he went to a proletarian school like Yale, you know there's something wrong. I mean, there you're actually trying to run a person down for belonging to what people see as an elite school, that there's something vicious about going to an elite school.

MOYERS: What did you mean when you said once that we have to stop living by the code of the past?

ASIMOV: Only because times change. In the old days, we didn't worry about the future, and now we must. We have to worry about the future all the time. Things are changing so fast.

MOYERS: You and I may not be around when it arrives.

ASIMOV: Well, I imagine our children will be, our grandchildren. And besides, the human race will be. And— well, let me try to make it— I don't want it to sound like a foolish idealist. I don't want to make it sound as though I just love humanity, but look — my books are going to survive me. I want to have people alive to read them.

MOYERS: Right. Is it possible that you suffer from an excessive trust in rationality?

ASIMOV: Well, I can't answer that very easily. Perhaps I do, you know. But I can't think of anything else to trust in. You say to yourself, "If you can't go by reason, what can you go by?" Now, one answer is faith. But faith in what? I notice there's no general agreement in the world of these matters of faith, they are not compelling. I have my faith. You have your faith. And there's no way in which I can translate my faith to you or vice versa. At least as far as reason's concerned, there's a system of transfer, a system of rational argument following the laws of logic, et cetera, that a great many people agree on. So that in reason there are, what we call, compelling arguments. That is, if I locate certain kinds of evidence, and even people who disagreed with me to begin with, once they study the evidence, find themselves compelled to agree by the evidence. But wherever we go beyond reason into faith, there's no such thing as compelling evidence. Even if you have a revelation, how can you transfer that revelation to others? By what system?

MOYERS: So, it's in the mind you find your hope.

ASIMOV: Yes, and I have to say I can't wait until everyone in the world is rational, just until enough are rational to make a difference.

MOYERS: *[voice-over]* From the Great Hall of Cooper Union in New York City, this has been a conversation with Isaac Asimov. I'm Bill Moyers.