Narration:

A characteristic that distinguishes man from the other species of life is his desire for studying his environment, his physical surroundings. Although that passion does not manifest itself in every individual, collectively the human race engenders and promotes, to some extent, this desire. The burden of explaining the physical world is willfully placed upon those who already are equipped to be the explorers. The history of science is punctuated with extraordinary individuals who have sustained the human spirit. Physicist, Richard Price.

Richard Price:

When I was young, science seemed important and ... it sure seemed interesting, and it even seemed noble, and it seemed to be the right thing to do. I thought about things and ... and thought that there were three ways of addressing important questions: science was one, but there was also religion and mathematics, and they were kind of the same but they were kind of different. Religion was a way of getting answers to fundamental questions, but ... it wasn't useful ... it wasn't reliable, you couldn't make predictions, you couldn't count on it. Mathematics was a very different kind of thing -- it didn't have the shortcoming of religion; it was predictable, it was very patterned, it was very reliable, it gave answers you could count on, and there was only one answer. But it was an answer about a question you were making up, it was ... it was winning a game that you were making the rules to; it wasn't an answer about the physical world. It wasn't an answer about -- for want of a better word -- nature.

Science seemed to be the right thing to do. It was ... it was a thing which was predictable, and it answered questions about the world we lived in and it had wonderful consequences. The whole nature of the thing had this wonderful consequence -- because we were talking about the world, it had relevance, and because unlike religion it was predictable, it was useful. It
could tell us predictable things about the world we lived in. And it ultimately allowed us to control that world: we became the predictors and the manipulators of nature, we became the true sorcerers and the oracles.

Narration:

Although many technological changes have taken advantage of past scientific explorations, the underlying theoretical scaffolding has not grown proportionately.

Richard Price:

It seems different now. It seems to have gotten mired and bogged down. And let me say at the outset that I'm not talking about applied science, I'm not talking about technology. I'm talking about the science at the cutting edge. I'm talking about the science that's usually associated with theoretical physics.

We have some theories now. There's General Relativity, for instance, Einstein's theory of gravitation, the theory that describes things on the biggest scale -- the theory of the universe itself. On small scales there's the Standard Theory, the so-called Standard Theory of the Fundamental Particles. So we know that these theories are not complete. They can't be complete -- they're not even compatible; they can't both be right, they're contradictory. They give reasonably accurate answers when you confine them to their realms of validity, but they have fundamental logical problems, fundamental internal inconsistencies. So we know that they're wrong, but we're not making much progress in finding out what's right. And the energy that's going into this effort in finding out what is right is energy that's going into something more like religion or mathematics. What's happened is we're losing the ability, we're losing the tradition of connecting thinking that goes into science with the testing that goes into science. We're losing the connection between the mind and the world.

Narration:

Questions about the physical world bring into question the very nature of knowledge itself. What is knowable? What is unknowable? What limitations exist to our knowledge? Mathematician and Philosopher, Peter Fivas.

Peter Fivas:

One must distinguish between ... what actually is the case and what the mathematical model that is in vogue dictates that it ought to be. Every time a theory comes into vogue that's based on a mathematical model it is much simpler than the actual physical phenomenon. And when the idiosyncrasies in the physical behavior tend to
fly in the face of the theory du jour, then somebody
tries to work around it to keep the theory intact and
the theory becomes more and more complex until it
becomes unwieldy. And then someone will come along with
a simpler theory to explain all the phenomena that have
been taking place and inject some new insight into the
problem. Then that theory, in turn, will have its
problems which will engender the development of a new
theory. So, the process tends to leapfrog, but it
happens not in a continuous linear fashion, but there
are quantum leaps that happen and the process is
discontinuous. So every time we reach the end of a
plateau, the question have we reached the end of what is
knowable? will obviously come up until a quantum leap
happens and then all of a sudden the horizon opens up
for new exploration, and then we come to another problem
and another quantum leap must happen. In other words,
this process apparently will go on infinitum as long as
human beings have finite intelligence, and I don't see
any resolution to that problem.

Narration:

The social changes that have taken place within this
century have cast the value of scientific knowledge in a
new light. Modern pressures have forced the pursuits in
science to be practical, rather than theoretical.

Peter Fivas:

To discuss what is actually known about the universe
always has to be set up so that one knows what the
knowledge is relevant to. If one speaks from, strictly
... a physical standpoint, then if one were to ask are
we approaching the limit of what's knowable in the
universe? one would first ask well, why has the subject
been broached? and obviously it's because of the demise
of the cold war and the decrease in funding for large
science projects: those noteworthy in nuclear physics of
being the Superconducting Supercollider project, which
was axed recently. So, as the funding dries up,
certainly the scientists who make their living from
doing physics are going to be very interested in the
nature of the business in the coming years. So, from
that aspect, one can understand why it's a topic of
conversation.

Narration:

At the end of the last century there existed a
prevailing attitude that everything that could be known
about the physical world was already known, save for a
few loose ends. Those loose ends launched the Theory of
Relativity and Quantum Mechanics. Is there a difference
between the events of the last century and the
approaching millenium?
Richard Price:

In the last century it was almost the opposite: there was a feeling that we had all of the answers. Michelson, for instance, had said that we now had all the theories: Michelson, the person most famous as one of the first American physicists and the person who confirmed Einstein's Theory of Special Relativity. He thought that with Special Relativity we had a coherent view of the physical world and all of science from that point onward would be details -- polishing the fine points. All of the grand concepts were in. We see how disasterously wrong that was.

It's said that the early history of the United States, to some small extent at least, can be understood in terms of the advance of the Western Frontier. It had to come to an end -- the west can't go on forever -- and it did come to an end. Maybe there's a drive within us to advance other frontiers and maybe those frontiers cannot be pushed forward forever. Maybe this drive is very important, maybe there is an intellectual drive that's been important for pushing us in science. And maybe that couldn't go on forever and maybe it hasn't gone on forever. Maybe it's like the closing of the Western Frontier. Maybe we've come to an end. Maybe. Maybe it's just my perception. Maybe it's because I'm no longer young and maybe I'm experiencing something universal, or at least common: midlife disappointments that so few of the promises I saw have been fulfilled. But I don't think so. I think that something is really coming to an end.

Written, Photographed, and Produced by Jeffrey Frederick Gold

Narrated by Robert Jetter

Thanks to:

Richard Price
Robert Jetter
Peter Fivas
Jason Gloyn
George Fivas
Robert Davis
Martin Liess

Other Side of Antarctica
Composed, Arranged, Performed, and Produced by Vangelis

Deliverance
Composed, Arranged, Performed, and Produced by Vangelis
Into Eternity
Composed, Arranged, Performed, and Produced by
Jeffrey Frederick Gold

Also thanks to:

Fabian
Keith Martindale
Dale Angell

Copyright 1995

Produced at the University of Utah