

Person : Marx, Leo
Date : 10/1/1990
Tape N# : 41A, 42A, 43A
Time code : 00:08:53:19
Subject : Technology

41A
00:08:53:19P

Antonello: Can you give me a definition of technology?

Well, I think one way to think about technology is to notice that until the eighteenth century there was no distinction between the mechanic arts and the fine arts. And that in English they began to introduce the term mechanic arts, to distinguish them from painting and music and other things, in the eighteenth century. And that..that prepared the ground for a separate class of human activities that later in the nineteenth century came to be called technology. So the mechanic arts or the practical arts is really the ancestor of the concept of technology. And I think the term is a very unstable one, it has grown immensely now so that everything is included in technology. And I tend to think of technology as a process for the transformation of of materials of the natural world and make it useful to human beings. And that includes the knowledge the skills, and the equipment, the hardware as we say. But um there's always been a debate about how inclusive this should be. And some people today define technology in such an inclusive way, that is they include the institution, the knowledge, the people and then it becomes another synonym for for social institutions. I mean, it loses it's distinctiveness, and everything gets thrown into it. So it's a very tricky term these days.

41A
Leo Marx

00:11:31:13P

Antonello: You talk about Jefferson in your book....

Yes,...well, first of all you know today when you say technology, most people identify it with post industrial technology, with machinery, with machine technology and factories. But of course course every culture that we know about has a technology, even hunter gatherer peoples have their technology. But as technology developed more and more, you you change the boundary line between what we call nature or not man, and technology constantly. So that every generation to deal with the fact that technology moving into new. And what happened in the US, I think, in Jefferson's, was a very natural result of the geography.

I mean, here you had Europeans moving into a landscape which was almost prehistoric, it had been transformed so little by the native peoples. And they saw the US as a perfect middle ground between the wilderness where there was too little technology, and too much savagery or nature, and the ancient regime in Europe which had too much civilization. And this was supposed to be the perfect compromise. Now that idea goes way back, it goes back to Italy, and to Virgil, and to the dream of arcadia, the pastoral dream. Which was always a dream of a perfect middle ground with just enough art and just enough nature. Around the idea of the shepherd, who is a...the archetypal eliminal figure, we speak of the shepherd as the threshold, or eliminal figure. Because he lived on what was seen as the borderline between the natural world and the man-made world. And so for me, Virgil's epilogues those poems, are really the birth of this dream of the middle landscape. And it was simply applied to the American situation, it fit perfectly.

41A

Leo Marx

00:15:03:09P

Antonello: The idea of Jefferson was taking the factories in Europe and putting them....

Well, Jefferson loved technology but he disliked the idea of an urban proletariat and cities, and he was very worried about bringing the factory system to this country, and with it what he thought would be an uneducated, powerless urban proletariat. But the industrial revolution meant an acceleration, a speed up of the invasion of the natural world by technology. That's the way it was seen. And that's why the railroad was sort of the perfect symbol in this country of what the industrial revolution was all about.

41A

Leo Marx

00:16:16:19P

Antonello: Can you talk a little bit about the impact and social consequences of the railroad system in this country?

The railroad at every level was the crucial invention. Particularly in a country where you had vast space, scarcity of labor, um and in order to develop, the railroad was an instrument for conquering the land, it was very different in America from in Europe, because here you were building the railroad into what was still wilderness. ug So that at an

economic and social level, the railroad was crucial to create the markets on which the new industrial system depended, and in conquering the land.

The building of the railroad coincided with the expulsion of the native people, the Native Americans. And the conquest of the territory, it was spoken of as the conquest of nature. At the symbolic level the railroad had all the attributes of the new system. It had machine mechanized motive power, iron, speed, steam, smoke, fire, it moved through the countryside. And it was immediately sized on as the emblem of progress. And it disseminated the ideology of progress, in a way that went beyond language. I mean all you had to do was see a train crossing the landscape, and uh you knew that this was something an earlier generation couldn't possibly have experienced, and it meant, it visually meant that the world was changing, and that it was getting the capacity to control the natural world was improving.

00:18:28:23B

The railroad was the first significant innovation in overland transportation since about the time of Caesar, and the chariot. There hadn't been that much change. And it's an extraordinary example of uh of the acceleration of change, that occurred in the nineteenth century. Then we have a whole other set of changes that the railroad meant. It was also the first technological system.

Before the building of the railroad in this country, the typical economic unit was the family firm, the father and son who organized a business. But when the railroad came along and you had to have people on duty twenty four hours a day, their time had to be synchronized. You needed experts, you had safety problems, you could no longer run it as a family firm, and it was the railroad more than any other invention that called forth the whole idea of scientific management, that Alfred Chandler writes about in, "The Visible Hand." The railroad was the first technological system that was too big for an ordinary firm to handle. So it's important in many many many different ways, that is a really radical innovation of the nineteenth century.

41A

Leo Marx

00:20:04:12B

Antonello: Did the railroad also change the concept of time?

Oh yes, there's no question about it...well, it was the railroad,..because the most famous example is the fact that until the railroad we didn't have time zones. I mean every community set its own time. It's also true that people didn't have to know the time. And that in New England here, only a very small, elite had watches. The clergyman had a watch and maybe the teacher, but everybody else depended on the church bells. But when you start running a railroad and the train leaves at ten minutes after eight, you have to know what time it is. And the people who work on the railroad. And so the mass production of clocks and watches came in almost at the same time as the railroad and the factories. So those were closely interrelated the mechanization of time and space.

41A

Leo Marx

00:21:20:22P

Antonello: What about the idea of space and the ability to move through the landscape at a certain speed?

That was for the imagination and the symbolism of it was immensely popular. And it ...again and again and again speakers used the railroad to stand for progress. And the fact that you see this train moving across the landscape, makes come visually real um. If you take.....you want hear a piece of railroad rhetoric? Well this is Daniel Webster, and he was the most famous orator in the US, he and Calhoun were considered the two great orators. He was invited to speak at the opening of railroads. And this is the he sounds speaking in New Lebanon, New Hampshire in 1847, and he's standing on a platform. And there's a huge crowd in front of him, and there's a railroad train, a locomotive puffing steam. And he says, this is the end of his speech...."It is an extraordinary era in which we live, it is all together new. The world has seen nothing like it before. I will not pretend, no one can pretend to discern the end, but everybody knows that the age is remarkable for scientific research. And to the Heavens, the Earth and what is beneath the Earth, and perhaps more remarkable still for the application of the scientific research to the pursuits of life. The ancients saw nothing like it, the moderns have seen nothing like it till the present generation. We see the ocean navigated and the solid land is traversed by steam power. And intelligence communicated by electricity. Truly this is a miraculous era. What is before us, no one can say, what is upon us no one can hardly realize. The progress of the age has outstripped human belief. The future is known only to our missions."

00:23:57:08P

Now we call that the rhetoric of the technological sublime, and it was everywhere in this period. This feeling of sudden burst of energy and progress, and human beings taking control, it was a very thrilling. He was talking...the railroad was the symbol there.

41A

Leo Marx

00:24:15:24D

Antonello: The Iron Horse became the symbol of progress...

Whenever people talked about progress, it was mostly the railroad, but you heard him, he talked about the steamship and electricity. But it's always a technology, technology is the incarnation of progress.

41A

Leo Marx

00:24:51:04D

Antonello: Do you think it is the same today?

No, I think we have a pretty good idea that WW2 was sort of the peak. And that the belief in progress, the belief that history is a record of continuous improvement, and expansion of knowledge and power. That suffered some real shock beginning with Hiroshima, and then the whole series of events since WWII. And I don't think there is as deep a belief, trust in progress anymore.

00:25:41:21D The very concept of progress changed you know since Jefferson and Franklin's time. When the idea of progress first was developed, at the time of the French Revolution, by people like Count Dorsey(?) in France and Tom Paine, and Franklin and Jefferson. These were all revolutionaries, and they saw science and technology in the service of a new kind of republican society. Liberation from aristocracy and monarchy and the rule of the Church. But what happens by the time you get to Webster, you're beginning to have belief in science and technology as progress, as ends in themselves, not as means to a new politics, but just as the progress itself. And by the time you come to Ronald Reagan and Star Wars, you have a very technocratic concept of progress. Technology, progress is simply, more and better technology. And if you have problem created by one technology, the atom bomb, you solve it with another technology, Star Wars. Every technology.. all problems are solved by technology. It's really a very different kind of

concept of progress.

41A

Leo Marx

00:27:18:05P

Antonello: Why are you saying that this concept changed a great deal during WWII?

Well, I think it was weakened somewhat by the world depression of the thirties. But I think the bomb and then the arms race that followed it, put technology in a much more destructive role and for the first time in human history. Human beings who always had felt themselves to be at the mercy of nature, suddenly we were in the position of being able to destroy the environment inflict irreparable harm on the environment. I think that was a major transformation. And then when you began to get all these events like Chernobyl, and Three Mile Island, and these technological disasters, when the whole use of technology by the Nazis in the Holocaust came thru, I think people's feeling about technology changed a lot.

41A

Leo Marx

00:28:32:24P

Antonello: Do you think the myth of technology as a source of progress...

Oh I think it has, it still has immense power this idea of technology as progress. But I think that there is more questioning among informed people than ever before, more doubt. And especially because of the environmental problems, things like global warming and so on, call into question not just one little bit of pollution, but the whole industrial world may be changing our global environment in a radical way. So it's bound to cut into the faith in progress.

41A

Leo Marx

00:31:16:14P

Antonello: What about the relationship between science and technology? Is there a difference between the relationship of science and technology in the early period and today?

I think that's a very big complicated problem. I think that there's been a terrific convergence, I think more and more sciences are utterly reliant on technology. Particle

physics, or molecular biology, these are, it's very hard in molecular biology to separate the science and the technology. And increasingly our technologies are science based. So that I'm not so sure how helpful that distinction really is anymore. The two are so interlaced in a place like MIT, where all our biology is molecular biology, it starts with technology. And it couldn't do anything without it.

41A

Leo Marx

00:32:33:04P

Antonello: Did the convergence get deeper after WWII?

I think yes, I think the second world war accelerated the process, yes. And I should say apropos to that of course the electronic revolution made warfare itself, so so technologized that uh the American weapons systems today are all based on the computer everyone of them without computers our if all our computers stopped we would be a defenseless nation our planes our guns our ships are all highly computerized

LEO MARX

42A

00:01:25:09P

Antonello: Let's talk a little bit about war and technology starting from the beginning..

Well, you know we.. you say starting from the beginning. If you said that to Louis Mumford, he would say we got to go back to the Egyptians, and the way they organized the building of the pyramids. The warfare and technology have been closely related since ancient times. And I believe that's the case. In one way it's very simple, that is, warfare..wartime is a time of urgency. And when you're fighting everything else takes a back seat. And if your energies, your inventive energies go into winning the war. You do anything you can to win the war, so it's sort of natural that the resources of science and technology are mobilized for war. And one of the ironies of the American situation today of course is that we mobilized our energies to win WW2. We got all our science, and ever since WW2, our research and development has gone into military. While we told Germany and Japan, that they couldn't have any military, they put their energies into civilian market and now they're outdoing us, we really have paid a terrible price for our military success. And we still invest a tremendously high percentage of our research and development money into defense, what we call defense, warfare.

42A

Leo Marx

00:03:35:22P

Antonello: What about the implications of this situation?

Well it means that every congressman in the US congress, has an important military firm or development in his district that he has to protect. Where for the workers and for the managers, so that we call the senator from Washington the senator from Boeing, because the boeing aircraft company is there. But that's true in almost every district in the country. Once it built in like this, it's very hard to change. It takes real imagination to figure how to get out from under this link between the economic and social system, and warfare, defense.

42A

Leo Marx

00:04:42:21P

Antonello: Do you think because of this a kind of war culture has developed?

Well, I think we ..after WW2, you remember that in the US up till 1938 or 39, we never had a standing army in this country of more than 75,000 men. Since WW2 we've never had military forces less than two or three millions, and often many more. We have we became a global military power, and it has affected the whole culture with a kind of nationalism and militarism that we have had a very hard time in shaking. And you see this reflected right now with the events in central Europe. I mean the Americans are having a hard time responding to it because we're so...we're so it's such a habit of thinking in Cold War terms, that we the American politicians don't really know how to think of a world without the Soviet enemy out there, and communism to build our armaments on. It's a real, it's going to be a real shake up.

42A

Leo Marx

00:06:24:06P

Antonello: If you say that there is this kind of war culture it also means that there is an influence in the educational system...

Of course I have to say, you know, Americans like to think we are a peace loving nation, but the truth of the matter is if you look at our history, we've had a war in almost every generation. This is a very deceptive idea. And the political culture has been totally transformed by these new weapons. The most obvious example being that in our system only the congress, only our representatives is allowed to declare war. But because of nuclear weapons and the need to make quick decisions, we've turned over that power to one man, the President of the US, who can decide to invade Panama all by himself and just did it. And the congress doesn't get consulted, although in our constitution it says only the congress can decide.....there's an example of where the new technology just transformed, eroded the power of legislature.

42A

Leo Marx

00:08:39:19P

Antonello: Can we say that technology drives history?

I think that's dangerous, I really think that's dangerous because.. to say that technology drives history, is a kind of fatalism. And anyway technology is just a name for a whole class of things. I thought of that several times as we've been talking here. When you make a general statement about technology does this, it's usually it's very rare that it can apply to military technology, medical technology, computer technology, all...we live with so many technologies. And to make a generalization about them all, is very misleading. So that to say technology drives history is just so abstract.

00:09:39:06P I mean it seems to me that technologies enable particular groups, they empower particular groups of people like the military or the president or whatever. But they disempower other people. And in this country today for example, we've created a two tier system with respect to technology. Every educated college student knows how to do computers, but go to the Black community in Roxbury and so on, the poor the urban poor they have nothing, the computer is nothing in their lives. And they don't have enough education to know how to use them. And so technologies are always embedded in a social system and a social process. And I think it's very important not to impute agencies the power to initiate change in the technology. It certainly is a critical variable but it isn't the driving force.

42A

Leo Marx

00:10:54:12P

Antonello: Can You tell me something of the importance in the American culture of the ideology of the frontier...

Well, you know there was a time when American historians thought that the frontier was the crucial fact in American history. The existence of this area of free land out there. And that that explains all the special features in American life. I don't think we believe, not many historians any longer believe that. And in recent years the importance of the frontier theory, the so called Turner thesis, has been diminished. There's no doubt that the existence of that territory there was a magnet that pulled energy from east to west, and that it involved getting pushing out the native Americans. I think now most historians would probably say that the most important factor in all that may simply be ethnocentrism or racism. The way it helped nurture the idea of a white anglo-saxon white European conquest of nature with the Indians or native Americans being part of nature and not counting as human beings. And treating them as subhumans, which then when you combine that with the fact of slavery, of Blacks, it created a racist mentality that's very deep, and very hard to eradicate, of white skinned supremacy. I think that someways it's the racist part of the frontier that is the most powerful and dangerous.

42A
Leo Marx

00:13:41:16P

Antonello: Do you believe that could be a reason for dropping the bomb on Japan?

I don't think we would have dropped that bomb on Europe, no of course not. I don't believe we dropped it because they were Japanese, I think the fact that they were Japanese got rid of some of the inhibition that we might have had, but it's hard for me to believe that a bomb would have been dropped anywhere else in Europe, where ..the lands from which white America came. I find that hard to believe. Of course you have the other circumstances that Japan was an island it was by itself, but the intensity of that racist feeling certainly was an element.

42A
Leo Marx

00:15:59:05P

Antonello: depiction of the Japanese as beasts, sub-humans living in the

jungle...

And the scientist did urge that they try it on an unpopulated place to show what they could do. No, I agree with that.

00:16:32:17P

Antonello: I would like you to tell us a little bit more on your research on painting etc..

Well, where to begin...when I wrote , "The Machine in the Garden," I had been interested in doing a lot more with visual materials, but just the pressure to get the book out and to make it not too big, I put that material aside and then a few years later, other people became interested and I got back into that research, and I suppose the most interesting thing about it was the difficulty that painters have. One of the things I talk about in this book, "The Railroad and American Art," is that you had these American landscape painters who were very upset about the way the Land was being ravaged by progress. And they immediately seized on the idea of painting the railroad which was a very colorful thing, in the landscape, that they couldn't, most of them could not bring themselves to showing it as an intrusive or dangerous force, so they, in some part of their mind they knew it was, but the conventions the habits of pastoral landscapes, the beautiful harmonious was such that you get painting after painting of these trains which are beautifully assimilated, they are put into the landscape. And the excuse or the rationale that some of them used was that well, what art does is show what society needs to do, what art does is exemplify how technology like the railroad could be harmonized with the natural landscape. So you have these small little trains that look like they're part of nature. Even though the very rider will be writing letters and essays screaming about what awful things this progress is doing.

So that one of the things you learn from this is the power of culture to resist facing reality, the element of denial of what's before your eyes, you know, and I think in this whole area of the negative consequences of technology, we practice a lot of denial of refusal to face the facts.

Well, I mentioned I will say this book by a man named David Potter, called "People of Plenty," in that book he argues that many of the things which are distinctive about American life come from the fact that it was one of the worlds' first societies of abundance, was not a society of scarcity, people could have enough. And certainly it was one of the first societies where a large percentage of the people were economically comfortable. And then he goes on to say, well every civilization which is distinctive has a distinctive institution. And what is the American

institution that goes with abundance, and he said, well, we really invented modern advertising.

00:21:23:17P

I think advertising is very important in America because it is the connecting link between the economic system and the culture, and that's shown by television, that is to say, we now have at least one television set in virtually every American home maybe two or three. We know that our children spend anywhere from 30 to 40 hours a week watching television. And the decision about what goes on television is made through advertising. It the programs that are supported on television are the programs which the advertisers think are most useful for selling commodities. And in private American television, it's an instrument of the market place controlled by advertising. And I think that link between advertising this technology which we put in every home, and the way people see the world is very strong. And that's why, you know, I hesitate to say technology is the driving force. I mean there's nothing in a television set which says, we will only show what somebody thinks is useful for selling underarm deoderants or cars, or whatever. The use to which this technology is put is determined by the economic system and by through the institutions like advertising. It's the combination of the technology and the economic social political institution, that's where the driving force is.

It is hardware and software, but it's a particular kind of software that's determined not by the hardware.....

00:23:43:08P

Well, I think I said it, there's nothing inherent in the technology that means it has to be used for that purpose. But the cultural consequences can be devastating, and it's shown by this new report that was announced last nite on American education, and how a quarter of our children don't learn how to read and write. It's a real serious possibility that literacy is going to be a threatened species, you know.

42A

Leo Marx

00:24:58:06P

Antonello: Do you think we are building a new Mega Machine?

No. I think Mumford's..I think Mumford megamachine was created by his feeling at the worst moments, especially at the time of the Viet Nam War, that the two super powers were creating these huge interlocking networks of technology and bureaucracy and political domination. But the events of this

year have shown that that's not necessarily the case. And coming back to television, I mean it seems very clear from central Europe that the television station is a crucial, well if you want to change your political regime, the television station is obviously a crucial place to seize power. I think we will see our television stations well protected from now on, we don't want anybody getting in there, sending out the wrong messages. If you want to keep political control.....

00:26:23:09P

But I do think Mumford's notion of a megamachine that's.. what he was talking about was a totalitarian system and it's possible, but it doesn't seem to me we're going that way at the moment.

42A

Leo Marx

00:26:54:04P

Antonello: How do you see the future?

Well, I'm less hopeful about this country than lots of other places, I think we're in trouble, we're going to have a hard time getting in touch with this new world. But I should think the future for western Europe looks much better, and for Europe generally. But I'm not a prophet..

42A

Leo Marx

00:27:35:24P

Antonello: the speed of change ..

Well, yes one hopes so. The capacity of different countries to change their institutions rapidly differs widely. And at the moment we seem to be very rigid.

42A

Leo Marx

00:29:06:08P

Antonello: Do you think this is due to the FEAR OF PEACE?

The dominant fact of American life since WW2 has been the Cold War with the Russians. And now that seems to be no longer something we have to be terribly concerned about, but we're not very, we're not being very clear or adept at shifting gears to something else. Because it, as we were saying before, we have created this warfare system and

mentality....been in power now for more than forty years,
and it's going to be a while.

Well, I just think it got very political toward the end
there, and I didn't know whether it was my fault or whether
you wanted it to go that way.....

Leo Marx

43A

00:00:38:04D

Antonello: Let's talk about the acceleration of time

Well, you know Louis Mumford in that famous section of
technics and civilization, talked about the clock as the key
to modern, modernity, as the key invention of modern times.
And that concept fits in with Max Webers notion that the key
to modernity is rationalization, the breaking up of every
process into its component parts and studying it. And that's
one way to talk about the scientific method, and that's the
way we organize mass production. The whole scientific
management movement in this country associated with Taylor,
Frederick Winslow Taylor, was to take every task, break it
up into its parts and then make each part mechanizable as
possible, or at least make....and I think that this is

..when you apply this to the realm of learning and culture,
you run into a very serious problem with our world, and that
is the specialization of knowledge, it's a smaller and
smaller specializations. So that at a place like MIT, I have
colleagues who tell me, that they don't...I'll have a man in a
department in science here who says that there's no one else
here who understands his work. That it is only somebody out
at Cal Tech or in England, and everything is so highly
specialized. And one of the problems of that of course is
that we don't have many people who think about the whole
picture. We don't have many people Any longer who....even as
I talk to you, I mean I hear myself saying things that are
too general too loose, I'm a little embarrassed because
they're not the kind of precise knowledge that we value at a
MIT, which is very careful, very minute. Not these sweeping
place like MIT, which is very careful, very minute. Not these
sweeping generalizations. I'm one of the few people in this
institution who would be talking in the terms that I've been
talking. Most people would stay in their specialty, but the
problem is if you don't have any intellectuals to think
about these large issues, who will think about them?

00:03:30:13D

I mean, you know, so I think the acceleration is not just an
acceleration of in a time sense, but an acceleration in the
process of rationalizing and specializing everything. I
recently last summer hurt my hand, and I was sent to a

specialist, and I went into their office and every one in that office had a hand, he did nothing but hands, that's the surgeon. Only operated on hands. And we have all kinds of intellectuals who think about some little segment of human behavior. It has produced wonders, but it undernourishes the political culture, the people who can think about the large issues. And one of the things about a man like Louis Mumford, is we don't have any people like that left, it's inconceivable. He never went to the university you know, he had one year of college, he was never a professor. But you couldn't write those books now, because nobody would look at them. And so it's that is a real problem and it's related to technology but it isn't a technological problem. It's part of this acceleration of the process of rationalization.

43A

Leo Marx

00:05:13:21P

Antonello: Intellectual division of labor...

This was very striking when the star wars program came, all the scientist whom I knew said it sounded crazy to them, they didn't think it would work. But when they were offered a chance to get some money for their particular field, under the star wars program they took it. And the few people who tried to organize a protest against the whole thing just were snowed under. Because it was all this money for science, and you could advance your work in whatever you were doing, laser beams or something, under this umbrella of star wars. Eventhough, you thought star wars as a whole was a crazy and unworkable thing.

43A

Leo Marx

00:06:49:19P

Antonello: What about technology and nature?

Well, I think that is going to be the great concern of the next few decades. People have always felt defensive, I mean we all get used to the level of technological invasion of nature that we met when we were children.

So you know there are people who say the railroad was fine, but the jet plane is too much, maybe the propeller plane was alright but..there's always a place where they say ah too much, and that has been, you could dismiss people's nostalgia for the past on the grounds that this is always happening, it happens to every generation.

But I think there's been a quantum leap now, and if the

ozone depletion, and the global warming theory prove to be correct, it means that for the first time the whole envelope around the earth is going to be, is being transformed by human intervention. Which means that there is no aspect of nature on this earth which is unchangeable by man. And if the whole climate, if if if the flow of the seasons, the height of the ocean, the temperature, if all these things are transformed, it means that there is no part of our experience which we call nature which is independent of our manipulation, at least not on the earth's eco system, out in outer space. I think this makes a very profound change in the way people think.

This book, McKibbon's book, "The End of Nature," is very eloquent about this. It's not that nature itself won't be there, in one sense everything is nature, I mean we're part of nature too. But we usually use the term to distinguish between man and not man. And we think of the seasons, the change of seasons, and the climate and the temperature as part of something that we don't control, that's that's nature. If that disappears it makes for a whole new mindset, quite apart from a physical threat, I mean quite apart from the fact that this means that the whole industrial system in it's deepest energy uses may prove to be lethal and destructive. If the worst hypothesis is true it would mean fundamental change would be needed in order to avoid disastrous global warming...I mean it hasn't been proven yet, and it may not be proven, but it's a prospect is extraordinary.

So when a man like McKibbon writes a book called "The End of Nature or The Death of Nature," he doesn't mean that there won't be nature, but that the idea of nature as a set of entities that exist independent of human beings is going to disappear. We won't have that as a reference point.

43A

Leo Marx

00:11:22:14P

Antonello: ...scientific revolution...?

Yes, I think these things are all related. Bacon said knowledge is power, and since the seventeenth century science and technology have empowered us to change our relationship to the natural world in fundamental ways. The idea of progress said that's a good thing and in many ways it has been a good thing. It's raised standard of living, it's liberated women, all sorts of good things. But it would be an ironic fact if in the process we foul our nest so much we jeopardize the future,

that's a possibility.

43A

Leo Marx

00:12:56:08P

Antonello: industrial revolution...changing of natural landscape..

00:14:50:13P

Well, when people talk the way you do or I do, the usual answer is that this is nostalgia. We don't have many words to talk about our attitudes toward the past, and one of the ways you get rid of these feelings is to say look nostalgia, it's sentimental, and afterall there's always been change. But I think that we're beginning to see that there are some ways in which the past is demonstrably better, and when it comes to things like.....it's not nostalgia if you say, I liked it when I could drink the water and breath the air, without getting cancer. That's not nostalgia, we need some other word to talk about the past which was hospitable to life in ways that it no longer is. And I think a lot of these fundamental attitudes toward past and present,

00:16:01:22P

you see in the myth of progress we're always going forward and it's always on the whole getting better. But I think the invasion of nature and the making it dangerous,..you know in some parts of this country people keep discovering that their children are drinking poisoned water and breathing poisoned air. When that happened your whole feeling about past and present technology and nature is going to change. And I think these are very fundamental changes.

43A

Leo Marx

00:16:46:24P

Antonello: Since the myth of technology is still alive...people think that nothing is dangerous because technology can fix it..

We call that the technological fix, that's what I meant before. When you have a problem you use a new technology to fix it.

Well, I hope we haven't discouraged it too much.