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## Will a Technological Fix Work, or Do We Need Fundamental Social Change?

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Among those concerned about environmental issues, there are two major schools of thought concerning how our problems can be solved. One believes that even if many of the assaults to the planet have been brought on by modern technology (for instance, ozone destroying chemicals, artificial radionuclides, and overpopulation due to modern medicine and industrialization), the solutions also lie in modern technology. Future scientific and technical breakthroughs will be the key to solving our environmental problems. The other school of thought holds that we are ill-advised to rely on new, unpredictable, yet to be developed technological fixes; rather, what is needed are fundamental political, economic, and cultural changes among human societies in order to address the current environmental crises.

Those advocating the technofix approach base their analyses in large part on past history. Scientific and technological knowledge has accelerated at an ever increasing pace over the last few hundred years, and especially during the last century. In the 1890s few could have imagined the electronic capability of the 1990s, the fact that humans can make regular trips to space and had already reached the Moon, the use of a metal (uranium) as an energy source, the unprecedented grain yields produced by modern fertilizers, the replacement of woods and metals by plastics for many uses, synthetic clothes and other substances, and so many other developments. Believers in technology place their faith in the idea that before any particular environmental problem becomes unbearable, a scientific and technological breakthrough will occur to mitigate or solve the problem. In this view, this has always been the general rule and there is no reason to doubt it will hold true in the future. Indeed, as scientific knowledge increases at an ever quickening pace (scientific knowledge grows exponentially, just as global human population does), we can predict scientific breakthroughs developing at a faster rate.

Extreme anti-technologists reject the preceding argument. Rather than looking to future technology to solve our environmental problems, they blame technology and industry for those very environmental problems in the first place. If it were not for the modern industrial-technological complex we would not have our current pollution and hazardous waste problems. Synthetic chemical compounds have done more harm than good--now they contaminate the air, soil, and water. Stratospheric ozone is being destroyed by that twentieth-century group of wonder chemicals known as chlorofluorocarbons. The internal combustion engine is largely responsible for the potential of significant global warming. Nuclear power never fulfilled its promise of cheap, virtually unlimited quantities of electricity--yet it has left us with a deadly legacy of radioactive pollution and stockpiled waste. Modern agricultural techniques have significantly increased world food production, but this has perhaps only encouraged the growth of the global human population. Even if certain aspects of science and technology have helped to address particular environmental problems, most of those problems were caused by modern technology in the first place.

Even if we accept that so far science and technology have allowed the world to keep up--to muddle along--and necessary breakthroughs have come as needed; conditions have improved for at least some people, more people are fed and sheltered, and so forth; is this necessarily good? Is this what we really want? As the global population continues to increase more people (in terms of absolute numbers) are living the "good life," but even more people are suffering. Projections for the immediate future do not predict a change in this trend. In 1950 67% of the world's population lived in less developed countries, and 33% lived in the more developed countries (essentially the modern, industrialized nations). By the 1990s these percentages were 77% and 23%, and based on past trends, by 2025 84% of the world's population will live in less developed countries. In 1950 there were only 2.5 billion people inhabiting our planet, there were 5.8 billion in 1996, and by 2025 there will be an estimated 8.5 billion. Of those 8.5 billion, only about 1.35 billion, those in the more developed countries, will receive the major benefits of modern science and technology. The other 7.15 billion will be left behind.

Thus, the anti-technologists argue, based on looking at all aspects of past history objectively, the best we can expect even when we factor projected breakthroughs in science and technology into the equation, is a future where the discrepancy between rich and poor will increase, not decrease. In 2025 the poor will outnumber the rich by a factor of over 5 to 1. By the end of the twenty-first century the poor could outnumber the rich by as many as 10 to 1. The technofixers usually imply that technology and science are making the world better for everyone, but this is just not the case. The trend has clearly been for an ever smaller percentage of the people to share in the fruits of technology even as resources flow from poor to rich nations. And of course even in the rich nations there are many poor citizens who do not reap all the benefits available to their wealthier counterparts.

One can argue that such gross inequalities between the poor and rich of the world cannot continue forever. As the poor increase in number they will resent the rich more and more. Eventually the poor may rebel; international conflict may break out; the tools of mass destruction, such as nuclear weapons (another gift of science and technology), may be used as a method to redistribute the riches and spoils of the world. In the aftermath, how will most people view technology?

Before such a ghastly scenario plays itself out, some anti-technologists argue that we must radically rearrange our social, cultural, and political institutions so as to ensure the more equitable distribution of food, material goods, and services to all peoples of the world. We must not work toward more for the few, but toward sustainability for the whole Earth.

Certain technological and scientific advances may help achieve this goal, but fundamentally it will take a rethinking of our basic values. The solution must come from within humans, not from another miraculous technological breakthrough.