This is the sort of process that destroys the traditional explanations of the mysteries of life and the world about us, that enables man to bend nature to his will—within limits, that is—and leads to the nearly innumerable extensions of his physical capacities by the development of what we now lump together as technology. I use the term broadly to include the technologies growing out of biological knowledge, such as those related to medicine and nutrition; the technologies growing out of knowledge of the physical world, such as those related to chemistry, mechanics, and external non-physiological forms of energy; the technologies growing out of increasing knowledge of man's social organization and the psychological and empirical bases for it.

This line of reasoning emphasizes that man has created a variety of tools, including many complicated machines, that enhance his otherwise rather meager physical capacities so that he can speak around the world, travel faster than sound, and see into the atom or the universe.

On the other side, man has created all of the societal factors that impinge upon him, aiding or retarding his individual actions. Here one must place all of the organizations that institutionalize his daily activities and permit collective action. We tend to lump them into the categories of the social sciences, such as politics, economics and sociology.

Having done this, we see that man's productivity is not that of other creatures of nature. Outstanding is his ability to harness and use external forms of energy to do his physical, and more lately, his mental work. His ever-growing knowledge of himself is applied to survival, health, and population growth. His knowledge of plants and animals and of the conditions they require have enhanced his food supply and taken him from the Garden of Eden into thousand-acre fields of corn and hundred-thousand-acre cattle ranches. At a different scale, he is exploring the more efficient micro-organisms as sources of food, the algae and yeasts, and looking toward the conversion of petrochemicals to comestibles.

All this and much more is very, very recent in man's history. Science has caused him to focus his attention closely on a small number of things, conditions, and processes. The resulting successes have kept his attention riveted on pieces of the real world. The technological developments that have been made possible have not encouraged a broad view of the world. On the contrary, engineering is singularly direct and single-minded in most of its solutions to problems. The problems themselves are narrowly defined.

We have only lately, and with something of a shock, come to realize that the way we have approached the world has produced benefits, certainly, but also very unfavorable consequences which we still think of as side effects. What technology for some time has been doing that we now find we don't like is not the cause of our problems but a symptom of them. The problem is that we have viewed the world mechanically. We have isolated partial problems one at a time. This is a failure of society, not of science and technology. Take autos, for example. They seem to have become an end in themselves, for the great companies and for the individual man. That as a result of autos the air is polluted and roads are often in the wrong places is what we have permitted, not an inevitable consequence of autos *per se*.

It is ironic to call the pollution of air and water by industrial waste "side effects." The way we have done things, thinking only of the economic products for which the process was designed, proves our narrow outlook. The pollutants are just as much a product of the functioning of an automobile as its ability to move a certain mass a certain distance in a certain time at a determinable cost of energy expended.

It is ironic that we have with great humanistic intent carried medicine, public health, and sanitation to people with little and certainly inadequate thought about the needs of the living people who would otherwise be peacefully dead. We have woefully, with inexcusable ignorance or thoughtlessness, unbalanced the population/food ratio by working on the death rate and leaving the birth rate unchallenged, and by affecting population growth so that it became explosive. (We can except at least a billion more people in the world during the next 15 years), without a corresponding effort to assure them of adequate sustenance and a reasonably human existence.

I will end these remarks by saying that there are two human ecologies. One is that of the individual, and collectively all of us. The other is that of society, of culture in all its manifestations.