

Environment, health and sustainability

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Environmental health has roots in Greek science, supplemented by knowledge painstakingly accumulated through centuries of observations of occupational health and disease, especially among miners and other workers exposed to high levels of heavy metals and other toxins. Understanding widened in the 19th century, particularly as the connections between environmental conditions and infectious diseases started to be uncovered. The long-known association in some places (including ancient Rome) between swamps, “miasmas” and fevers became understood to be mainly from insect vectors breeding in water, and their transmission of agents causing diseases such as malaria (caused by a protozoa) and yellow fever (caused by a virus). Later, the range of vector-borne fevers expanded to include many other viruses, including dengue fever. Cholera was shown to be passed to vulnerable recipients through the drinking of faecally contaminated water.

In the 20th century the field of environmental health expanded again, to include the effects of dirty air and health, spurred by severe air pollution events including in Belgium and Britain, and the slow acceptance that smoking tobacco is injurious to health. Roughly in parallel, the invention of synthetic molecules such as DDT (used to combat mosquito and other insect-associated diseases) and pesticides (used to grow more food) stimulated another field of environmental health; that of the “bio-accumulation” and sustained duration of some molecules in human and animal tissue, especially in fat, and their possible relationship with conditions such as cancer, Parkinsons disease and, with less certainty, other disorders. Today, there is growing concern about tiny fragments of plastic, which are now widespread in many organisms, including in ourselves.

Sustainability and health

As the end of the 20th century neared, concerns arose over a new form of environmental health risk, which is fundamentally different in scale and severity to all that have gone before. This concerns sustainability and health. Although the life cycles of empires had long been understood, at least by historians, the use of nuclear weapons in Japan in 1945 revealed that it might be possible for humans to destroy civilisation on a global scale. This concern grew during the Cold War, as the two main antagonists accumulated arsenals on a sufficient scale to cause “nuclear winter” many times over. Nuclear winter is a prolonged global haze likely to kill all plant (and hence animal) life. Experts calculated that only a small fraction of the nuclear weapons in existence would need to be exploded for this catastrophe to occur.

Then, roughly at the same time as humans ventured into space, awareness increased that our species is altering the environment on a planetary scale, a phenomenon (increasingly called the Anthropocene) which is completely unprecedented. These changes have three main forms: (1) the accumulation of waste gases on a sufficient scale to superimpose human driven changes onto the natural fluctuations of the global climatic system, (2) degradation of planetary ecosystems and biodiversity (including in the ocean) and (3) the thinning of the stratospheric ozone layer. Action and new technology has greatly slowed the most recently discovered of these changes, but the rate and severity of the first two is still accelerating, despite an increasingly concerned coalition of scientists and activists.

In turn, each of these phenomena is related (and increasingly conceptualised as related) to the integrated outcome of the expanding scale of the human enterprise, as global population rose from about 1.6 billion in 1900 to almost 8 billion today. Of course, the cause for these new threats is not just additional people. But in processes of co-evolution and dazzling invention, human ingenuity has wrested new sources of energy from Earth's resources, harnessing these to new technologies which have enabled the clearing of forests, the trans-oceanic movement of food, and a myriad of other developments which make modern life possible. The changes in the Anthropocene, the human-dominated age, have had great benefits for our species, but have imposed costs and suffering on many others, including long-lived mammals and birds. These losses and costs are almost unbearable to deeply contemplate. Humanity is not immune to these threats; our collective success is breeding new risk.

Concerns about the long-term continuity of global civilisation, first mooted in response to atomic weapons, deepened in the 1960s, as policy makers and many people became aware that the global population was rising at an unprecedented rate, which crested at about 2% per annum in 1969. However, public concern over population growth faded (prematurely, I argue) as oral contraception became widespread, as the "Green Revolution" raised crop yields, and as famines declined and health improved in most places. Today, however, in part because of the war in Ukraine, but also because of rising energy prices and climate change, food prices are at a record high. The optimism of the late 20th century, expressed by most authorities of the time, is today looking hollow.

A minority always disagreed with the optimism that then prevailed, including over 1700 individuals who co-signed the World Scientists' Warning to Humanity in 1992 (see <https://www.ucsusa.org/resources/1992-world-scientists-warning-humanity>). In 1993 Tony McMichael proposed a new form of environmental health; issues that potentially undermine what the human ecologist Frederick Sargent had called "life support" systems. This idea is fundamentally different from the other kinds of environmental health mechanisms that have been described.

The difference between these "Anthropocenic" effects and other aspects of environmental health lies mainly in their scale, their interactions with human behaviour, and the long causal chains between exposure and effect. Events such as the growing number of refugees, the emergence of a growing number of walls and razor wire barriers along borders, and the scale of insurgencies and attacks are all manifestations of this. Although many of the linkages in these causal chains remain under-appreciated within science and government, there is an increasingly rich scientific literature which underpins this growing field.

There may still be time to reverse these ominous trends, but (to paraphrase Albert Einstein) we need to develop new ways of thinking, if we are to do so. We need courage to contemplate the unthinkable, and to wrest economic, political and moral power from the small minority of individuals who are the chief beneficiaries of our collective hubris.

References

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