

ON IRREVERSIBILITY*

One of the most important lessons I ever learnt was imparted to me by a high school teacher who showed us an egg and said: “It’s very easy to break an egg: Just drop it.” This he proceeded to do, cracking the shell and spilling the yolk and white all over his desk. Then he said: “However, once it’s broken, it’s impossible to put it back together again.” (I don’t remember which of us ended up cleaning the mess.)

Physicists and economists have been analyzing the paradoxical nature of time asymmetry and Quantum irreversibility since the 1930’s. In a nutshell, all complex natural processes are irreversible. The phenomenon of irreversibility results from the fact that if a [thermodynamic system](#) of interacting molecules –which is any system of sufficient complexity– is brought from one thermodynamic state to another, the configuration or arrangement of the atoms and molecules in the system will change in a way that is not easily predictable. Irreversibility applies to all physical systems from the microcosmic to the macrocosmic, from quarks to quasars. Thus, it is certain that when a star goes Nova, no cosmic process can ever reverse the event and put all its components back together again in its original form.

This essay will not attempt to review all the scientific theories addressing irreversibility. Instead, I will focus on the human field of interactions and on certain historical decisions that have been made which have had unintended deleterious effects, most of which have proven to be impossible to reverse. I believe that there is an element of ethical impairment or amorality that force generations of unborn human beings to pay for their forefathers’ decisions.

Here are some examples:

(1) Jean-Paul Sartre relates that Chinese peasants, who in past centuries cleared vast tracts of land for agriculture, caused massive deforestation which unintendedly triggered destructive floods. He used the example to underpin his argument that the pursuit of individual goals leads to undesired consequences. – See *Critique of Dialectical Reason* (1960), English edition, *New Left Books* (1976), pp. 161-165.

(2) Following the arrival of Europeans in the Americas in 1492, tobacco became one of the primary products fueling colonization, while also becoming a driving factor in the development of [African slave](#) labor. The Spanish introduced tobacco to Europeans in about 1528, spreading initially among the nobility and the rich, and eventually reaching all other classes. The French, Spanish, and Portuguese initially referred to the plant as a "sacred herb" because of its purported medicinal properties. Only since the last century has medical research proven conclusively that smoking tobacco –also a highly addictive herb– leads to major lung and heart disease, causing the death of thousands every decade.

(3) When in 1885, [Karl Benz](#) developed the first gasoline-powered automobile, he started a chain reaction that revolutionized transportation for centuries; marrying the exploitation of fossil fuels with the dream of one-man-one-vehicle independence. Further, in 1913, the [Ford Model T](#), created by the [Ford Motor Company](#), became the first automobile to be mass-produced on a moving [assembly line](#). By 1927, Ford had produced over 15 million Model T automobiles. It is estimated that there are more than one billion motor vehicles in use in the world today. (This figure represents the number of cars, trucks and buses in the planet, but does not include off-road vehicles or heavy construction equipment.) From the moment of its invention on, the production and sale of gas-burning vehicles has expanded exponentially, covering the whole planet today in a toxic pall of greenhouse gases and contributing to irreversible and disastrous climate change.

(4) A good example of an attempt to reverse –or at least make amends for– bad decisions, is that of Alfred Nobel (1833 – 1896), best known as the inventor of [dynamite](#). After reading a [premature obituary](#) which condemned him for profiting from the sales of arms, he bequeathed his fortune to institute the famous [Nobel Prizes](#). Whether this noble gesture has made up for the millions of human lives lost as a result of Nobel’s inventions, I leave to the reader to decide.

(5) Other well-known scientists have tried to reverse momentous decisions which are today threatening not only humanity but the whole biosphere. After the development of the first atomic bomb, some of its creators publicly intervened to put a break on further development of nuclear energy for military purposes. We now know what the Manhattan Project decision to create the Bomb has meant for our irreversible descent into Armageddon since Hiroshima.

Each and every one of us has made good or bad decisions that have had irreversible consequences we may now regret. As none of us has a crystal ball that can foresee the future, we can only try to avoid unethical moves and try to develop a long-term perspective so as to reduce the eventual harm our decisions may make for ourselves and others in years to come.

* Written by ©Pascual Delgado, July 29th 2019. All information –except for the Sartre quote– was culled from Wikipedia sources.