

## A History of Change

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As a historian, most of what I have to say about change over the last thousand years is quite uplifting on the social front but deeply depressing on the matter of sustainability. This is because it concerns how we got into the unsustainable mess we're in now. So I apologise for any glumness in what follows. Nevertheless, it is important that we understand the causes of change in the past because they are also the causes of change now and in the future. As I often tell people, you can't plan for the next fifty years simply looking back over the last fifty. You need to look back much further. You might think that plague and smallpox are dead and buried but you never know when the next pandemic will arise.

Historically, the root causes of change fall into three categories: factors external to society, social pressures *within* society, and discoveries that benefit society.

External factors include diseases, climate change, coastal erosion, the exhaustion of natural resources, and so forth. In general, the more widespread the impact, the more profound the change. In Europe, the Black Death of 1347-50 killed half the population. But it also led to the rise of wages; better living standards; religious changes and the emergence of capitalism. When smallpox arrived in America in the sixteenth century, it destroyed whole civilisations. As for the weather, short-term variations have always caused food shortages, resulting in rebellions, revolutions and diaspora. Long-term climate fluctuations have also had their impacts, both good and bad. The Medieval Warm Period, for example, which saw a rise in the average world temperature of about 1 degree Centigrade for two hundred years, led to agricultural surpluses, population growth, the establishment of many new markets, and ultimately the founding of monasteries, schools and the first universities. External factors continue to affect our lives in the most profound ways – and they always shall.

The pressures for change that arise within society, contrary to what many people suppose, are not normally caused by technological innovations. Take the magnetic compass for example: this was not employed by navigators to cross oceans until the fifteenth century – at least five hundred years after it was invented in China and three hundred years after it was known in the West. Likewise, gunpowder was known about in China in the eleventh century and demonstrated in Europe in the thirteenth, but it only became a decisive factor in warfare in the

sixteenth. If you want to change the world by inventing something, it has to be a tool that the world actually needs. There has to be a pre-existing social pressure for the change.

So where *do* social pressures come from?

Probably everyone has heard of the hierarchy of personal needs proposed by the psychologist Abraham Maslow in 1943. First, people require the basics of life: food, air, water, clothing and shelter. Then, after those needs are satisfied, they seek safety, then love, then personal esteem and finally, self-actualisation. Similar hierarchies of needs can be drawn up for social groups – for whole nations, towns, villages, businesses, religions, minority groups and like-minded individuals. All these needs are impulses or forces for change within society. Like gusts of wind, they act on each other, sometimes combining to become very strong. They are particularly powerful when a unifying national or international aim develops, such as when nations find themselves at war. The major conflicts of the twentieth century acted as catalysts for innovations as varied as the development of weapons, artificial fertilisers, the widening of the electoral franchise, mental health, occupational health, penicillin and radar.

In sustainability terms, the most important social pressure of all is probably the instinct to reproduce. You may think that this is a biological constant but, when combined with sufficient food and healthcare, it is the root cause of population growth, and that directly leads to the unsustainability of numerous traditional activities. Many people see nothing wrong in trawling for fish, clearing rainforests, cattle farming or discharging effluent into rivers because they have always done these things. But the world has changed with the number of people living in it. When was the halfway point of the last millennium? Chronologically it was five hundred years ago. But in terms of the number of person-years lived, it was in the 1870s. In terms of the amount of iron we have used, it was probably in the 1950s. As we all know, population growth is having a concertina effect on history, increasing the intensity of everything we do.

The third category of causes of change is discoveries. A combination of social pressures and individual ambitions impelled Columbus and his fellow mariners to sail westwards looking for China in 1492, and although they miscalculated by about five thousand miles, their stumbling on the Americas led to changes on a tremendous scale. Imagine how different the world would be today had America not been there – and Columbus had just sailed on, into the Pacific! Discoveries constantly reshape the landscape of our lives in the same way that external forces do. Most inventions depend on them. Where a discovery allows us to fulfil a fundamental social need, it can be of world-changing significance – for instance, when Fritz Haber found out how

to fix atmospheric dinitrogen in the form of ammonia, thereby enabling the mass-production of artificial fertilisers.

Those three categories describe the root causes of change. But how can understanding them help with sustainability?

Three hundred years ago, almost everyone in the world was living a sustainable lifestyle. Almost everything was locally produced, organic and biodegradable. Traditions – such as the annual rituals of sowing and harvesting – were valued by communities precisely because they guaranteed an ongoing positive relationship with the local environment. Even where effluent was poured into rivers and coal used for fuel, these were on a scale so small as to be environmentally insignificant. What disrupted this was the Industrial Revolution, starting in England in the eighteenth century. In the public mind this is characterised by steam engines and machinery. But as noted above, inventions don't change the world by themselves: they require pre-existing social pressures. In this case, the root cause was an increased desire for profit. But why did eighteenth-century Englishmen suddenly get so greedy? The answer is not actually greed but the desire for resilience. They wanted never to be hungry again.

To understand the connection between profit and resilience, you need to focus on the period just before the Industrial Revolution. In the years 1690-1710, a succession of harvest failures struck Europe. In France they cost the lives of about two million people – one tenth of the population. Similar proportions died in Scotland, Scandinavia, the Baltic States, Finland, Prussia and Italy. In England, almost no one died. The reason was that the Agricultural Revolution was already underway. Farmers were adopting scientific ways of making their land more productive. Just as importantly, they were storing large surpluses of food, particularly grain and cheeses. They were prepared for just such a sequence of harvest failures. At the same time, English parishes were legally obliged to tax local people to pay for the sustenance of their poor neighbours. When the harvests failed, farmers released their supplies. The local taxes helped those who could not afford the higher prices. Communities proved resilient.

You can see the long-term trend here. Sustainability in itself was not enough to defend communities against external threats such as repeated harvest failures. People needed *resilient* sustainability. So a system developed whereby some landowners would specialise in maximising the productivity of the land and others would specialise in making enough money so that they could be sure of always being able to buy the surpluses they created. By the mid-eighteenth century, more food was being produced in England than ever before; the population was rising and in need of employment, and landowners started looking at other forms of industrial

productivity. And that is when, for many manufacturers, profit became an end in itself. Thus we saw the introduction of machine-driven factories and better transport infrastructure. The rest of Europe and America swiftly followed the English example. Ever-larger economies of scale developed, reaching further and further afield. When steam engines became more efficient than horse and waterpower, the profit motive encouraged people to burn fossil fuels. Ever since then, there have been more and more economic incentives for rich countries to live unsustainably.

The rewards have been incredible. Just to look at the effects on Europe: income inequality is far less today than it was in 1700; we have seen life expectancy at birth more than double; our individual liberties have expanded, and our population has quintupled. Worldwide the population is twelve times greater. The only problem is that, in our efforts to be resilient through specialisation, and then to use our wealth to secure greater health, personal freedom and equality, we forgot all about sustainability.

Obviously, we need to rebalance this trend. Even people who don't believe in climate change can see that the free market is beginning to deliver *less* resilience, not more, as supply lines prove vulnerable to external factors such as pandemic disease and extreme weather events. Clearly, locality is of fundamental importance. Just as clearly, we are going to have to give up some of our twenty-first-century privileges and renounce some of our unsustainable practices. This makes it sound like a huge challenge. But, actually, giving things up is not as much of a problem as you might think.

Throughout history, people have ceased practices that were initially acceptable but later were deemed socially undesirable or morally wrong. Between the eleventh and thirteenth centuries Western Europe renounced slavery, even though it had been justified by the Ancient Greeks, the Romans and the early Christian Church. The slave trade was renounced again in the nineteenth century, even though it was the foundation of considerable wealth. Since then we have seen many similar renunciations in Europe: the death penalty, public flogging, the persecution of minorities, cruelty to animals, the subjugation of women, and the exclusivity of male power. It is significant that the first renunciation of slavery coincided with the relative prosperity of the Medieval Warm Period. The second abolition of slavery and all these other renunciations similarly came about after the Agricultural Revolution, when, again, food became relatively more abundant. When a nation's food supply, health and security are broadly satisfactory, people look further up their collective hierarchy of needs and call on their contemporaries to renounce activities that they deem immoral or undesirable. Even though

renunciations are difficult – because they are ongoing processes, not single acts – whole nations may choose to turn their backs on their past behaviour.

Does this awareness make me an optimist? Any historian who is optimistic about the future is either complacent or naïve. However, history also makes me critical of pessimists. For the processes necessary for us to give up unsustainable practices are far from impossible. We *can* change people's fundamental thinking. For instance, two hundred years ago, barely 12 percent of the world's population could read and write. Today, 86 percent is literate. That almost complete reversal has nothing to do with technology but rather is the result of the collective needs of nations, individuals and interest groups all converging on the desirability of an ongoing process, namely education.

The example of literacy shows how worldwide social changes can be brought about entirely by social pressures. It also demonstrates that the small changes made in one age can have exponentially large consequences in another. Teaching an extra thousand people to read in the fifteenth century may well have resulted in a hundred thousand more literate people in the seventeenth century and a hundred million more in the nineteenth. It is the same with sustainability: every small gain is worthwhile for it has the potential to result in an exponentially larger gain in the centuries to come. Obviously, the reverse is also true. But if we were to educate everyone in the principles of sustainability and demonstrate that they can empower themselves through the application of those principles, sustainability could become as normal as literacy. After all, if people could live sustainably with seventeenth-century levels of technology, we should be able to do so in the twenty-first century with ours – despite the population of the world being twelve times greater.

Over the next thousand years there are going to be wars, there are going to be pandemic diseases, there are going to be revolutions. We are likely to see a rise in inequality and a curbing of individual freedoms. But all of these are secondary to the most important fact of all: that we will always need a world in which these things can happen. It follows that sustainability, resilience and conservation are not merely comfort blankets. They are the unseen bedrock of our existence. Educating everyone in the world so that they realise this fact is the great challenge facing us all – now and for the foreseeable future.