Nicholas Maxwell

THE WORLD CRISIS — AND WHAT TO DO ABOUT IT

A Revolution for Thought and Action

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1 The World Crisis

The world is in crisis.

One would think that a book with a first sentence like that, written in 2020, has to be about the coronavirus pandemic. In what follows, I will indeed have some things to say about the pandemic. But this book was conceived long before the coronavirus unleashed its deadly attach upon humanity; it is about an older, and far more serious, world crisis. It is a crisis that stares us in the face, and yet in practice is all but ignored. Only token actions are taken in response to it. The many manifestations of the crisis tend to be considered in isolation from one another; they are not understood to be diverse aspects of one gigantic crisis that menaces our future. There is hardly any understanding as to what the nature of the crisis is, and almost none as to the key thing that needs to be done to put a stop to it. A basic message of this book is that many of the very serious global problems that threaten our future have a common origin, a common cause, and require for their resolution, in important ways, common actions. It is only if we see and understand the interconnections between these diverse global problems that we are likely to appreciate the full extent and seriousness of the world crisis that we face — and are, much more importantly, likely to be able to summon up the capacity to solve these problems.

The crisis has indeed many diverse aspects to it.

It is glaringly apparent in the climate crisis. Carbon dioxide (CO_2) in the atmosphere continues to rise because of human activity, the temperature of the earth rises as a result, storms intensify, ice at the poles melts, sea levels rise and, as I write, forests in Australia, Brazil and elsewhere are engulfed

by fire. If present trends continue, whole areas of the earth's surface will become uninhabitable, and millions, possibly billions, of people will die.[1]

We have known about global warming for a long time. John Tyndall, an Irish physicist, discovered the crucial property of CO_2 in 1859. He discovered that CO_2 absorbs infrared light. It is this that makes CO_2 a greenhouse gas. Light from the sun shines on the surface of the earth, and some is reflected back as infrared light; this is absorbed by CO_2 in the atmosphere and re-emitted, some back to the earth. The more CO_2 there is in the atmosphere, the more infrared light is absorbed and re-emitted back to the earth's surface, and the hotter the planet gets. In 1896, Svante Arrhenius, a Swedish physicist, realised that industrialisation would have this effect: the planet would heat up. But he thought it would not matter; living in Sweden, a cold country, he thought a bit of warming would be good. In 1938, Guy Callendar gave a lecture to the meteorological society in London in which he presented evidence that the earth was already getting hotter as a result of emissions of CO_2. Callendar also thought it would be a good thing.[2]

It was, however, in the late 1950s that we really learned that we are increasing the amount of CO_2 in the atmosphere, year on year, as a result of the fossil fuels that we burn: gas, oil and coal. David Keeling, an American scientist, began to make very accurate measurements of the amount of CO_2 in the atmosphere in Hawaii — so accurate that he could detect that levels of CO_2 went up in the autumn due to the decay of leaves, and went down in the spring as a result of new plant growth (which absorbs CO_2). The overall tendency was, however, clear; year by year, the amount of CO_2 in the atmosphere was increasing at an alarming rate, sufficient to raise the average temperature of the planet.[3]

Many climate scientists hold that if we continue to respond to the climate crisis in the ineffective way that we have done so far, the average

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[1] For a wonderfully readable and utterly terrifying account of diverse aspects of the climate crisis, see Wallace-Wells (2019). Detailed claims about the grim future we face are backed up with a wealth of references to relevant technical climate science literature.

[2] See https://www.wired.com/story/meet-the-amateur-scientist-who-discovered-climate-change/ (accessed 21/11/2020).

[3] For an excellent history of the discovery of climate change, see Weart (2008).

temperature of the earth will rise by 3° centigrade by the end of the century, if not higher. That would be a disaster. It would trigger events that would be catastrophic: the melting of ice in the Antarctic and Greenland, and the rise of sea levels leading to the flooding of major cities and densely populated coastal land; the destruction of tropical rainforests, with the further emission of CO_2; the thawing of tundra in northern Russia and elsewhere, and the release of vast quantities of methane, a far more powerful greenhouse gas than CO_2; and possibly the melting of even greater quantities of frozen methane hydrates, at present beneath the oceans, leading to the release of even greater quantities of methane. Once 3° centigrade is reached, in other words, all sorts of irreversible processes are triggered which lead, remorselessly, to the planet heating up even more.[4] Great tracts of the earth's surface might no longer support human life — because of flooding, droughts, fires, and temperature. Billions of people will die — because of floods, droughts, fires, starvation, and war.

The climate crisis is the worst of our global problems, but there are others too that threaten our future. There is the destruction of natural habitats, the rapid loss of animals in the wild, and the devastating extinction of species. There is massive and, in some respects, growing inequality in wealth and power around the globe. According to Oxfam, the wealthiest 26 people — yes, a mere 26 people — own as much as the poorest half of the world's population.[5] There is the lethal character of modern war. Whereas around 12 million people died in wars in the 19th century, over 100 million died as a result of war in the 20th century, and we are not doing too well in the 21st century so far. There is the spread of modern armaments around the world, conventional, chemical, and possibly biological.[6] There is the menace of nuclear weapons ready to be unleashed at the touch of a button. On several occasions in the past a flock of geese, the moon, or malfunctioning equipment has signalled incoming missiles; all-out nuclear war has only been averted because key officials have disobeyed orders. As long as nuclear weapons are ready to be unleashed at a moment's notice, sooner or later they will be unleashed, whether because of rising tension,

[4] Some of these processes have begun to happen as I write in 2020.
[5] See https://www.theguardian.com/business/2019/jan/21/world-26-richest-people-own-as-much-as-poorest-50-per-cent-oxfam-report (accessed 21/11/2020).
[6] See Smith (2003).

war, accident, malfunctioning equipment, or hacking. The mere existence of nuclear weapons threatens our future.

There is the problem of pollution of earth, sea and air: plastic and acidity in the oceans devastate ocean life; pollution of air kills millions of people, and CO_2 pollution causes global warming. There is the problem of growing resistance of bacteria to drugs as a result of the misuse of antibiotics. We face the dreadful possibility that we may return to the state of affairs in the 19th century, when trivial infections would lead to death, and diseases such as TB had no effective treatment. There is the explosive rise in the world's population. In the middle of the 19th century there were 1 billion people; there are now 7.8 billion. It is estimated that there will be as many as 11 billion people by the end of the century. There are the threats to democracy that stem from the internet: governments, political parties, and other interested bodies, spread deception and lies on social media, and subvert democratic elections. And there is the coronavirus pandemic, which caused over 1.7 million deaths worldwide towards the end of 2020, and has undermined economies and disrupted social and cultural life.

What makes many of these threats to our future all the more serious is that they interact with and intensify one another. At a time when the world's population goes up, and more food is required to keep hunger at bay, the capacity of the world to produce food may well go down because of loss of land fit for agriculture due to climate change. Again, as the population increases, the area of the earth's surface capable of supporting human life goes down, due to adverse weather conditions and rising sea levels. Millions of people, in north Africa, parts of Asia and elsewhere, living in areas that increasingly fail to support any kind of human life, will seek to move into neighbouring areas, also degraded and under threat, and thus incapable of accommodating refugees. These are circumstances all too likely to provoke war. As global problems intensify, it becomes all the more important that the nations of the earth find ways to cooperate with one another to discover how best to resolve the crises. But as the crises intensify, conditions likely to provoke violent conflict proliferate, and cooperation becomes all the more difficult to achieve. It is possible that we now have only a decade or so to put in place measures capable of coming to grips with these grave problems. If we do not do now what

needs to be done, the world may descend into even greater anarchy and chaos than what we have at present.

Why have all these crises, so distinctive of the 20th and 21st centuries, come upon us just now in human history? Humanity has experienced plagues, drought, famine, and other disasters many times in the past, but the global crises we face today seem especially distinctive and characteristic of our age. What is it about our times that caused these specific crises to arise just now in human history? Why this state of unprecedented global emergency?

There is a reason. It will be discussed in the next chapter.

2 The Key to the Disasters of Our Time: Two Great Problems of Learning

Humanity is confronted by two great problems of learning: learning about the universe, and about ourselves and other forms of life as a part of the universe; and learning how to create a genuinely civilised, enlightened, wise world.[1] We have solved the first great problem of learning, but have not yet solved the second one. That puts us into a situation of extreme danger. All our global problems stem from that source. The world is, as a result, in a state of unprecedented crisis that threatens to get worse and worse, more and more terrifying, as time goes by.[2] Now that we have solved the first great problem of learning, it is a matter of extreme urgency that we discover how to set about solving the second one.

The first problem was cracked, in essence, in the 17th century, with the birth of modern science. We discovered how to make increasingly rapid progress in knowledge; we learned how to learn. A *method* was discovered for progressively improving knowledge and understanding of the natural world, the famous empirical method of science.[3] There is

[1] A genuinely civilised, enlightened, wise world is, in my view, one in which everyone can share equally in enjoying, sustaining, and creating what is of value in life, insofar as that is possible. It would be a world that reconciles equality and liberty insofar as that can be done. There would be peace, justice, democracy, and probably a democratic world government. However, in chapter 4 it will emerge that a rather different, hierarchical approach to characterising civilisation needs to be taken: see figure 3 and associated text discussing aim-oriented rationality.

[2] Anyone who has any doubts on that score should read Wallace-Wells (2019).

[3] Some scientists, and many historians of science, deny that there is any such thing as scientific method. One well-known historian of science declared, "It is doubtful that there is any such thing as scientific method, and even more doubtful that its

of course much that we still do not know and understand, four centuries after the birth of modern science; what is undeniable, however, is that during this time, science has immensely increased our knowledge and understanding at an ever accelerating rate.[4] And with this unprecedented increase in scientific knowledge and understanding has come a cascade of technological discoveries and developments which have transformed the human condition.[5] It is this that has made the modern world possible, so different in a multitude of ways from the world experienced by people in Europe or North America only one or two centuries ago.

Modern science and technology have had profoundly beneficial consequences for humanity. They have made possible the development of modern industry and agriculture, modern hygiene and medicine, modern travel, modern communications, and all the multitude of good things that come from these developments. But there is a downside. These very successes have also led to all our current grave global problems. In every case, current global problems have been made possible by modern science and technology. Let us take the global problems indicated in the last chapter, one by one, and see how, in each case, modern science and technology are implicated. Implicated, but not the inevitable cause; in each case, as we shall see, we could have avoided generating these global problems if we had been wiser.

The climate crisis. Modern industry, power production, agriculture and travel, all made possible by modern science and technology, have led to a

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origins are in the 17th century." Shapin (1998, pp. 3–4). This is a symptom of the persistent failure of the intellectual community to get the progress-achieving methods of science properly into focus, as we shall see in chapter 4. See also Maxwell (2017a and 2017b), especially pp. 24–29 of the latter book.

[4] Actually, some contemporary historians and sociologists of science do deny that science has improved our knowledge of the world; this denial is another symptom of the general failure to get the nature of scientific method properly into focus, as we shall see in chapter 4.

[5] There is a long-standing debate as to whether technology emerges from science, develops independently, or actually contributes to science (as in the case of the steam engine leading to the development of thermodynamics). I sidestep this debate here, and assume merely that as far as modern science is concerned, science and technology developed in tandem with one another, each contributing to the development of the other.

substantial increase in CO_2 in the atmosphere, sufficient to raise the average temperature of the earth, and cause the alarming signs of global warming we have begun to witness — the devastating forest fires, the melting of Greenland and Antarctic ice, the increasingly intense storms, floods, and droughts, and the release of methane from the tundra of north Russia, thus further intensifying global warming.

Destruction of natural habitats. Modern agriculture and the rising world population have, together, led to the destruction, over the decades, of over half of the world's tropical rainforests, in which 80% of terrestrial species live. Every year about 18 million hectares of forest — an area the size of England and Wales — are lost. If destruction continues at the present rate, all tropical rainforests will have disappeared by the middle of the century, or soon after. The destruction is caused by logging, clearance for agriculture, mining, and roads, all facilitated by modern technology. This destruction of forests, via burning, in turn contributes to CO_2 emissions and global warming.

Coral reefs are the tropical rainforests of the oceans; they support a great diversity of species of fish. But they are under threat too, from acidification and warming of the oceans — which stem from CO_2 emissions and global warming — and destructive fishing. If CO_2 emissions continue at something like their present rate, all coral reefs will, before long, disappear.

Loss of wildlife. During the last 50 years or so there has been a catastrophic loss of wildlife: mammals, birds, insects, plants, fish — all have disappeared in vast numbers, across most species. More than half of all wild animals have disappeared since 1970. Increased hunting and fishing by an increasing human population has something to do with it, but the main cause is habitat destruction, in turn caused by human population growth, expansion of human habitation and modern agriculture. Wildlife, having nowhere to live, dies. Modern science and technology are implicated here too, as a result of facilitating modern methods of hunting and fishing, population growth, modern agriculture and habitat destruction.

Mass extinction of species. All but inevitably, loss of wildlife leads to the extinction of species. A relatively recent report estimated that 500 species

are in danger of imminent extinction.[6] It is estimated that at present there are somewhere between 15 and 20 million species on earth; by the end of the century, half of these may have become extinct if we do not rapidly change the way we interact with the natural world.[7] The causes of mass extinction of species are, of course, exactly the same as those that cause loss of wildlife: human actions made possible by modern science and technology.

Inequality. This arose when we stopped living in small, scattered hunting and gathering tribes, and took to agriculture, possession of land, and the building of cities. Global inequality was much exacerbated after modern science and technology were developed in Europe. Modern science and technology made possible the Industrial Revolution and, as a result, the generation of wealth — wealth, as it happened, very unequally distributed within Europe. Furthermore, a positive feedback effect comes into operation. Increasing wealth makes possible more financial support, and more leisure, for scientific and technological research, which in turn makes possible the generation of more wealth. Thus, because Europe and its outposts — North America, South Africa, Australia and New Zealand — initially possessed modern science and technology exclusively, these nations became especially wealthy in comparison to the rest of the world. Unequal geographical distribution of science and technology led to unequal distribution of wealth around the world.

European wealth may have been further promoted as a result of European empire building. And empire building may have been facilitated by science and technology, in providing tools for navigation, ships and modern weapons. On the other hand, ancient Rome built an empire; and so did ancient Athens: neither had modern science and technology. At most, modern science and technology facilitate, but are not essential for, empire building, and the inequality in wealth and power that that is likely to produce.

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[6] "Sixth mass extinction of wildlife accelerating, scientists warn", *The Guardian*, https://www.theguardian.com/environment/2020/jun/01/sixth-mass-extinction-of-wildlife-accelerating-scientists-warn.

[7] The impending mass extinction — the sixth life has had to face — is discussed in Kolbert (2015).

During the 20th century, as poor nations became somewhat wealthier, in part as a result of acquiring modern science and technology, global inequality became somewhat less extreme. There is, however, still the extreme inequality noted in the last chapter: the wealthiest 26 people own as much as the poorest half of the world's population. There can be no doubt that this is made possible by the explosive growth of computer technology, and the internet. During the last two and a half centuries or so, modern technology has played a role in facilitating the growth of inequality.

Lethal character of modern war. As I remarked in the last chapter, a mere 12 million people died as a result of war in the 19th century, whereas over 100 million died in the 20th century — and the record of the 21st century is not too good so far, either. Part of the reason for the increase in numbers killed in war is that there are many more people around to be killed — but that is due to modern science and technology, which makes possible the growth of the human population. The other factor is the development of far more lethal weapons of war: machine guns, tanks, aeroplanes, bombs. These are only possible because of modern science and technology.[8]

Spread of modern armaments, conventional, chemical, and possibly biological. Without modern science and technology, the modern arms trade would not have been possible. But here, as elsewhere, a wiser, more enlightened world could have avoided this outcome.

Menace of nuclear weapons. This menace, very clearly, is not possible without modern science and technology. As before, a wiser world would have managed to avoid developing such weapons, or at least unleashing them in war; but if developed, such a world would have organised their monitored elimination.

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[8]China invented gunpowder in the 9th century, some four centuries before it was acquired or made by Europeans. China, notoriously, made a great number of technological discoveries centuries before Europe. But China never discovered modern science, for reasons that will become clear in chapter 4. China's failure to create modern science had the consequence that it never fully solved the first great problem of learning — the discovery of how progressively to improve scientific knowledge and technology, in tandem with each other.


image
not
available

being transferred to another species that is harmful to people, as a result of the transference of the relevant mutated gene. Some strains of some diseases, such as sepsis, TB and gonorrhoea, have become immune to all antibiotics. Antibiotics are, of course, a wonderful product of modern science and technology which we increasingly render useless by our foolish misuse.

Threats to democracy posed by the internet. The internet makes it possible for campaigning groups, political parties, and hostile foreign powers to post deceptive messages, burdened with falsehoods, on social media such as Facebook, targeted to be received by just those most likely to be influenced in the desired way. This has had serious consequences: it may well have been the decisive factor in the Brexit referendum in the UK, and the vote for Donald Trump for president in the US. It may well have debased elections and democracy elsewhere in the world. There is another deplorable impact that internet companies such as Facebook have. Hungry for "clicks" to feed advertising and revenue, whenever a particular topic is called up by the user of social media, the internet company will offer the user further topics, designed to be more enticing, more extreme. In this way, users are encouraged to tread down narrow alleys of dogmatism, extremism, fanaticism and malicious fantasy. Instead of bringing people together, the internet locks people away in their dungeons of fear and hatred.[12]

The coronavirus pandemic. Covid-19 spread from Wuhan in China to the rest of the world in a matter of a month or two because of widespread, rapid modern travel, made possible by modern science and technology. Modern science and technology made the coronavirus pandemic possible. Many experts hold, in addition, that pandemics are more likely to occur in the future because we are interacting more with natural habitats, reservoirs of such diseases. I am not so sure. From our earliest times on the planet, we have lived in natural habitats. What is new, and pandemic-threatening, is that people who do now interact with creatures from natural habitats are also in close contact with people who connect with the travelling community of the world. It is widespread, rapid worldwide travel that is the decisive factor.

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[12]The internet does of course have many more positive and fruitful uses!