BioFutures and the Legacy of Our Past

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Escaping Evolution

By

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Cover image: This bone comb illustrates, both in its styling and its intended function, how even the most basic technology allows us to escape evolutionary pressures. The comb is skilfully crafted and would probably have been a high value item, passed around a Neolithic farming homestead group, that shared action of mutual care reinforcing the group's cohesion in its struggle for survival. The styling of the comb refers to one pressing external biological threat, in the shape of the wolf's head. At the other end, a stern human head expresses the determination of the group to resist such a threat. In its function, the comb also deals with another, far smaller, biological enemy – the ticks and fleas that would have been vectors of infectious disease within the group.
Source: Wellcome Collection, CC-BY-4.0.

to Cecilia

It is sothe that synne is cause of all this peyne, but al shal be wele, and al shall be wele, and all manner thing shal be wele.

CONTENTS

PREFACE

This book is about the biological future of our species, *Homo sapiens*.

Broadly speaking, there are two perspectives on this subject. The first of these is that, as a biological species, we are embedded in the Earth's ecosystems as much as any other species on the planet. Civilization may have convinced us that we are no longer "wild", that we are somehow apart from, and indeed above, all the actual wild animals and other species out there, but that is an illusion. We do not "inhabit" our planet like guests in a luxury spa eco-hotel, rather we are just one of the many biological manifestations *of* that planet. Our success in manipulating our environment, for better or worse, has not disentangled us from it. There is no division between humanity and the natural world, but we remain entranced by this myth of our superiority, despite frequent unpleasant reminders of its falsehood.

The second perspective is that we really can, in some way, "escape" our biological natures, and indeed that we have almost managed to do so, via the capacity that our evolved massive brains have granted us to produce complex technologies and societies. We are the first species to be truly in control of our own destiny, the first species to be no longer at the mercy of our ecological surroundings. Our brains are the products of evolution, but thanks to those brains we have, perhaps, finally escaped our evolutionary heritage. Biologically deterministic models of human nature are all wrong.

This is more than merely an academic argument. We know by now that our planet, in decades, centuries and millennia to come, will be a rather different, and in all likelihood more challenging, place than it is today. If the first of the two perspectives above is the correct one, then we are in for a very rough time indeed. If the second is closer to the mark, however, we can afford to breathe a little more easily, provided of course that complacency does not set in. The question then becomes exactly how we can continue our Houdini act, as the planetary ecological noose tightens around our necks. The tension between these two views of human nature means that an understanding of human evolution and its implications has

never been more important, as we look forward, now more than ever with a sense of trepidation, into the unknown.

The academic discipline of looking into the future has become known as Futures. Those who practice Futures professionally – the Futurists – tend to the second of the two perspectives outlined above. Evolutionary biologists tend to the first perspective. Consequently, the two fields have had little to say to each other. This book attempts to bridge this gap by orienting Futures more deliberately towards biology – an endeavour I call "BioFutures". BioFutures attempts to do two things. The first is to examine the biological history of *Homo sapiens* to understand how evolution brought us to where we are, and how it still works within us today. Without that understanding, without taking into account our embeddedness, our entanglement, in the natural world, we risk embarking on utopian enterprises that are biologically flawed. The second goal of BioFutures is to urge the use of the Futures method within biology, to bring into that field Futures' insistent focus not just on our possible and probable future trajectories, but also on our desired future. Otherwise, dystopian pessimism may lead us to miss any chance we may actually have of cutting free from our entanglement in nature, or of adjusting our relationship with nature in a way that enables us to squeeze out a few million years more yet of the human story.

The next chapter, *The Masque of the Red Death*, explores how our greatest fears for the future have always been problems with biology at their root. Then Chapter 2, *The Vision Thing*, takes a closer look at Futures thinking in general. Chapter 3, *He Who Understands Baboon*, explores evolutionary theory. Much of that part of our story takes place in Africa, according to some theories a relatively stable and abundant environment which moulded us from apes into the creatures we are today. This environment was not the biblical Garden of Eden, although in the hands of some evolutionary psychologists it has almost become presented as a kind of utopian mythical past. Just as in the story of the Garden of Eden, that idyllic existence also had the seeds of dystopia within it. But utopia or not, our sojourn on the plains of Africa could not last forever, and Chapter 4, *Anthropocene*, follows humans out of that continent and across the rest of the planet. This was bad news for a large number of other species. Eventually it was also bad news for humans, as we increasingly turned on each other, and we shall see how the story of that dystopia echoes down the millennia. Chapter 5, *The Ghost of Malthus*, brings us up to the present day, with a human species that has encompassed the globe and has nowhere else left to go. In Chapter 6, *Fourth Horseman*, we once more meet a character from Chapter 1, and his pestilential companions. Then Chapter 7, *Life on a Hotter Planet*,

ventures into the future climate dystopia that many modern environmentalists are convinced awaits us. Chapter 8, *Escaping the Soft Machine*, takes the other fork in the road and voyages into present day utopian BioFutures, and how some believe we can reach out to a trans-human, even post-biological existence. Having reached such heady techno-utopian delirium, Chapter 9, *Australopithecus redux*, returns us to a future Earth where we are absent. Perhaps it really was too late, as the eco-dystopians insisted. Or maybe things did not go so badly after all, humanity did in some way survive its omni-crisis and simply kept on evolving. This future world does contain our descendants, but they are just not instantly recognisable. Chapter 10, *Rousseau's Headstand*, draws together the themes from the previous chapters, showing how a Futures approach is essential if we want to have any influence over our own biological future, if we are to have any chance at all of escaping evolution.

My immense gratitude goes out to all my colleagues in the Institute (now Centre) for Social Futures, for their constructive criticism and intellectual companionship during this project. In particular, my colleague at Lancaster University Prof. Richard Harper provided very necessary advice on the architecture of the book and keeping things as concise as possible. They are, of course, *not* responsible for any errors of fact or opinion, which are entirely my own. My wonderful wife Cecilia has had to contend for over more than three decades with an occasionally frustrated lecturer who kept droning on about writing a book that never quite appeared. Well, here it is at last. Without her, it would never have appeared at all.

I thank EAT[1] for permission to reproduce the quote at the top of Chapter 5. Quotations from public domain works are under the terms of the Project Gutenberg License. All other quotations are kept short and apposite to the discussion and are therefore submitted to be "Fair Use". Some material in Chapter 2 is from a previous work of my own to which the publishers, Routledge, have generously allowed me to retain copyright[2]. I have avoided long footnotes, as the temptation to digression is too great, and I set out specifically not to be one of those authors who almost writes a second book (sometimes a rather different - or even worse, a more interesting one) within the footnotes[3]. All the citations within the text are simply references to the sources for the various factual claims I make and acknowledgements of

[1] https://eatforum.org/
[2] Gatherer 2022
[3] as parodied by Alasdair Gray in his novel *Lanark. A Life in Four Books* (Gray 1981).

where I have plundered the ideas of others. There are some authors that have borne most of that plundering, in alphabetical order: Peter Bellwood[4], Roger-Maurice Bonnet & Lodewijk Woltjer[5], David Buss[6], Eric Cline[7], Jared Diamond[8], Jack Eller[9], Yuval Noah Harari[10], Raymond Kurzweil[11], Kevin Laland & Gillian Brown[12], Richard Leakey[13], Colin Mason[14], Steven Pinker[15], Paul Rubin[16], Alvin Toffler[17] and Alan Weisman[18]. I have also made extensive use of the multi-author works edited by: John Foster[19], Emily Spiers & Carlos López Galviz[20], Max More & Natasha Vita-More[21] and Russell Blackford & Damien Broderick[22] as well as Philip Appleman's edition of Malthus[23]. The usual next sentence in prefaces of this sort involves the cliché about "standing on the shoulders of giants". Much as my English teachers urged me to avoid clichés, the reason they are so persistent is usually because they express exactly what the writer is trying to say. So thank you to all those giants.

[4] Bellwood 2013, 2015
[5] Bonnet and Woltjer 2008
[6] Buss 2019
[7] Cline 2014
[8] Diamond 1997
[9] Eller 2019
[10] Harari 2014, 2017
[11] Kurzweil 2005
[12] Laland and Brown 2011
[13] Leakey 1979; Leakey and Lewin 1995
[14] Mason 2003
[15] Pinker 1994
[16] Rubin 2002
[17] Toffler 1970, 1981
[18] Weisman 2007
[19] Foster 2019
[20] Spiers and López Galviz 2022
[21] More and Vita-More 2013
[22] Blackford and Broderick 2014
[23] Malthus 2004

CHAPTER 1

THE MASQUE OF THE RED DEATH

And darkness and decay and the Red Death held illimitable dominion over all.
—Edgar Allen Poe[24]

When I began to sketch out the plan of this book, in the autumn of 2019, the television screens of the UK, and perhaps even other parts of the world, were filled with footage of a strange theatrical protest event taking place in London. A drum began to beat out a slow funereal march, as two columns of eerie figures emerged from under the 19th century neo-classical edifice of Marble Arch. Dressed from head to foot in red robes styled somewhere between a Victorian version of a druid and a 15th century courtier's costume, with faces painted deathly white, they walked slowly and silently, their arms lifted in the *orans* prayer posture, into the parting throng of rapt onlookers. A plaintive and repetitive hymn-like song was softly intoned by an unseen choir within the crowd[25].

These figures were members of the Red Rebel Brigade[26] and their procession was the opening act of the protests organised by the pressure group Extinction Rebellion in several world cities during the second and third weeks of October 2019. As soon as I saw the video footage of the Red Rebel Brigade, I was immediately struck by a resemblance to Roger Corman's 1964 film *The Masque of the Red Death*[27], an adaptation of the Edgar Allan Poe short story of 1842. The Red Death is the spectral harbinger of a terrible epidemic whose victims die of spontaneous bleeding, something we would nowadays classify as a haemorrhagic fever – a typical

[24] Poe, Edgar Allan 1842. The Masque of the Red Death. Project Gutenberg.
[25] Extinction Rebellion: London: Opening Ceremony, streamed live 6th October 2019. https://www.youtube.com/watch?v=uMU3N6VFS-A accessed 15th February 2020.
[26] See http://redrebelbrigade.com/ (accessed 4th January 2023) for some striking images.
[27] https://www.youtube.com/watch?v=KXV-LOiaH3Q accessed 15th February 2020.

example might be Ebola. The masque of the title is a festivity organised by Prospero, a fabulously wealthy mediaeval aristocrat and perhaps, judging by the Shakespearian reference in his name, also a magician of some kind. Prospero has sealed himself inside his palace in a "bubble" with a large number of his acolytes to sit out the terrible Ebola-esque epidemic that is raging in his land while having a spectacularly debauched ultimate "lockdown party".

The occultist allusions Poe provides in Prospero's name[28] are more fully developed in Corman's film version, where he is depicted as an outright Satanist, and his masque takes on more of the air of a depraved ritual. The Red Death then appears uninvited, having somehow broken through the quarantine, and dances through the festivities with the same implacable grace as the Red Rebel Brigade, pursued by an increasingly desperate Prospero. Nothing can be done, of course. The epidemic has finally arrived in Prospero's domain, and he, together with all his friends and hangers-on, will die.

In the original story, the Red Death does not wear a red robe but merely a shroud of unspecified colour. For 1960s horror movies, steeped in their intense Pathécolor, things had to be more lurid, so Corman has the Red Death exchange the shroud for a monastic habit and cowl in bright crimson. At the end of the film, we discover that the Red Death is just one member of a Death squad of various colours – we meet his friends the Black Death (bubonic plague), the Yellow Death (yellow fever), the White Death (probably tuberculosis[29]) and a couple of other Deaths whose identities are less easily guessed. The *Masque of the Red Death* may have been set in mediaeval times, written in 1842 and filmed in 1964, but it speaks clearly to the present day. In the midst of prosperity and complacency, it warns, unseen and unstoppable horrors might suddenly bring our civilised world to its knees. Crucially, the horrors are not those of our own fashioning, such as nuclear weapons or other technologies of destruction, but horrors which come from the natural world, horrors which we cannot escape because we are still part of that natural world, still hopelessly entangled in it despite all our civilization.

Nearly sixty years later, as the second decade of the 21st century drew to a close, the Red Rebel Brigade appeared perhaps to be drawing on Corman's cinematic imagery to make the point that there is once again a spectral

[28] Shakespeare 1610/1961
[29] Dormandy 1999

presence lurking just behind us. This time, it is the threat of climate catastrophe due to runaway global warming. Ironically, in almost the same week that the modern Red Deaths were parading through central London, a more literal manifestation of Poe's metaphor was infecting its first human hosts several thousand miles away in Wuhan, China. In the shape of COVID-19, pandemic disease would soon return to the forefront of our anxiety about the future. I wrote the first draft of the above paragraphs wondering if a discussion of pandemic disease was quite the right way to begin the book. I feared that it might seem a little melodramatic and considered dropping the comparison of the Red Rebel Brigade's costumes with that of Corman's version of the Red Death and diving straight into a climate change-themed opening. Little did we suspect, in those final days of 2019, what was about to descend upon us.

In retrospect, we ought not to have been so surprised. In the decade before COVID-19, Corman's troupe of colour-coded Deaths had been very active – the Red Death in Africa, the Yellow Death across Africa and South America, the Black Death in Madagascar. The White Death has perhaps been the most pervasive of all, effortlessly stepping in wherever AIDS has destroyed the immune system. And then, of course, COVID-19. Corman was prescient enough to provide a few spare colours in his Death squad. We are still haunted.

There is nothing new in such fears. The terror of pestilence, dramatized in Poe's short story, has been perpetually present throughout human history. The 19th century world in which Poe lived, despite its railways, factories, steamships and the other triumphant demonstrations of Industrial Revolution, still had not shaken off the threat of epidemic mass mortality. Poe's USA had already begun its expansion into the world's greatest power, but hundreds of thousands of its citizens were still dying each year of smallpox, typhoid, cholera, syphilis, tuberculosis, measles and polio among many other things. The Red Death breathed as much down Poe's own neck as it had down that of his fictional Prospero, five centuries earlier. The reappearance of the modern successors of Corman's Death squad can now be seen as a return to more normal conditions after a period when the world, or at least its richer parts, basked in a relatively benign era of well-functioning antibiotics and vaccines.

Of course, it was during that short golden age of the third quarter of the 20th century, that our fear of another biological catastrophe began to develop – global famine. Precisely the success of humanity in breaking out of the grip of pestilence, however temporarily, led to a massive increase in our

numbers. Local famines, almost continental in their worst manifestations, did from time to time occur, but the Green Revolution (a suite of crop breeding, agrochemical development and irrigation - nothing to do with modern Green political parties), globalization of capitalism and demographic transition increasingly lessened their frequency and impact. Once again, however, a new biological threat emerged – mass extinction due to anthropogenic climate change. Humans might have escaped pestilence and famine through our ingenuity, but only at the expense of the planet as a whole. The potential victims of this latest biological spectre are not just the human species but every species on the planet.

"Field" biologists, those who observe and work with nature in the outdoors, tend to be pessimistic about the future. They often see natural systems in the process of degradation, habitats being destroyed, environments polluted, species moving towards extinction. To be an ecologist is often to be the observer of an ongoing slow tragedy. By contrast, those biologists whose working day is spent within the laboratory are usually optimists, sometimes wildly so. The list of experimental achievements by lab biologists is almost endless – vaccines; antibiotics; synthetic hormones; contraception; *in vitro* fertilization and surrogacy; genetic fingerprinting; prenatal diagnosis of, and gene therapy for, genetic diseases; a vastly expanded pharmacopoeia of drugs for all kinds of conditions; molecular diagnostics for epidemic and other diseases; a Green Revolution and genetically modified crop plants and so on. Synthetic biology is all the rage. With a track record as impressive as that, it is easy to start thinking that with enough time, money and brains, any problem can be solved.

Biologists looking into the future therefore tend to see either eco-dystopias or techno-utopias. Projecting a future dystopia may serve as a warning, a call to rebel against the current *status quo* or a gesture of resignation. Future dystopias have featured prominently in much science fiction, and many of them involve a component of environmental disaster, just like the ones that eco-dystopian biologists observe today or fear for tomorrow. In contrast, utopias are rarer. Fiction featuring benignly organised, peaceful societies where people manage to be mostly nice to each other, seldom has the dramatic tension needed to fashion a good read or a gripping movie. Where published utopias can be found, they tend to be political tracts, exhortations to make a better world, even the manifestos of organised utopian socialist movements. Many attempts have indeed been made to create actual functioning utopias, with varying degrees of success. Often the best of intentions leads to the most appalling results. The techno-utopians of modern biology are not designing a complete utopian world like their more

political predecessors, but they see advances in biotechnology at the very least as a way to avoid some of the dystopias that threaten us, and some even more speculatively see the power of modern synthetic biology as part of a pathway through to a completely new form of existence, a transhuman condition.

We shall return to the Red Death and other spectres later, but first: Futures.

CHAPTER 2

THE VISION THING

Oh…. the vision thing….
—George H.W. Bush[30]

On 1st May 2011, members of a combined CIA and US Navy SEAL Team 6 commando unit raided the hideout of Osama bin Laden in Abbottabad, Pakistan. Among the many items that were packed onto the departing Chinook and Black Hawk helicopters, along with the body of bin Laden himself, were some computer drives containing digital editions of a sizeable library of books, many in English[31]. One of these was a Futures book by the Australian politician Colin Mason - *The 2030 Spike. Countdown to Global Catastrophe*[32]. Interest not just in the future, but in the discipline of Futures itself, has apparently reached the most unexpected corners of 21st century life.

This chapter is an introduction to Futures. Self-identifying Futurists may therefore wish to skip to the next chapter. Those that read on, will find that all I attempt here is to give a general overview of the Futures approach. Rather than namecheck dozens of authors, this chapter outlines what Futures is about by focussing on the work of just a handful, particularly Alvin Toffler who, via his best-selling *Future Shock* of 1970, became probably the most famous name in the field[33].

Colin Mason, author of *The 2030 Spike,* approached Futures from the practical viewpoint of a politician eager to get things done his way. Another Futurist, Damien Broderick, had previously used the phrase "The Spike" to describe a sudden civilizational leap forward as a raft of emerging technologies, from artificial intelligence to biotechnology, converge on spectacular solutions to world problems[34]. Mason, on the other hand, is

[30] attributed to Bush by Robert Ajemian of *Time* – see Wilson 2018
[31] Johnson 2018
[32] Mason 2003
[33] Toffler 1970
[34] Broderick 1997

never really clear what his own "Spike" actually is - except possibly something going through our heart. Mason's *The 2030 Spike* thus falls into the general category of a dystopia intended as a warning concerning the future and ends with a 100-point manifesto of measures needed to avoid impalement. Written in 2003, Mason's book also provides a useful example on how eco-dystopian visions of the near future have changed in the last two decades. One element is still very familiar today - Mason sees the destruction of our planetary environment as our biggest single collective problem. Nevertheless, some twenty years later, some of his immediate concerns seem at odds with current thinking on the subject. For instance, Mason worries more about incipient new Ice Ages than global warming, although the latter is briefly mentioned as a potential complicating factor. He is also more concerned about carbon running out, rather than about us using too much of it.

Although Mason's vision of the future was dystopian, and his sense of urgency palpable, he did not regard it as inevitable. Like today's environmental activists, Mason believed that solutions to the crisis must come from those in power as much as from cumulative individual action. Change has to be top-down as well as bottom-up. But Mason's politics emerge in the book as rather different to what one might typically encounter at an environmental protest today. Mason was a prominent member of the Australian Democrats (national convener, then a senator from 1978-1987), a left-leaning splinter from the conservative Australian Liberal Party. This defined him as a socially liberal capitalist who possibly would be only classed as "light green" on today's political spectrum. In his book, he also has a few critical things to say about American global hegemony. This was admittedly a rather commonplace opinion in the aftermath of the invasion of Iraq, when the book was written, even on the centre-right, but one wonders what bin Laden might have been thinking as he scrolled through his copy.

Mason also airs his views on globalization, of which he was an opponent in the economic sense of the word, but he was nevertheless a strong advocate of all moves toward the reduction of power of nation-states and incremental federalization with the goal of a single global government. Mason was a globalizer not in the Adam Smith capitalist sense of totally open free markets for goods, money and labour, but more in the sense of H.G. Wells and the utopian socialists of the early 20th century. Modern environmental activists are often heard chanting "system change, not climate change", and Mason's recipe for the governance of the world system, if somewhat refurbished from 2003 to current circumstances, is certainly as radical as

anything one might hear proposed today. Mason was a practioner of "formative" Futures, a Futurist who wanted to mould the future rather than merely predict it.

A subtler approach to formative Futures can be seen in the work of Alvin Toffler. His 1970 book *Future Shock* was not only an international bestseller but was even adopted as a school textbook in the USA and summarised in a documentary film narrated by Orson Welles[35]. Written at a time when the 1960s counter-culture was reaching its peak across the Western World, the "Shock" of the title is not a brewing planetary crisis like Mason's "Spike", but the psychological state induced in individuals who cannot comprehend the speed of societal change going on around them. Unlike Mason and subsequent Futures practitioners whose main preoccupations were planetary level phenomena, Toffler drilled down into the minutiae of a mid-20th century daily life undergoing whirlwind change. Sexual liberation and the anticipated dissolution of the nuclear family into more freewheeling communal living, featured large. Toffler's influence over subsequent Futures work is such that even Mason, writing some 43 years later, briefly took his eye off the global ecosystem and his recipe for world government and interpolated into his book a more Tofflerian interlude concerning Barbara Ehrenreich's speculations on non-standard family structures (e.g. sex-free parenting contracts[36]).

Futures is thus concerned with everything from potential planetary mass extinction down to everyday relations between ordinary people, and all that lies in between. Practitioners of Futures must therefore, as Toffler insisted, think like generalists, not specialists[37]. Futures has undergone a remarkable recent expansion, which possibly even Toffler could not have foreseen, although the popularity of *Future Shock* certainly assisted it. Futures has become an academic discipline in its own right, with its own journals, professorships, conferences and learned societies. So we have Material Futures, which considers how the objects we use in our ordinary lives may be fashioned via new technologies and substances. We have Mobility Futures, which considers how much travelling - long or short distance, permanent or temporary - humans might do in the future, and how. We have Creative Futures, which considers how individuals or groups might express themselves, and also uses the arts as a means to express Futures in alternative ways to academic tomes. There are Health Futures, Social

[35] Grasshoff 1972
[36] Chapter 14 "Love, Family and Freedom" of Mason 2003: 130
[37] Toffler 1981: 141

Futures, Urban Futures and numerous others[38]. Toffler, for instance, covers ground that would qualify him as a Social Futurist, perhaps even a Psychological Futurist.

But, of course, human beings have always been interested *in* the future. A basic desire to stay one step ahead of nature, to guess when the herds of big game were migrating, to choose the best time to sow or harvest, to deduce what neighbouring rival humans were up to – these were always at the forefront of our ancestors' minds. The need to have the "Vision Thing", as Vice-President George Bush called it in 1987, has been a constant pre-occupation of human existence. The road from pre-historic divination rites and folk wisdom to modern Futures has, however, seen many changes of emphasis. Nevertheless, pre-scientific or non-scientific techniques are still very much with us. Advertising agencies have used psychics in their marketing campaigns; police forces are regularly rumoured to consult clairvoyants concerning the whereabouts of missing bodies; some world leaders still have their horoscopes cast. The customers for these ancient methods, or their modern variants, must presumably feel that they are effective, otherwise demand would soon dry up. Calls for scientific corroboration are simply brushed off – after all the *arrivistes* of science have only been around for a mere four centuries. Those who do look for objective reliability in the predictions of divination are often disappointed, but often so are those who look to more scientific methods. The modelling of everything from weather though economies to pandemic disease, is littered with poor predictions.

We have to accept that a lot of the time, the systems we are trying to forecast are too complex for even our most sophisticated tools. Futures may be about the future, but (regardless of the fact that Toffler in 1980 predicted the break-up of the Soviet Union and the demise of communism within a decade[39], a bulls-eye that shot his already substantial guru rating through the roof) it is not simply forecasting, not simply a composite of all the more specific predictive sciences. Instead, Futures has more often concentrated on more general scenario building, on feeling through the mights, maybes, coulds and shoulds of the not-yet[40]. The "Vision Thing", indeed, is difficult. George Bush Snr was right.

[38] a wide range may be found in Spiers and López Galviz 2022
[39] Toffler 1981: 325
[40] Bloch 2000

These scenarios, these visions, of other worlds may be broadly divided into utopias and dystopias. The word utopia originates in Thomas More's *Utopia* of 1516[41] and dystopia was coined by Lewis Henry Younge in 1747[42]. Nowadays, both utopias and dystopias are seen as future states, but when More was writing, the land of Utopia was simply elsewhere. Enough of the world was undiscovered in 1516 that there was no need to locate very different versions of reality in another time. Utopia just needed to be somewhere out there. Nevertheless, the birth of the original Utopia, and the other lesser utopias that followed it, coincided with the birth of the idea of social, political and technological progress and the beginnings of the Enlightenment in the Western World. More and his contemporaries were not just beginning to think *about* the future, they were hinting at perhaps a better future, and one they might just have a hand in making.

It has to be admitted, however, that More's intentions in writing *Utopia* have been much debated. As well as being a genius of Renaissance *belles lettres*, More was also something of a player. Later in his life he worked for Henry VIII, an absolute monarch who was quite prepared to execute anybody who disagreed with him too much, and indeed More met his end that way, although not in a dispute over any of the ideas expressed in *Utopia*. Whether More's *Utopia* is a sincere blueprint for a better world, an ironic contrast to the actual state of England at the time, or a sarcastic parody of idealistic fantasies, will no doubt continue to be debated[43]. Nevertheless, it defined a genre of writing. Francis Bacon's *New Atlantis* of 1626[44] is a more straightforward attempt at description of a better society, containing none of the sly ambiguity that has provoked doubts about More, but despite Bacon's earnestness, it was "utopian" rather than "atlantean" that entered common usage as Enlightenment scholars began to cast off the divinely appointed eternal equilibrium of the Middle Ages and look to alternative places and alternative futures.

The creation of worlds different to the one we live in, has always been something that comes more easily to writers of fiction than to academics. Novelists, however, unlike writers of academic books, need to attract an audience who, in turn, want to be entertained. Because of this, dystopias have always been somewhat easier to find in fiction than utopias, although some writers have been brave enough to try writing both, for instance H.G.

[41] More 1516
[42] Sargent 2010
[43] e.g. Sargent 2016; Eggers 2016
[44] Bacon 1627

Wells[45]. Science fiction has proved a fertile ground for exploration of dystopian future worlds, and indeed Futures as an academic discipline has also had a tendency to focus on the dystopian, especially where it too seeks a wider audience. Mason's *The 2030 Spike* is firmly on the dystopian side. Toffler's *Future Shock* may also be characterised as a dystopia, but his dystopia is the one unfolding in the human mind.

The rapid change in society that is producing Toffler's communal internal dystopia – perhaps dysphoria would be a better word - may be good or bad, depending on one's political orientation. What concerns Toffler more, is the effect it has on us as individuals. Toffler himself subsequently took some pains to disavow the dystopian label. Through his subsequent books *The Third Wave* of 1980 and *Creating a New Civilization* of 1995[46], Toffler moved from anatomising our psychological difficulty in coping with the breakneck speed of societal change to a theory of how periods of Future Shock-inducing change occur as a society moves from one organizational level to another – the "Waves" of his 1980 book: agricultural, industrial and post-industrial.

There is, of course, nothing particularly original in the division of history into retrospective epochs. More's *Utopia* may have been one of the texts that heralded the threshold of the Enlightenment, but the word "enlightenment" was not coined for over 150 years after More, and its use to describe the intellectual epoch he helped to initiate is even later. Likewise, terms such as Renaissance, Middle Ages and Antiquity have thrilled several generations of history students but would have been meaningless to the people who actually lived through those periods. Those, however, who would wish to dismiss Toffler's Waves on these grounds, as simply another way to order a historical bookshelf, miss his major point of interest - that we are going through an epochal transition in the present day. Toffler even pinpoints the very day on which the Second Wave's death knell was sounded - 8th August 1960[47], the day when the CEO of Exxon made the decision to lead a cartel of oil companies to drive down their costs at the point of production. The plan backfired. The oil producing nations were, by the mid-20th century, no longer too weak, or too politically disinclined, to defend their own interests. OPEC was formed on 9th September 1960, thus beginning the process of inflating oil prices, the opposite of what Exxon had intended. By the time of the aftermath of the Yom Kippur War of 1973, it

[45] reviewed by Urry 2016
[46] Toffler 1981; Toffler and Toffler 1995
[47] Toffler 1981: 142

was clear that the Second Wave industrial economies of the West were no longer in charge of their own destiny.

Toffler also points out that it was in that same year of 1973, that US newspapers reached their peak circulation of 63 million copies daily – three newspapers for every ten Americans alive at the time. Newspapers responded to this tipping point with various stratagems to maintain revenue and managed to keep the cash flow increasing until around 2000, after which it too fell precipitately, in 2020 lying around one seventh of its turn of the millennium level. Contrary to received wisdom, the internet did not kill newspapers, merely their profitability. As long ago as 1980, Toffler realised that the end of the carbon-fuelled industrial Second Wave economy had already begun to strangle newspapers as a daily ubiquitous artefact. Toffler's Wave transitions are not just macro-economic or geopolitical, they operate within our heads too. A quarter of a century before the World Wide Web, members of the new incipient post-industrial society in 1970s USA, stunned to varying degrees with Future Shock, had already begun to feel less need for the industrial information services of print.

Again, Toffler's linkage of social upheaval with its psychological equivalent may not be particularly original. Max Weber's connection, made over seventy years earlier, of the Reformation with the seeds what would later become capitalism[48], is an obvious predecessor, as is the Marxist notion of intensifying development of class consciousness as the revolution approaches[49]. Unlike Marxists, however, or even followers of Weber, Toffler does not see the transition from an agricultural to an industrial economy as being necessarily dependent on capitalism. He portrays both the Russian Revolution and the American Civil War as simply different crises forcing the First-to-Second Wave transitions on two different continents, thereby tending to see capitalists and communists as two sides of the same Second Wave coin[50]. Soviet-era communist theorists had to undergo many intellectual contortions to explain why the revolution had not, as Karl Marx had predicted, broken out among the mighty industrial proletariats of Germany, France and Great Britain, or even the tiny industrial proletariat of the Russian Empire, but among the peasants. Toffler, on the other hand, simply advances the theory that the Russian Revolution was more about creating that Second Wave proletariat from the immense human resources of the First Wave peasants. The American Civil War likewise was about

[48] Weber 1905/1985
[49] Lukács 1923/1971
[50] Toffler 1981: 111

abolishing the labour-intensive First Wave slave system of the Confederacy and making its new freed citizens into a new proletariat for the American Second Wave. The descendents of ex-slaves made Motown - the automobiles as well as the music.

As a consequence, Toffler sees the Cold War not as a global struggle for supremacy between two completely different economic systems and philosophies of society, but merely a sort of factional conflict between two rival wings of Second Wave industrialism. Despite his previously mentioned accuracy in predicting the demise of the Soviet Union, Toffler did not see this as any particularly salient victory for the West, or even for capitalism. He rather saw it as an abrupt end to the domination of the Second Wave in Eastern Europe, a Second Wave that, since that fateful day of 9th September 1960, was already being displaced by the Third Wave in the Western World.

Writing in 1980, Toffler had already spotted the decline in traditional print news media that accelerated with the dawn of the internet. Over forty years later, the transition to Third Wave economic domination is almost globally complete. This transition has also been a massive expansion. Just as the First-Second Wave transition created an industrial economy far larger than its agricultural predecessor, so too has the Third Wave grown to dwarf the previous industrial world. As an illustration of this, consider that US Steel had become the first billion-dollar corporation in 1901 – roughly equivalent to 100 billion dollars, perhaps slightly more, today. The world had never previously seen such a corporate behemoth. However today, a business with a market valuation of 100 billion dollars would only barely qualify for inclusion in the world's top 100 corporations. Just prior to COVID-19, the top four places in the corporate league table were filled by Apple, Microsoft, Amazon and Google, all of which had market capitalizations of more than 850 billion dollars in 2019. A clean sweep of the top eight places by information technology corporations was only prevented by the intrusion of Berkshire Hathaway, a giant holding company[51]. Some readers may protest that such an analysis of post-industrial decline and the rise of IT is commonplace – and indeed it is, *today*. It is important to remember, however, that Toffler was writing in 1980, before the World Wide Web, before domestic personal computing, and at a time when even US Steel was

[51] For an update, see: https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-value/

still doing quite well (its financial and competitivity problems did not really become overtly apparent until 1982).

Toffler, for all his rumination on the 19th century and the state of the world in 1980, did not intend a recasting of history or even a heightened understanding of the present, useful though these may be, but rather the creation of a theoretical standpoint for consideration of the future – the essence of Futures. In fact, Toffler's concerns as a practitioner of Futures are often similar to those articulated in *The 2030 Spike* by Mason, and indeed his characterization of environmental degradation is not far from those of environmental campaigners of the 21st century. What may strike the modern reader as very different to present day attitudes is that Toffler, like Mason, is worried about non-renewable energy running out. Toffler fears a post-carbon economy rather than the prolongation of the carbon economy. If oil runs out, the end of cheap resources and cheap energy will cause "eco-spasm"[52]. Of course, since Toffler wrote this in 1980, consumer goods have been kept cheap, not by continuing cheap resources but rather by cheapening their manufacturing costs via the growth of the new industrial world, a veritable new Second Wave, of the "BRICS & MINT"[53] economies. The Third Wave, it seems, needs a Second Wave beneath it, to sustain its profitability, just as the industrial proletariats of the Second Wave need First Wave agriculture to feed them.

Even if Toffler's view of the future from the vantage point of 1980 contains as many miscalculations as it does prescient observations, it is important not to be distracted by either of these. Futures, as has been stated, is not about prediction. Toffler makes the point that notions of the inevitability of the future, whether good or bad, tend to freeze us into inaction[54]. The "Vision Thing" that Vice-President Bush struggled with so much, is much more than simple forecasting. Forecasting may be the essential activity for meteorologists, economists and epidemiologists, among others, but it is not Futures.

Peter Medawar described science as "the art of the soluble"[55]; Bismarck may have claimed that politics is "the art of the possible"[56]; Aristotle asked "what is the good life?"[57] Futures incorporates all of these concerns into visions of the future that may be likely, possible or desirable to various

[52] Toffler 1981: 134
[53] Brazil, Russia, India, China, South Africa, Mexico, Indonesia, Nigeria & Turkey
[54] Toffler 1981: 26
[55] Medawar 1967
[56] probably apocryphal, but the quotation dates from at least 1918.
[57] Aristotle 2005

degrees. Toffler's *The Third Wave* asks his readers if they want this to be their future. By the time Toffler wrote *Creating a New Civilization* in 1995, the internet era was finally upon us, and he had moved into exhorting his readers to create a new data-centred world. Many of them did, for better or worse, and we now live in that society. Toffler's late-20th century exercise in "formative" Futures has indeed formed our 21st century present.

Since this book is about BioFutures, a survey of Toffler's contribution as the writer who put Futures onto the popular agenda, ought not to end without considering his views on biology. Back in 1970, Toffler's *Future Shock* devoted much space to the impact of the permissive society on traditional family structures. In 1980, Toffler showed how this could also be analysed in terms of the theory of the three Waves[58]. First Wave, agricultural, societies were built around extended families sharing farmland. Second Wave industrial societies removed humans from their connection to the soil and instituted a nomadic lifestyle chasing industrial jobs. Extended families were too unwieldy for such a system and were therefore pared down to the nuclear family, the largest family unit that could cope with potentially frequent relocation from factory to factory, from town to town. The nuclear family also intensified the division of labour by sex and its association with what we would now call gender roles[59]. Nuclearization meant that unproductive family members were a burden on family efficiency, necessitating the creation of poorhouses and nursing homes. A greater need for literacy and numeracy for industrial employment coupled with far less time for education within the family, resulted in the spread of mass school systems. As well as teaching industrial workers how to read and count, a "covert curriculum" of punctuality, obedience and rote-work became what we would now call the "transferable skills" of the Second Wave proletariat.

The demands of the transition to an industrial society therefore carved out a new kind of family structure, a new philosophy of mass education, a new notion of appropriateness in dress, comportment and morals[60], and even a new conception of what it meant to be a man or a woman. Readers may once again comment that Toffler's view on this subject are scarcely original, and that the ethnographic distribution of nuclear families[61] is rather more complex than such a simple deterministic model would imply, but again it must be stressed that Futures is concerned with making the reader

[58] Toffler 1981: 42-43
[59] Toffler 1981: 56-59
[60] Toffler 1981: 84; Elias 1978
[61] Murdock 1967

contemplate the future she wants – in this case future family structure – rather than with a complete description of reality.

Toffler's implication, in both *Future Shock* and *The Third Wave*, is that the nuclear family is breaking down. Subsequent demographic surveys would tend to bear out this prediction, even if the hippie commune lifestyle suggested in his earlier work did not quite prove to be a stable successor state. Half a century on, we still see fully intact nuclear families, together with fragments of nuclear families, often joined together to make new nuclear families, which may themselves then fragment, and so on. A nuclearized complexity is far more prevalent than the return to pre-industrial communal living that Toffler envisaged at the end of the 1960s. Toffler asked – do we want to live in communes? The answer seems to be no, even if the nuclear family is somewhat harder to maintain in the modern world. We have made our family structure BioFuture, at least for now.

Once more, those who would dismiss Toffler as an entertaining repackager of well-established ideas, may miss the nugget of originality lurking within his sweeping explanations. What is more original in Toffler's analysis of the nuclear family under Second Wave industrialism is its connection to mechanistic models of biology, which Toffler calls "mechano-mania"[62]. The idea that living things are just complex machines is often attributed to René Descartes in the mid-17th century and was certainly believed by his *philosophe* successors – the title of Julien Offray de la Mettrie's 1747 *L'Homme Machine* speaks for itself[63]. Toffler considers that in a society where everything, including political and industrial relations, was conceived as a giant machine, surely life had also to be so. The incipient Second Wave world that Descartes witnessed being created, demanded a Second Wave industrial, mechanical view of life. The implication is that, in our post-industrial Third Wave, this version of biology will decay along with the rest of the Second Wave apparatus. However, in this book, we shall see that this mechanistic philosophy of biology, whether a mania left over from the Second Wave or not, is still very much part of the modern landscape in the biological sciences, and that it plays a great part in one of our main prospective techno-utopian BioFutures.

This chapter has introduced the field of Futures via a review of some of the salient work of its best-known exponent, Alvin Toffler. Nobody has done more than Toffler to thrust the field into the public eye, and even those who

[62] Toffler 1981: 84
[63] de la Mettrie 1747/1912

prefer a more academic approach cannot avoid engaging with his work. Toffler will appear again in some later chapters, but before concluding this one, we must turn our attention to the author of the first dystopian BioFuture – T.R. Malthus.

In February 1858, the naturalist Alfred Russel Wallace was working on the island of Ternate in the Moluccas (now North Maluku Province, Indonesia)[64]. Bouts of malaria and other tropical infections were an occupational hazard for 19th century specimen collectors like Wallace but this latest one was, by his own account, particularly nasty. A ghastly nightmare wracked his semi-consciousness, a dream of a dystopian world where all living things were engaged in a fight to the death over diminishing natural resources, a Hobbesian "war of all against all" raging across all of Nature[65]. As Wallace's fever subsided and clarity returned to his mind, he began writing urgently. Wallace thought he knew where these nightmarish visions had originated, in a book he had read many years previously – *An Essay on the Principle of Population* by Thomas Robert Malthus, first published in 1798[66]. That work sets out a bleak view of humanity's future based on what Malthus saw as inescapable laws of nature.

"When goods increase, they are increased that eat them"[67] quoted Malthus, as he painted his melancholy picture of a human race that grows in number until the resources of the planet can no longer sustain it. The exact level at which there would be simply too many humans on Earth, was unknown to Malthus; indeed it is still unknown to us today. However, as Philip Appleman points out in his introduction to the 2004 edition of *An Essay on the Principle of Population*, although Malthus would no doubt have been surprised to learn that the one billion people that inhabited his world of 1798 had become more than 6 billion by 2004 (and 8 billion by 2022), he would not be surprised to learn that more than 1 billion of the world's population live in conditions of chronic malnutrition.

Malthus spells out the consequences of overpopulation: pandemics that kill millions, economic crashes and famines that starve even more, mass migration of the resulting destitute[68]. As we reach the limits of sustainable population size, what modern ecologists call the "carrying capacity" of the population, Malthus envisages this process as cyclical. There will be a series

[64] Wallace 1905: 361-63
[65] Hobbes 1651
[66] Malthus 1798
[67] *Ecclesiastes* 5:11 KJV
[68] Malthus 2004: 26-30, 46, 50-51

of such catastrophes, after each of which the survivors immediately start reproducing at a higher rate than the pre-famine level, because there is more food to go round, thus hastening the next disaster. Humanity continually bounces brutally off its carrying capacity ceiling, like a wasp repeatedly slamming into a window, unaware of any solution and unable to stop the process. This stark dystopia of population crisis soon earned its own adjective – Malthusian – and founded a tradition of dystopian Futures writing that survives to the present day.

The neo-Malthusians of the modern world will appear in a later chapter, but Malthus also had profound influence in an entirely unexpected area. By seeding Wallace's nightmare, Malthus became the intellectual grandfather of the theory of evolution by natural selection. The notes that Wallace scribbled as he emerged from his delirium became known as the *Ternate Essay*[69] and that paper was read at a meeting of the Linnaean Society in London on the 1st July 1858. Wallace's had sent the *Ternate Essay* to London as part of his intermittent correspondence with Charles Darwin, necessitating an equally rapid bout of writing from its recipient. Darwin's predilection for methodical research, slow rumination of ideas and horror of making any errors that might hold him up to future censure or ridicule, had meant that he had gestated his own theory of evolution by natural selection for over two decades since his return from the voyage of the *Beagle*. Courtesy of Malthus, Wallace's dream jolted him into action.

Neither man was present on the big day. Wallace was still in the East Indies and Darwin was unable to attend, having just lost his youngest son, one of six children that died in an outbreak of scarlet fever in the village of Downe in Sussex that summer. The theory of evolution by natural selection was thus conceived and born in the midst of terrible fevers. The *Ternate Essay* and Darwin's hurriedly prepared summary of his own theories were read out before the Linnaean Society without any opportunity for questions from the audience. Nevertheless, there were plenty of geologists and biologists present who realised that their theoretical world had just shaken and would never be the same again. Wallace's nightmare had also been a flash of brilliantly simple inspiration. If all the species on the planet are in a state of permanent Malthusian crisis, with population sizes touching carrying capacity – what would the consequences be? Suppose that one or two individuals were naturally equipped with some physical, constitutional or behavioural advantage that allowed them to survive where their fellow

[69] Wallace 1858/2024