



Why Humans Aren't Designed To Think About The Future

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Chapters extracted from 'SCARY-WONDERFUL: THE NEXT 50 YEARS'

“Scary Wonderful: The Next 50 Years”

Introduction

Back in 1970 futurist Alvin Toffler famously coined the term "Future Shock" to describe the effects on humans of late 20th Century technological progress.

Today the speed of human innovation is accelerating to such a pace that only words like "fear", "scary" or "frightening" are appropriate to describe the emotions most humans experience when confronted with the implications of probable technological development in the near future (the next 20 or 30 years) . Developments likely to occur in the second half of the 21st Century will seem so extreme that the vast majority of people will simply refuse to consider them.

Of course, we should not be alarmed by *all* of the new technological

possibilities that are going to present themselves. Human health and wellbeing will be greatly improved by technological progress (at least for the world's richer inhabitants) and progress in robotics and other forms of automation is likely to add greatly to [sustainable economic growth](#)¹. This is likely to lift developed economies out of any remains of the sluggish state they entered following the financial crisis of 2007-2013.

But, as I describe in this series of chapters, some of the technological trends now discernible in science are almost certain to lead to new situations, possibilities and opportunities that many humans today would wish to ban, to regulate strictly or to turn into outright criminal offences.

Of course, public attitudes always suffer from the "bias of the present" – the inevitable colouring of judgement based on today's social values – and, as we have seen repeatedly, these change over time.

Technological advances such as rail travel, television viewing and human organ transplantation filled many humans alive at the time those innovations first arrived with fear, apprehension and revulsion. Today they are accepted as normal¹.

But the new technologies of the 21st Century will be far more extreme – so much so that it is not frivolous or fantastic to suggest that we will see the beginning of the end of human evolution as we have so far known it before the end of this century. In essence, humans are becoming God-like – at least

¹ The writer Douglas Adams said that we do not regard technology developed before we are born as technology. He added that any technology developed up to the point we are 35 we consider exciting and new and that any technology invented after we reach the age of 35 we regard as baffling and pointless.

in their power over the creation of life, both human and non-human.

Attitudes to technologies and the opportunities and challenges they present will change as time passes, but the "exponential curve" of technological development² is now reaching its very fastest phases and humans simply won't have time to catch up and adapt before vital decisions have to be made. And there is now a very strong school of thought which suggests that machines will not only displace unskilled works but will [rapidly compete with highly-skilled knowledge workers in white collar and professional employment](#).

I suggest that humans always lack the language to describe and discuss new technologies when they first arrive and, because of this lack of language for new concepts, constructive thought (and therefore appropriate action) remain beyond reach until a community or society has developed a widely understood common language for something that is very new³.

These chapters are an attempt to describe some of the technologies we're likely to encounter throughout the rest of the 21st Century and, therefore, to kick-start the process of acquiring language to allow us to consider how to react to the opportunities and very considerable threats these developments

² "An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense "intuitive linear" view. So we won't experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress (at today's rate). The "returns," such as chip speed and cost-effectiveness, also increase exponentially. There's even exponential growth in the rate of exponential growth. "Within a few decades, machine intelligence will surpass human intelligence, leading to The Singularity — technological change so rapid and profound it represents a rupture in the fabric of human history. The implications include the merger of biological and nonbiological intelligence, immortal software-based humans, and ultra-high levels of intelligence that expand outward in the universe at the speed of light." [From The Law Of Accelerating Returns](#)" by futurist Ray Kurzweill

³ See my YouTube micro-lecture "[We Have No Language For The Future](#)."

will bring.

Of course there will be many innovations and technologies that arrive in the next 80 years which can't now be anticipated, but it is better to start somewhere than to throw up our hands and admit defeat in the face of what will be an unprecedented onslaught of the New. Events in the future are necessarily excluded from this discussion as, by definition, they can't be foreseen.

Ray Hammond, London, October 2013

Why Humans Find It Hard To Think About The Future

Humans aren't equipped to think seriously about the long-term future. We dismiss or discount periods more than a few years ahead because evolution hasn't prepared us to consider the longer-term; in fact, evolution has primarily prepared us to live very short and brutal lives of almost total unpredictability.

Until the recent arrival of advanced technologies the future has always been very like the past and thus there was no benefit or evolutionary advantage for individuals who pondered the long-term objective future in any serious way. Abstract thinking had no value in a hand-to-mouth economy. The only individuals who concerned themselves with things to come were those charismatic individuals who convinced themselves and others that they could actually predict specific events in the future. (The

subjective future was, of course, always of interest to humans because the ability to see into the future allows humans to foresee their own deaths. Huge amounts of wealth and energy were expended on placating gods, on efforts to secure immortality for the dead and to ensure entry to ‘heaven’.)

Now change in the external, objective future has become rapid and, for the first time in history, the future is certain to be unlike the past. But modern, educated humans in the developed world *still* discount the future, as if they can’t quite be certain that they will still be around to see it.

Scientific research has shown repeatedly that if you offer a group of people a choice of a smaller reward today, or a larger reward one year in the future (say €5 today or €10 in a year’s time) the majority of men and women will opt for [the instant reward, foregoing the larger sum they would have received had they waited](#)².

This decision makes good sense in evolutionary terms. It is only in the last century that people in the world’s richest countries have been able to entertain any feelings of security about their future health and wellbeing. In the millions of years of human evolution before that there could have been no confidence in any pre-human or human surviving for even as long as 12 months into the future. Even 18th century writers such as Jane Austen repeatedly required their healthy middle-aged characters to express hope that they might be lucky enough to live for another year.

Evolutionary biologist [Steven Pinker](#)³ has observed that, ‘The struggle to reproduce is a kind of economy, and all organisms must “decide” whether to

use resources now or save them. Some of these decisions are made by the genes. We grow frail with age because our genes discount the future and build strong young bodies at the expense of old ones.’⁴

But we are now entering a new phase of human evolution in the developed world in which life and, indeed, increased longevity is becoming more certain, even as technological change occurs more rapidly. In the last hundred years we have learned that there is great advantage – personal, social, corporate and national – to be gained by systematically studying both the trends of history and identifying the trends occurring in the present to see how they might interact to shape the future. The better we are at estimating the impact of important trends on future development, the better we can ensure that such developments turn out to be positive. In other words, the more that you understand about the likely future, the more you can shape it to be as you wish. (You might not be able to change the shape of the future itself, but you can adjust your own position to take best advantage of future developments.)

Today there is a substantial body of futurologists and futurists who attempt to study the future by a variety of systematic and less-systematic methods⁴. One of the greatest futurologists of all is the American thinker Alvin Toffler. In his 1972 book *The Futurists* he described how the term ‘futurology’ was coined, and reiterated one of the key arguments why such work is important:

⁴ See my YouTube micro-lecture [“What Is A Futurologist?”](#)

The use of futurist and its synonym futurologist in the modern context of thinking about and analyzing the future began in the mid-1940s, when German professor [Ossip K. Flechtheim](#) coined the term [futurology](#) and proposed it as a new science of probability. Flechtheim argued that even if systematic forecasting did no more than unveil the subset of statistically highly probable processes of change and charted their advance, it would still be of crucial social value.

All good business leaders have to be amateur futurists or futurologists⁵ as it is future strategy which defines the long-term success or failure of all corporate enterprise. Democratic politicians, on the other hand, are short term thinkers and although those advising them should peer further into the distance and guide them towards better long-term policies, short-term political thinking is reinforced by the regular and frequent election cycle. And in many democracies the period that any individual politician can remain in power is strictly limited by the constitution. This is not conducive to good long-term planning even if it protects against the real risk of the corruption of power.

Futurists and Futurology⁶ often get a very bad press, partly because humans innately discount the future and, therefore, discount the work of those who focus on it.

⁵ In the USA most people who study the future professionally often call themselves ‘futurists’ rather than ‘futurologists’.

⁶ As mentioned above, the use of futurist and its synonym futurologist in the modern context of thinking about and analyzing the future began in the mid-1940s, when German professor [Ossip K. Flechtheim](#) coined the term [futurology](#) and proposed it as a new science of probability. Flechtheim argued that even if systematic forecasting did no more than unveil the subset of statistically highly probable processes of change and charted their advance, it would still be of crucial social value.[\[1\]](#)

Also in the mid-1940s the first professional "futurist" consulting institutions like [RAND](#) and [SRI](#) began to engage in long-range planning, systematic trend watching, scenario development, and visioning, at first under WWII military and government contract and, beginning in the 1950s, for private institutions and corporations. The period from the late 1940s to the mid-1960s laid the conceptual and methodological

Typical of such negative views is the closing sentence to a definition of futurology that sociologist Gordon Marshall supplied in his 1998 book [A Dictionary of Sociology](#)⁵:

Futurology in general is interesting as a speculative exercise, but has little or no scientific basis, and has an almost complete record of predictive failure.

Dr Marshall defined ‘futurology’ in terms that were far too narrow and, as a result, he missed the bigger picture entirely. But I quote his negative comment because many people think that future forecasting is something primarily done by quack scientists and charlatans - which is usually not the case as I hope to demonstrate in this short essay. And, as to the worth of his conclusion about the accuracy of futurology I shall leave you to be the judge of that after the next few pages.

If Aldous Huxley had thought a little less flippantly in 1947 when he adopted the term ‘futurologist’ to describe his own fascination with the future he might have come up with the term ‘futurographer’ (someone who writes and speaks about the future) which would have been far more apt and less prone to misunderstanding. But futurology it is (at least in Britain and

foundations of the modern [futures studies](#) field. [Bertrand de Jouvenel](#)'s *The Art of Conjecture* in 1963 and [Dennis Gabor](#)'s *Inventing the Future* in 1964 are considered key early works, and the first U.S. university course devoted entirely to the future was taught by futurist [Alvin Toffler](#) at [The New School](#) in 1966.[2]

More generally, the label includes such disparate lay, professional, and academic groups as visionaries, foresight consultants, corporate strategists, policy analysts, cultural critics, planners, marketers, forecasters, prediction market developers, roadmappers, operations researchers, investment managers, actuaries and other risk analyzers, and future-oriented individuals educated in every academic discipline, including anthropology, complexity studies, [computer science](#), economics, engineering, evolutionary biology, history, management, mathematics, philosophy, physical sciences, political science, psychology, sociology, systems theory, technology studies, and other disciplines.

some parts of Europe) and even Alvin Toffler, one of the greatest American writers on the future describes himself as a futurologist whereas most future thinkers in the USA describe themselves as futurists,

Serious study of the long-term future began only in the latter half of the 19th Century – and it is no coincidence that this new discipline coincided with the rapidly increasing onslaught of technological innovation that began during the Victorian period. Before that time all future-gazing was paranormal in approach and prophetic in style. Psychics, astrologers, fortune tellers, etc., from the [Greek Delphic Oracle](#)⁶ onwards strove (sometimes with considerable success) to convince an uninformed and gullible public that specific events in the future could be accurately predicted (some major religions are based on such notions).

But writers such as France's [Jules Verne](#)⁷ (1828 –1905) and Britain's [H.G.Wells](#)⁸ (1866 –1946) began to think seriously and logically about the future and they started to identify the big trends – technological, social, economic and cultural – that were likely to shape the 20th Century. That they didn't describe themselves as futurologists (the word wasn't invented until 1947) may have caused Dr Marshall to overlook their important work.

Both writers alternated between fiction and non-fiction as the platform on which to launch the visions of the future they had developed from their studies of the trends. In 1863, Verne wrote [Paris in the 20th Century](#)⁹, a novel about a young man who lives in a world of glass skyscrapers, high-speed trains, gas-powered automobiles, calculators, and a worldwide communications network. A stunning and accurate vision which should

have ensured his reputation a reliable futurologist even without major works such as [*From the Earth to the Moon*](#)¹⁰, [*Twenty Thousand Leagues Under the Sea*](#)¹¹ and [*Around the World in Eighty Days*](#)¹².

H.G. Wells got so much right that his concepts and book titles have become embedded within the cultures which share the English language, and many of those which don't⁷.

Wells's first non-fiction bestseller was [*Anticipations Of the Reaction of Mechanical and Scientific Progress upon Human life and Thought*](#)¹³ (1901). When originally serialised in a magazine it was subtitled, 'An Experiment in Prophecy', and is considered his most explicitly futuristic work. Anticipating what the world would be like in the year 2000, the book is interesting both for its many hits (trains and cars resulting in the dispersion of population from cities to suburbs; moral restrictions declining as men and women seek greater sexual freedom; the defeat of German militarism, and the existence of a European Union) and its few misses (he did not expect successful aircraft before 1950, and averred that 'my imagination refuses to see any sort of submarine doing anything but suffocate its crew and founder at sea').

Wells then invented a number of themes now classic in science fiction in such memorable works as [*The Time Machine*](#)¹⁴, [*The Island of Doctor Moreau*](#)¹⁵, [*The Invisible Man*](#)¹⁶, [*The War of the Worlds*](#), [*When the Sleeper Wakes*](#)¹⁷, and [*The First Men in the Moon*](#)¹⁸.

⁷ **Foresight** may be the oldest term for the field. In a 1932 BBC broadcast the visionary author [H.G. Wells](#) called for the establishment of "Departments and Professors of Foresight," presaging the development of modern academic futures studies by approximately 40 years

Later in life Wells foresaw the global communications networks and knowledge collections such as the internet encyclopedia, Wikipedia. In 1938, he published a collection of essays on the future organisation of knowledge and education he called [*World Brain*](#)¹⁹ which included the essay, ‘The Idea of a Permanent World Encyclopedia.’ I used a quote from one of these Wells essays to end my own 2001 novel [*Emergence*](#)²⁰ which was about the emergence of conscious intelligence inside the world’s communications networks:

In the evocation of what I have here called a World Brain...
A World Brain which will replace our multitude of uncoordinated ganglia...
In that, and that alone is there any clear hope of a really Competent Receiver for world affairs.
We do not want dictators, we do not want oligarchic parties or class rule, we want a widespread world intelligence conscious of itself.

Since the middle decades of the 20th Century futurologists have continued to provide some extremely graphic and accurate presentations of the expected future and of possible alternative futures (although these writers haven’t always described themselves as ‘futureslogists’). [*George Orwell*](#)²¹ (1903–1950) gave the world imagery and concepts of totalitarianism in his 1949 novel [*Nineteen Eighty-Four*](#)²²⁸ and the self-dubbed-futurologist [*Aldous Huxley*](#)²³ (1894–1962) foresaw a culture of recreational drugs and human speciation in [*Brave New World*](#)²⁴ which was published in 1932.

⁸ Orwell stole most of his story for 1984 from ‘We,’ a novel written by the Russian author Yevgeny Zamyatin in 1922. It gave him all his basic components; people with numbers instead of names, a Big Brother character known as The Benefactor, perpetual war and constant surveillance by a thought police known as the Guardians. Citizens of what Zamyatin called The One State even had to apply for a pink slip before they could have sex. ‘We’ was never published in the UK and Orwell read a French translation in the 1930s.

Later writers of both fiction and non-fiction who have given us visions of the future already proved to be accurate by the passage of time include [Sir Arthur C. Clarke](#)²⁵ (1917-2008), [Alvin Toffler](#)²⁶ (1928–) and, perhaps surprisingly, [Michael Crichton](#)²⁷ (1942-2008).

Today there are more futurologists and futurists than ever before. The majority of these are based in the United States (a very forward-looking culture) but there is a respectable body of individuals and institutions studying the future in Europe and in the developed countries of Asia-Pacific. The developing nations of the world have few futurologists based on their home territories. Studying the future in a systematic way is a luxury that is only possible when life is certain and conditions are stable.

But a common problem for all of these past and present ‘future thinkers’ is that, by definition, we lack a language for the technological future, by which I mean that new technological developments offer new ways of doing things and new things to do for which we don’t initially have words. When new technologies first arrive we have to learn what they do and how they will change individual and social behaviour, then we learn how to describe and discuss these characteristics.

This has always been the case; the slide projector was called a ‘magic lantern’ when it was first introduced. The car was a horseless carriage, a locomotive was an ‘iron horse’, radio was ‘wireless’ and a plane was a ‘flying machine’. And, I suggest, where we lack language there can be no complex thought. Which is why there is always a time lag between the

arrival of a genuinely new piece of technology and our full understanding of its potential.

The somewhat pejorative and tabloidy title of the book from which this essay is extracted is aimed pointedly at democratic politicians and their advisors. I have had an opportunity to meet and work with some of them and I find they discount the long-term future to our cost. I believe this to be a profound mistake (perhaps a fault inherent in democracy) and one that is responsible for many of our ills including global warming, the increase in global terrorism and our general unpreparedness to deal with the technological earthquake that will arrive later this century.

I appreciate hearing from readers so if you agree, disagree or have a point to make about any of my arguments in this short essay, please write to me at ray@rayhammond.com. You'll find more essays at www.rayhammond.com and daily research postings on Twitter @rayhammond2030

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¹ [http://krugman.blogs.nytimes.com/2012/12/26/is-growth-over/#h\[\]](http://krugman.blogs.nytimes.com/2012/12/26/is-growth-over/#h[])

² <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1810021/>

³ <http://pinker.wjh.harvard.edu/>

⁴ Pinker, S. (1997). *How the Mind Works*, London: Penguin.

⁵ <http://www.encyclopedia.com/A+Dictionary+of+Sociology/publications.aspx?pageNumber=1>

⁶ <http://en.wikipedia.org/wiki/Pythia>

⁷ <http://en.wikipedia.org/wiki/Pythia>

⁸ http://en.wikipedia.org/wiki/H.g._wells

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- ⁹ http://en.wikipedia.org/wiki/Paris_in_the_20th_Century
 - ¹⁰ http://en.wikipedia.org/wiki/From_the_Earth_to_the_Moon
 - ¹¹ http://en.wikipedia.org/wiki/Twenty_Thousand_Leagues_under_the_Sea
 - ¹² [http://en.wikipedia.org/wiki/Around_the_World_in_Eighty_Days_\(Verne_novel\)](http://en.wikipedia.org/wiki/Around_the_World_in_Eighty_Days_(Verne_novel))
 - ¹³ <http://www.gutenberg.org/etext/19229>
 - ¹⁴ http://en.wikipedia.org/wiki/The_Time_Machine
 - ¹⁵ http://en.wikipedia.org/wiki/The_Island_of_Doctor_Moreau
 - ¹⁶ http://en.wikipedia.org/wiki/The_Invisible_Man
 - ¹⁷ http://en.wikipedia.org/wiki/The_Sleeper_Awakes
 - ¹⁸ http://en.wikipedia.org/wiki/The_First_Men_in_the_Moon
 - ¹⁹ http://en.wikipedia.org/wiki/World_Brain
 - ²⁰ <http://www.rayhammond.com/emergencepageandprologue.html>
 - ²¹ http://en.wikipedia.org/wiki/George_orwell
 - ²² http://en.wikipedia.org/wiki/Nineteen_Eighty-Four
 - ²³ http://en.wikipedia.org/wiki/Aldous_Huxley
 - ²⁴ http://en.wikipedia.org/wiki/Brave_New_World
 - ²⁵ http://en.wikipedia.org/wiki/Arthur_C._Clarke
 - ²⁶ http://en.wikipedia.org/wiki/Alvin_Toffler
 - ²⁷ http://en.wikipedia.org/wiki/Michael_Crichton