

TOMORROW'S PEOPLE

Chapter 1

The Future: What is the problem?

Look through an old album of sepia photographs from the early 1900's. There they are, our forebears, most usually posed in front of some cardboard Arcadian scene, doomed to manual or social drudgery and a rigid code of conduct and thought. Those placid, distant faces stare into a world, invisible and unknowable to us, of toothache, outside privies, stale sweat and certainty. 'The past is a foreign country,' mused L.P. Hartley in *The Go-Between*, 'they do things differently there.' Yet the mid-20th century British Prime Minister Harold Macmillan, looking back over a long life to his Victorian childhood, once reminisced that the great watchword of the turn of the century was 'progress'. Progress – social, economic and above all scientific – was perceived as just that, the forward march of the human intellect, from which we would reap only benefits. And progress came from science.

In the 1950s the scientist knew everything. He (always he) was characterized in television advertisements as the white-coated authority, condescending to endorse 'scientifically' the latest washing powder. The very fact that there was television at all transformed not only people's lives but also the way they viewed the world beyond the confines of their own community. The chirpy, capped, short-trousered schoolboy of that era, voraciously swotting up endless facts that 'every schoolboy knows', was fascinated by the technological marvels of the Festival of Britain and the new world that science was making possible. Meanwhile penicillin was rescuing many from misery and early death, whilst the contraceptive pill, no longer just a pipe dream, was about to revolutionize the outlook of, and for, women.

But the 20th century has surely taught us, among much else, that everything comes with a price; every schoolchild now knows that scientific and technological advances have colossal potential for both good and evil. Although the public have been aware, ever since Hiroshima, of the need to try to understand the implications of new scientific discoveries, it has only been in the last few decades of the previous century that the alarm bells have grown deafening. GM foods, mad cow disease and brain-scrambling mobile phones have compelled the most ostrich-like technophobe to question what might be happening in the remote and rarefied stratosphere of the laboratory. For science is increasingly not just on our minds but at the heart of our lives, encroaching upon everything that we hold dear: nutrition, reproduction, the climate, communication and education... The impact of science and technology on our existence, in the future, is no longer a whimsical excursion into science fiction.

Those sci-fi images of yesteryear now have an enchantingly amateurish glow. The Daleks in pursuit of Dr Who, the politically correct crew in *Star Trek* – even that ultimate icon, from Stanley Kubrick's film *2001*, the psychopathic computer, HAL – are as far-fetched and unthreatening as the tin-foil outfits and staccato jerks of the marionettes in

Thunderbirds. The human and humanoid characters, in most cases, think and act like we do. They have similar sets of values and expectations, and the bulk of the appeal depends on a good guys/bad guys plot. And that is how most people used to see the future – not chasing bandits around the galaxy so much as still being human in a world of souped-up, high-tech gadgetry- a gadgetry perhaps of interest to some anorak-kitted nerds, but for the majority of us reasonable everyday folk to be taken in our stride.

But now we face a future where science could actually change everyday life any day soon; many think such transformations are already under way. Yet there are some – let's dub them, without much originality, The Cynics – who do not see any point in dusting down the crystal ball. The chances are, glancing at the track records of our predecessors, that pretty much any prediction anyone makes now will be either impractical or uninspired.

Moreover, just because a technology is up and running doesn't mean to say it will become central to the daily grind. One late-19th-century prediction of the future, for example, was that everyone would travel around in hot-air balloons. And on the other hand, unknown, unimaginable technology can catch us unawares: a picture of a domestic scene 'in the future' drawn back in the 1950s shows all manner of gleaming appliances, but no computers, let alone anyone surfing the web. Even a glimmer of the priming technology just wasn't part of normal existence; it would have been a fairly impressive intellectual leap to conceptualize our 50-emails-a-day lifestyle from the standing start of clunky, expensive and essentially mechanical computers whirring and churning in their remote rarity in custom-made rooms of their own. And I remember a summer afternoon in the 1970s, lounging after a heavy lunch on a lawn with friends, when someone, a physicist, first mentioned the microchip – he prophesied that 'it will change all our lives'. The rest of us hadn't the vaguest ideas what he was talking about.

The problem with thinking about the future, shrug The Cynics complacently, is that it is impossible to predict the big new scientific advances that underpin serious technological progress; meanwhile, how easy to be distracted by high-tech toys, the latest variation on an existing theme, amusing enough for escapist science fiction but not sufficiently innovative to restructure our entire existence and our seemingly impregnable mindset. Yet, as physicist Michio Kaku points out, the problem with extrapolating the future in the past – as with the hot-air balloon mass transport system – is that it hasn't been the scientists themselves making the predictions. Now they are in a very strong position to do so.

However, The Cynics have long placed a trip wire on the track of human progress, even when scientists have indulged in flights of fancy. They laughed at Christopher Columbus, derided Galileo, scoffed at Darwin and sneered at Freud. A curious feature of The Cynic's attitude is that he (and again it usually is he) thinks that science is on his side, backing up his sane voice of reason against the fantastic. In 1903 a *New York Times* editorial glibly wrote off Langley's attempts at flight: 'We hope that Professor Langley will not put his substantial greatness as a scientist in further peril by continuing to waste his time, and the money involved, in further airship experiments. Life is short, and he is

capable of services to humanity incomparably greater than can be expected to result from trying to fly...’ And a few decades later, in 1936, when technology had become much more part of life, Charles Lindbergh wrote to Harry Guggenheim of Robert Goddard’s rocket research: ‘I would much prefer to have Goddard interested in real scientific development than to have him primarily interested in more spectacular achievements which are of less real value.’

Even now one of the most popular quotes for after-dinner speeches has to be the famous prediction of Thomas Watson, Chairman of IBM in 1943: ‘I think there is a world market for maybe five computers.’ And if you had suggested to our 1950s schoolboy that one day his, or her, 21st-century counterpart would have no idea what a slide rule was, or what log tables were all about, they would have thought you utterly crazy.

But it still does not follow that *this* time, *this* century should be any different, in terms of the revolutions in science and technology that come and go. Yes, as we shall see, we may well have the technology for a disease-free, hunger-free and even work-free existence. But then, too, the values, fears and hopes engendered in a chilly, smelly cottage on a bleak hillside would have produced an outlook very different from one based on a 20th-century upbringing in a centrally heated suburbia shimmering with shiny, chrome appliances and unforgiving neon lights. Yet we still have the same human brains as our very early ancestors, who stumbled uncomprehendingly around on the savannah some 100,000 years ago.

For the first time, however, our brains and bodies might be directly modified by electronic interfaces. For a second group, The Technophiles, such a prospect is welcome. The electrical engineer Kevin Warwick, for one, would welcome the prospect of heightened senses, sensations and muscle power that being a cyborg might bring – as we will see later. And cyber-guru Ray Kurzweil is gung-ho for the intimate embrace of silicon:

There is a clear incentive to go down this path. Given a choice, people will prefer to keep their bones from crumbling, their skin supple, and their life systems strong and vital. Improving our lives through neural implants on the mental level, and nanotechnology-enhanced bodies on the physical level, will be popular and compelling. It is another one of those slippery slopes – there is no obvious place to stop this progression until the human race has largely replaced the brains and bodies that evolution first provided.

Both Warwick and Kurzweil, not to mention other intellectual luminaries such as Marvin Minsky and Igor Aleksander, along with various futurologists such as Ian Pearson and Hans Moravec, all take it as read that another feature of future life will be conscious machines. Kurzweil’s message is that our only future as a species will be to merge intimately with our technology: if you can’t beat the robots, join them. So imagine a spectrum of beings, from pure carbon-based (as we humans are now) through the cyborg silicon-carbon hybrids that we could become to the ultimate – the vastly superior thinking silicon systems that will be Masters (and again they will have to be male) of the Universe.

It was actually because he was eavesdropping on a discussion between Kurzweil and the philosopher John Searle, concerning the very question of computer consciousness, that the co-founder and Chief Scientist of Sun Microsystems, Bill Joy, began to feel anxious about the direction in which future technology was heading. As an undisputed technomandarin, Joy created an enormous stir when he wrote of his urgent concern in the magazine *Wired*, in April 2000, in an article titled ‘Why the future doesn’t need us’:

The 21st-century technologies – genetics, nanotechnology, and robotics – are so powerful that they can spawn whole new classes of accidents and abuses. Most dangerously, for the first time, these accidents and abuses are widely within the reach of individuals and small groups. They will not require large facilities or rare raw materials. Knowledge alone will enable the use of them.

True, a critical difference between the technology of the 21st-century genetics, nanotechnology and robotics and that of the previous 100 years – darkening as they were with nuclear, biological and chemical doom – is that now it is no longer necessary to take over large facilities or access rare raw materials. Yet an even bigger change in the technology of the future, compared to that of the past, is that a nuclear bomb, though hideous in its potential, cannot self-replicate; but something that might – nanorobots – could soon be taking over the planet.

Just browse a few websites that are devoted to ‘problems of preserving our civilization.’ One worry, you will read, is that the manipulation of matter at the level of atoms, the nanotechnology that promises to be ‘the manufacturing industry of the 21st century’, will bring a new enemy – robots scaled down to the billionth of a metre that the nanolevel mandates, minuscule serfs who are focused on assembling copies of themselves. What might happen, one website asks, if such prolific yet single-minded operatives fell into the hands of even a lone terrorist? But then, of course, intelligent robots do not have to be small to be evil – just much cleverer than us. Common-or-garden human-sized machines might also soon be able to self-assemble, and, more importantly, to think autonomously.

Bill Joy had never thought of machines heretofore as having the ability to ‘think’; now he is worried that they will, and in so doing lead us into a technology that may replace our species. He worries that humans will become so dependent on machines that we will let machines make decisions. And because these machines will be so much better than humans at working out the best course of action, soon we will capitulate entirely. Joy argues that, in any case, the problems will soon be so complex that humans will be incapable of grasping them. Considering that, in addition to greater mental prowess, these silicon masterminds will have no need to sleep in, nor to hang out in bars, they will soon be way ahead of us, treating us as a lower species destined, as one website warns, to be ‘used as domestic animals’ or even ‘kept in zoos’.

Kevin Warwick’s predictions are similarly ominous. ‘With intelligent machines we will not get a second chance. Once the first powerful machine, with an intelligence similar to that of a human, is switched on, we will most likely not get the opportunity to switch it

back off again. We will have started a time bomb ticking on the human race, and we will be unable to switch it off.’

Equally nightmarish would be an elite minority of humans commanding large systems of machines, whilst the masses languish redundant. Either the elite will simply destroy this useless press of humanity or, in a more benign mood, generously brainwash them so that they give up reproducing and eventually make themselves extinct – it would be kindest to ensure that at all times the masses are universally content. They will be happy, but not free. It is a disturbing thought that these are the views of the Unabomber, Theodore Kaczynski; though he was obviously criminally insane, and no one would for a moment condone his actions, still Joy felt compelled to confront the sentiment that ‘as we are downloaded into our own technology, our humanity will be lost.’

The coming Age of IT, then, offers a raft of possibilities from conscious automata to self-assembling autocrats to carbon-silicon hybrids. Extreme though such possibilities might seem, especially to The Cynics, it is very likely that a more modest version of carbon-silicon interfacing will be invisible and ubiquitous – if not actually inside our bodies and brains then sprinkled throughout our clothes, in our spectacles and watches, and converting the most unlikely inanimate objects into ‘smart’ interactive gadgets.

The real problem is not what is technically feasible but the extent to which what is technically feasible can change our values. The gadgets of applied technology are the direct consequences of the big scientific breakthroughs of the previous century, and promise any day now to influence, with unprecedented intimacy, the previously independent, isolated inner world of the human mind. Yet this widespread availability of modern technology is, for some, a loud enough wake-up call for us to re-evaluate our priorities as a society. Bill Joy again: ‘I think it is no exaggeration to say that we are on the cusp of the further perfection of extreme evil, an evil whose possibility spreads well beyond that which weapons of mass destruction bequeathed to the nation-states, on to a surprising and terrible empowerment of extreme individuals.’

But of course not all of this third group, The Technophobes, are scientists. Not surprisingly, and indeed more typically, non-scientists’ fears are usually grounded in a more romantic view of life, but the fears are there nonetheless. In his Reith Lecture in 2000 Prince Charles summed up the worries of many: ‘If literally nothing is held sacred anymore ... what is there to prevent us treating our entire world as some “great laboratory of life”, with potentially disastrous long-term consequences?’

It may be a little unfair, and certainly incautious, to write off this type of view as simply that of latter-day Luddites, striving in vain to hold back progress with a misconceived vision of some golden bygone age when humans adhered to a Rousseau-like natural nobility, and no one died in childbirth, suffered poor housing, worked at mind-numbing manual tasks or froze to death ... It’s just that for many there is a very real fear that science, and the technology that it has spawned, have outpaced the checks and balances we need for society to survive – indeed for life as we know it to continue at all.

In our growing knowledge of life, in biology, the trend for science to be slipping out of control appears already to be gaining an ever-faster pace. The rigid hierarchy of a society segregated by biochemical and genetic manipulation, from intellectual ‘alphas’ down to ‘epsilons’ who operate the lifts, portrayed by Aldous Huxley in *Brave New World*, is now seen as a real future threat by many. Predictably, a morass or websites express serious concerns over genetics, for example: ‘The path is open, by-passing the natural evolution, to design unusual creatures – from fairly useful to imagination-striking monsters.’

And we might well end up with ‘designer’ babies, potential geniuses or highly obedient and tough soldiers. But manipulations of genes allows further possibilities too; offset against the benefits of gene therapy and new types of medication and diagnostics, there are clones, artificial genes, germ-line engineering, and the tricky relationship of genetic profiling to insurance premiums and job applications. In any event, for The Technophobes, the question of basic survival seems far from certain; according to Bill Joy, the philosopher John Leslie puts the risk of human extinction at 30 per cent at the least. And the astronomer Martin Rees, in his latest book, *Our Final Century*, rates the chance as no better than odds on that civilization will avoid a catastrophic setback.

No one could really disagree with Aristotle that ‘All men by nature desire to know’; the human brain has evolved to ask questions, and to survive by answering them. Science is simply the formal realization of our natural curiosity. Yet no one could fool themselves any longer that, as we stand on the cusp of this new century, we are traveling the simple path of ‘progress’. Sure, for several generations now we have strived to balance the pay-off between ‘unnatural’ mechanization and a pain-free, hunger-free, longer-lasting existence; but now we face a future of interactive and highly personalized information technology, and intrusive but invisible nanotechnology, not to mention a sophisticated and powerful biotechnology, that could all conspire together to challenge how we think, what kind of individuals we are, and even whether each of us stays an individual at all.

For The Cynics the implications that this prospect poses, in all its horror and excitement, will be sensationalist hype at best and scaremongering at worst. They won’t believe that science will ever be able to produce new types of fundamentally life-transforming technologies, and even if it were, they feel that humans are sufficiently wise and have an inbuilt sanity check to deal with any ethical, cultural or intellectual choices that might ensue. This attitude is not only questionable – in the light of the far more modest precedents that we have witnessed in technology over the last half century – but also chillingly complacent. Can we really afford to assume that humanity will be able to muddle through? And even if we did survive as the unique personalities we are now, in a world bristling with biotech, infotech and nanotech, can we still be sure that such passivity, just letting it all happen, will be the best way to optimize the benefits and reduce any ensuing risks?

Perhaps both Technophiles and Technophobes would agree on one very important issue that sets them aside from The Cynics: we must be proactive and set the agenda for what we want and need from such rapid technical advances; only then shall we, our children

and our grandchildren come to have the best life possible. So first we need to evaluate the 21st-century technologies, and then unflinchingly open our minds to all possibilities...