disappears as fast as it arises?

At present, humankind has far greater interest in the biochemical solution. No matter what monks in their Himalayan caves or philosophers in their ivory towers say, for the capitalist juggernaut, happiness is pleasure. Period. With each passing year our tolerance for unpleasant sensations decreases, and our craving for pleasant sensations increases. Both scientific research and economic activity are geared to that end, each year producing better painkillers, new ice-cream flavours, more comfortable mattresses, and more addictive games for our smartphones, so that we will not suffer a single boring moment while waiting for the bus.

All this is hardly enough, of course. Since *Homo sapiens* was not adapted by evolution to experience constant pleasure, if that is what humankind nevertheless wants, ice cream and smartphone games will not do. It will be necessary to change our biochemistry and re-engineer our bodies and minds. So we are working on that. You may debate whether it is good or bad, but it seems that the second great project of the twenty-first century – to ensure global happiness – will involve re-engineering *Homo sapiens* so that it can enjoy everlasting pleasure.

The Gods of Planet Earth

In seeking bliss and immortality humans are in fact trying to upgrade themselves into gods. Not just because these are divine qualities, but because in order to overcome old age and misery humans will first have to acquire godlike control of their own biological substratum. If we ever have the power to engineer death and pain out of our system, that same power will probably be sufficient to engineer our system in almost any manner we like, and manipulate our organs, emotions and intelligence in myriad ways. You could buy for yourself the strength of Hercules, the sensuality of Aphrodite, the wisdom of Athena or the madness of Dionysus if that is what you are into. Up till now increasing human power relied mainly on upgrading our external tools. In the future it may rely more on upgrading the human body and mind, or on merging directly with our tools.

The upgrading of humans into gods may follow any of three paths:

biological engineering, cyborg engineering and the engineering of non-organic beings.

Biological engineering starts with the insight that we are far from realising the full potential of organic bodies. For 4 billion years natural selection has been tweaking and tinkering with these bodies, so that we have gone from amoeba to reptiles to mammals to Sapiens. Yet there is no reason to think that Sapiens is the last station. Relatively small changes in genes, hormones and neurons were enough to transform *Homo erectus* – who could produce nothing more impressive than flint knives – into *Homo sapiens*, who produces spaceships and computers. Who knows what might be the outcome of a few more changes to our DNA, hormonal system or brain structure. Bioengineering is not going to wait patiently for natural selection to work its magic. Instead, bioengineers will take the old Sapiens body, and intentionally rewrite its genetic code, rewire its brain circuits, alter its biochemical balance, and even grow entirely new limbs. They will thereby create new godlings, who might be as different from us Sapiens as we are different from *Homo erectus*.

Cyborg engineering will go a step further, merging the organic body with non-organic devices such as bionic hands, artificial eyes, or millions of nano-robots that will navigate our bloodstream, diagnose problems and repair damage. Such a cyborg could enjoy abilities far beyond those of any organic body. For example, all parts of an organic body must be in direct contact with one another in order to function. If an elephant's brain is in India, its eyes and ears in China and its feet in Australia, then this elephant is most probably dead, and even if it is in some mysterious sense alive, it cannot see, hear or walk. A cyborg, in contrast, could exist in numerous places at the same time. A cyborg doctor could perform emergency surgeries in Tokyo, in Chicago and in a space station on Mars, without ever leaving her Stockholm office. She will need only a fast Internet connection, and a few pairs of bionic eyes and hands. On second thoughts, why *pairs*? Why not quartets? Indeed, even those are actually superfluous. Why should a cyborg doctor hold a surgeon's scalpel by hand, when she could connect her mind directly to the instrument?

This may sound like science fiction, but it's already a reality. Monkeys have recently learned to control bionic hands and feet disconnected from their bodies, through electrodes implanted in their brains. Paralysed

patients are able to move bionic limbs or operate computers by the power of thought alone. If you wish, you can already remote-control electric devices in your house using an electric 'mind-reading' helmet. The helmet requires no brain implants. It functions by reading the electric signals passing through your scalp. If you want to turn on the light in the kitchen, you just wear the helmet, imagine some preprogrammed mental sign (e.g. imagine your right hand moving), and the switch turns on. You can buy such helmets online for a mere $400.[43]

In early 2015 several hundred workers in the Epicenter high-tech hub in Stockholm had microchips implanted into their hands. The chips are about the size of a grain of rice and store personalised security information that enables workers to open doors and operate photocopiers with a wave of their hand. Soon they hope to make payments in the same way. One of the people behind the initiative, Hannes Sjoblad, explained that 'We already interact with technology all the time. Today it's a bit messy: we need pin codes and passwords. Wouldn't it be easy to just touch with your hand?'[44]

Yet even cyborg engineering is relatively conservative, inasmuch as it assumes that organic brains will go on being the command-and-control centres of life. A bolder approach dispenses with organic parts altogether, and hopes to engineer completely non-organic beings. Neural networks will be replaced by intelligent software, which could surf both the virtual and non-virtual worlds, free from the limitations of organic chemistry. After 4 billion years of wandering inside the kingdom of organic compounds, life will break out into the vastness of the inorganic realm, and will take shapes that we cannot envision even in our wildest dreams. After all, our wildest dreams are still the product of organic chemistry.

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We don't know where these paths might lead us, nor what our godlike descendants will look like. Foretelling the future was never easy, and revolutionary biotechnologies make it even harder. For as difficult as it is to predict the impact of new technologies in fields like transportation, communication and energy, technologies for upgrading humans pose a completely different kind of challenge. Since they can be used to transform human minds and desires, people possessing present-day

minds and desires by definition cannot fathom their implications.

For thousands of years history was full of technological, economic, social and political upheavals. Yet one thing remained constant: humanity itself. Our tools and institutions are very different from those of biblical times, but the deep structures of the human mind remain the same. This is why we can still find ourselves between the pages of the Bible, in the writings of Confucius or within the tragedies of Sophocles and Euripides. These classics were created by humans just like us, hence we feel that they talk about us. In modern theatre productions, Oedipus, Hamlet and Othello may wear jeans and T-shirts and have Facebook accounts, but their emotional conflicts are the same as in the original play.

However, once technology enables us to re-engineer human minds, *Homo sapiens* will disappear, human history will come to an end and a completely new kind of process will begin, which people like you and me cannot comprehend. Many scholars try to predict how the world will look in the year 2100 or 2200. This is a waste of time. Any worthwhile prediction must take into account the ability to re-engineer human minds, and this is impossible. There are many wise answers to the question, 'What would people with minds like ours do with biotechnology?' Yet there are no good answers to the question, 'What would beings with a *different* kind of mind do with biotechnology?' All we can say is that people similar to us are likely to use biotechnology to re-engineer their own minds, and our present-day minds cannot grasp what might happen next.

Though the details are therefore obscure, we can nevertheless be sure about the general direction of history. In the twenty-first century, the third big project of humankind will be to acquire for us divine powers of creation and destruction, and upgrade *Homo sapiens* into *Homo deus*. This third project obviously subsumes the first two projects, and is fuelled by them. We want the ability to re-engineer our bodies and minds in order, above all, to escape old age, death and misery, but once we have it, who knows what else we might do with such ability? So we may well think of the new human agenda as consisting really of only one project (with many branches): attaining divinity.

If this sounds unscientific or downright eccentric, it is because people

often misunderstand the meaning of divinity. Divinity isn't a vague metaphysical quality. And it isn't the same as omnipotence. When speaking of upgrading humans into gods, think more in terms of Greek gods or Hindu devas rather than the omnipotent biblical sky father. Our descendants would still have their foibles, kinks and limitations, just as Zeus and Indra had theirs. But they could love, hate, create and destroy on a much grander scale than us.

Throughout history most gods were believed to enjoy not omnipotence but rather specific super-abilities such as the ability to design and create living beings; to transform their own bodies; to control the environment and the weather; to read minds and to communicate at a distance; to travel at very high speeds; and of course to escape death and live indefinitely. Humans are in the business of acquiring all these abilities, and then some. Certain traditional abilities that were considered divine for many millennia have today become so commonplace that we hardly think about them. The average person now moves and communicates across distances much more easily than the Greek, Hindu or African gods of old.

For example, the Igbo people of Nigeria believe that the creator god Chukwu initially wanted to make people immortal. He sent a dog to tell humans that when someone dies, they should sprinkle ashes on the corpse, and the body will come back to life. Unfortunately, the dog was tired and he dallied on the way. The impatient Chukwu then sent a sheep, telling her to make haste with this important message. Alas, when the breathless sheep reached her destination, she garbled the instructions, and told the humans to bury their dead, thus making death permanent. This is why to this day we humans must die. If only Chukwu had a Twitter account instead of relying on laggard dogs and dim-witted sheep to deliver his messages!

In ancient agricultural societies, most religions revolved not around metaphysical questions and the afterlife, but around the very mundane issue of increasing agricultural output. Thus the Old Testament God *never* promises any rewards or punishments after death. He instead tells the people of Israel that 'If you carefully observe the commands that I'm giving you [...] then I will send rain on the land in its season [...] and you'll gather grain, wine, and oil. I will provide grass in the fields for your livestock, and you'll eat and be satisfied. Be careful! Otherwise, your

hearts will deceive you and you will turn away to serve other gods and worship them. The wrath of God will burn against you so that he will restrain the heavens and it won't rain. The ground won't yield its produce and you'll be swiftly destroyed from the good land that the Lord is about to give you' (Deuteronomy 11:13–17). Scientists today can do much better than the Old Testament God. Thanks to artificial fertilisers, industrial insecticides and genetically modified crops, agricultural production nowadays outstrips the highest expectations ancient farmers had of their gods. And the parched state of Israel no longer fears that some angry deity will restrain the heavens and stop all rain – for the Israelis have recently built a huge desalination plant on the shores of the Mediterranean, so they can now get all their drinking water from the sea.

So far we have competed with the gods of old by creating better and better tools. In the not too distant future, we might create superhumans who will outstrip the ancient gods not in their tools, but in their bodily and mental faculties. If and when we get there, however, divinity will become as mundane as cyberspace – a wonder of wonders that we just take for granted.

We can be quite certain that humans will make a bid for divinity, because humans have many reasons to desire such an upgrade, and many ways to achieve it. Even if one promising path turns out to be a dead end, alternative routes will remain open. For example, we may discover that the human genome is far too complicated for serious manipulation, but this will not prevent the development of brain–computer interfaces, nano-robots or artificial intelligence.

No need to panic, though. At least not immediately. Upgrading Sapiens will be a gradual historical process rather than a Hollywood apocalypse. *Homo sapiens* is not going to be exterminated by a robot revolt. Rather, *Homo sapiens* is likely to upgrade itself step by step, merging with robots and computers in the process, until our descendants will look back and realise that they are no longer the kind of animal that wrote the Bible, built the Great Wall of China and laughed at Charlie Chaplin's antics. This will not happen in a day, or a year. Indeed, it is already happening right now, through innumerable mundane actions. Every day millions of people decide to grant their smartphone a bit more control over their lives or try a new and more effective antidepressant drug. In pursuit of health, happiness and power, humans will gradually change first one of