us lack a coping strategy or tangible tactics. We fall upon the idea of 'digital detox' or of temporary disconnection as if it is some kind of novelty, like being coated in seaweed at a health spa, and not an everyday routine. It is almost impossible *not* to be fully connected in society today. Emails, texts, 'feeds' of news, mobile phones that are not 'smart' . . . the list goes on and on.

We can no longer bank or board a plane or pay a bill without using connected technology. We have entered an eery virtual era when almost everything exists electronically first: we pay with our 'cashless' card, are tracked via embedded apps, and absorb adverts that use algorithms which are beginning to second guess us far more accurately than we might like (although there are always comic and irritating exceptions). Humans have been around a long time but we are now living cheek by jowl with another species entirely: technology.

The teeming brain

While Sir Tim Berners-Lee is the godfather of the current connected world having invented the worldwide web, the birth father of connectivity as we know it was Thomas Alva Edison, who, just 150 years ago, ushered in mass connection. He was the pioneering inventor of devices ranging from the phonograph to the electric lightbulb. Edison, who had studied the cable telegraph system extensively and had written about it at length,[8] devised the original carbon transmitter, the basis for that most common form of connected technology we still know today – the telephone network – for the Bell Telephone Company.

The digital telephone made its appearance in the 1980s but evolutionary echoes of Edison are with us in today's network technology. There is surprisingly

[8] Extensive papers for *Appleton's Cylopaedia of Applied Mechanics* (1849) cite Thomas Edison as co-author, and much of the material matches his own manuscripts.

little change from the days of manual carbon-filled glass tubes and using magnets and batteries in small batches, to those Elon Musk is using to design his subsonic Hyperloop transit system using passive magnetic sources to create levitation.[9] However, there is one crucial difference between then and now: human behaviour. Where we were once users of networks – travellers on trains, boats and in cars, people picking up a telephone (cautiously initially; no-one ever thought the telephone would catch on, and it was originally designed exclusively for business use) – now our lives are so embedded in and on networks that we behave as if we have actually *become* them.

Where does all of this connectedness lead us? The advances and benefits of networked technology in the advanced and developing worlds cannot be overstated. Of course, I love being connected. I take it for granted. Don't we all all? Skyped medical consultations. Webinars. Conference calls. Sharing and posting clips from YouTube, or uploading documents to cloud-based document sharing apps such as Dropbox or Slack. Email, LinkedIn, Instagram, Twitter, Facebook, FaceTime, WhatsApp, Snapchat . . . the list is endless; so are the possibilities.

Life can be spent in a series of windows within windows, opening and widening onto yet more. Connection comes before conversation via iPad or laptop. The mobile phone is used less to speak into than to text on or to scroll through. If I want to know something, of course I turn first to Google or Wikipedia, BuzzFeed or the BBC. Getting our information and relaying it to others in this way has become second nature. Connection is movement, mobile. Nothing stands still, and nor do we. Technology companies sell us limitless possibility. Finite somehow equates to failure. The blue, blue sky of online storage always beckons.

There may be convenience, the necessary thrill of innovation. There is also a radical reshaping of the way we live and work to factor in. Despite the manifest benefits of this connected age – the medical, mechanical, cultural and

[9] Luke Edwards, *'What is Elon Musk's 700mph Hyperloop? The subsonic train explained'*. www.pocket-lint.com.

commercial advances – it also exacerbates, complicates, accelerates and infiltrates our lives, creating more problems alongside the many solutions. Our lives today are full of cognitive dissonance, all based around some of the tensions which happen when you put human beings, with their natural limits, in a computerized social world that is literally programmed to be without limit and never switched off. Unlike computers, we do not have limitless storage, nor do we have unlimited time: we still only have 168 hours in the week, a number that has not changed fundamentally since the Sumerian calendar first began to express time in terms of cycles.[10]

The twenty per cent of my time per week that is spent 'managing' my inbox, including having to look at the 'clutter' folder (which still manages to swallow emails I need; algorithms are actually no substitute for the human mind), feels like a necessary cost of modern living, even if the mind feels, as the nineteenth-century romantic poet John Keats described his 'teeming brain', too full of things to express and too time-poor to get them all out, before 'I cease to be'.[11]

Find me anyone working in an office, a school, a call centre, a warehouse, a parliamentary chamber, a public state frontline service, an NGO or a university who does not struggle with overload, who does not admit that much of daily life is not working well or indeed properly. Individuals and institutions share many of the same problems: we are already full to capacity.

Degrees of connectedness

I was born in 1964, in London's Bloomsbury, around the time that Gordon E. Moore, the founder of Intel, framed 'Moore's Law' – that computing capacity

[10] The Sumerians of Babylon are thought to be the first people to make a calendar. They used the phases of the moon, counting twelve lunar months a year and twelve hours between the dawn and sunset.
[11] John Keats, '*When I have Fears*'. Originally written in 1818 and published posthumously in 1848.

would double every two years.[12] This was also just a handful of years before the psychologist Stanley Milgram undertook a landmark study looking at just how short the social connection paths were between people. The answer, famously, was six – hence the phrase 'six degrees of separation', which we all instinctively know and understand to mean, ironically, its opposite. Rather than how separate or disconnected we are, the experiment showed just how *connected* we are to everyone, by only six removes. In a small world – and this experiment has indeed been dubbed 'Small World Theory' – connections are limited. Now they are not: Twitter, Ebola, airlines … take your pick. We may still live and work and operate in small clusters, but we reach many, many others. And nowadays we can reach them very, very quickly indeed.

Moore's law sits inside two other movements: the death of distance and the rise of what I call 'peak connection'. First, distance. I was five in 1969 when the supersonic airliner Concorde took its maiden flight and Neil Armstrong took his first steps on the Moon, 370,300 km away from Earth. Just under a generation later, in 1997, the same year that the space station Atlantis docked with the Mir space station, the management thinker Frances Cairncross coined the phrase 'the death of distance', to convey how the new connecting technologies were blowing away not just timeframes but mere miles.[13] My working life has coincided with the death of distance. During the early 1990s – after twenty years of mass consumerism, television, the computer, all being connected by cables to a wall, at vast expense, some distance away – the distance changed. It moved right in and up close. First to our desks; now to our hands.

Second, peak connection. Back in the 1960s, I was far less interested in walking on the moon than I was in holding close my most prized possession: the Sindy doll. Sindy has long gone but I can remember exactly how she felt in

[12] See '*50 Years of Moore's Law*', www.intel.com

[13] Frances Cairncross, *The Death of Distance: How the Communications Revolution will Change our Lives*.

my arms and exactly what she meant to me. I could dress her and play with her; she was like a friend. The little girls of today still play with their dolls but their favourite characters are often an infinite distance away, up in the cosmos of the internet. As I write, the current game of choice for children is Pokémon Go, which involves the global toy of choice: a smart mobile phone. The world began its ascent a very short time ago, just half a century or less, to where we are now. Fully connected – and not always in a good way.

Origins of the stressed species

We may tell ourselves that it is technology that connects us most, which makes us somehow more human ('better enabled'), yet technology is the amplifier for the instrument that makes the music: it is still us, the person or group of people, who remain the most successful transmitters. The series of computing code and algorithms that gave birth to the connected social age were just an evolutionary echo of something fundamental: how everything from species development to ideas spread is done by people. The spreading rate of human society has, in evolutionary terms, been very rapid indeed.

The historian Yuval Noah Harari believes that the speed with which humans have evolved has meant that, as a species, we are immature at dealing with stress. He notes that for a worker in Jericho's wheat settlements of 8,500 BC, the newly flourishing farming communities of the ancient world 'revved up the treadmill of life to ten times its former speed and made our days more anxious and agitated'.[14] I often feel anxious and agitated, just like our Jericho forebears. Middle Eastern bakers back then could never have imagined that today I can download a 'breadmaking basics' app[15] on Apple or Android for £1.49, or that

[14] Yuval Noah Harari, *Sapiens: A Brief History of Humankind*.
[15] *'Bread Baking Basics'*, app, Ruhlman Enterprises Inc, October 2011.

'artisan bread' would become an in-store staple at the most mass-produced emporiums in the world: supermarkets. Could our Neolithic forbears, domesticating einkorn wheat in a world with fewer than five million people living in it, have imagined the possibilities of global exports of bread itself in a world of seven billion people, where cereal production will soon exceed 2,500 million tonnes?[16] So it is not just speed to which the fully connected life must adapt: it is scale, too.

We do not see life in the fully connected living as a crisis, especially not a health crisis, in particular, but we should. We think nothing of going to the gym and working out, but have not yet seemed to realise that our new connectedness has many discontents too. Take 'Generation Z', the social group that has followed the 'Millennials' and which is, according to Goldman Sachs, 'the first generation to be born in a post-internet world, truly device-in-hand'.[17] They can spend up to eighteen hours a day looking at their screens, more comfortable on social media than in many face-to-face settings. AI will soon give them computers that can 'talk' to them. Is this socially healthy? It is socially here. Now.

The attention span of students is changing fundamentally; some universities are being built without lecture theatres, catering for shorter attention spans and embracing their new desire to continually share rather than soak up learning from 'on high'.[18] Cinemas struggle to adhere to a 'mobiles off' rule, as customers seem unable to stop fidgeting with their phones. If we think about the staggering *Lancet* study statistic that twenty per cent of the global

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[16] See Food and Agriculture Organization of the United Nations, '*World Food Situation: FAO Cereal Supply and Demand Brief*', December 2015.

[17] Christopher Wolf, *'What if I told You . . . Gen-Z Matters More Than Millennials'*, Emerging Theme Radar report, 2 December 2015, Goldman Sachs.

[18] The *Northampton Chronicle* reported in November 2013 that lecture theatres 'may not be included' in the new University of Northampton campus, while Frank Gehry's design for Sydney's Dr Chau Chak Wing Building School of Technology, which opened in 2015, features a '120 seat collaborative lecture theatre' and rooms 'designed for flexible configurations with moveable furniture to support group activities' see: www.uts.edu.au.