Autumn 2024

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NASCENT STATE

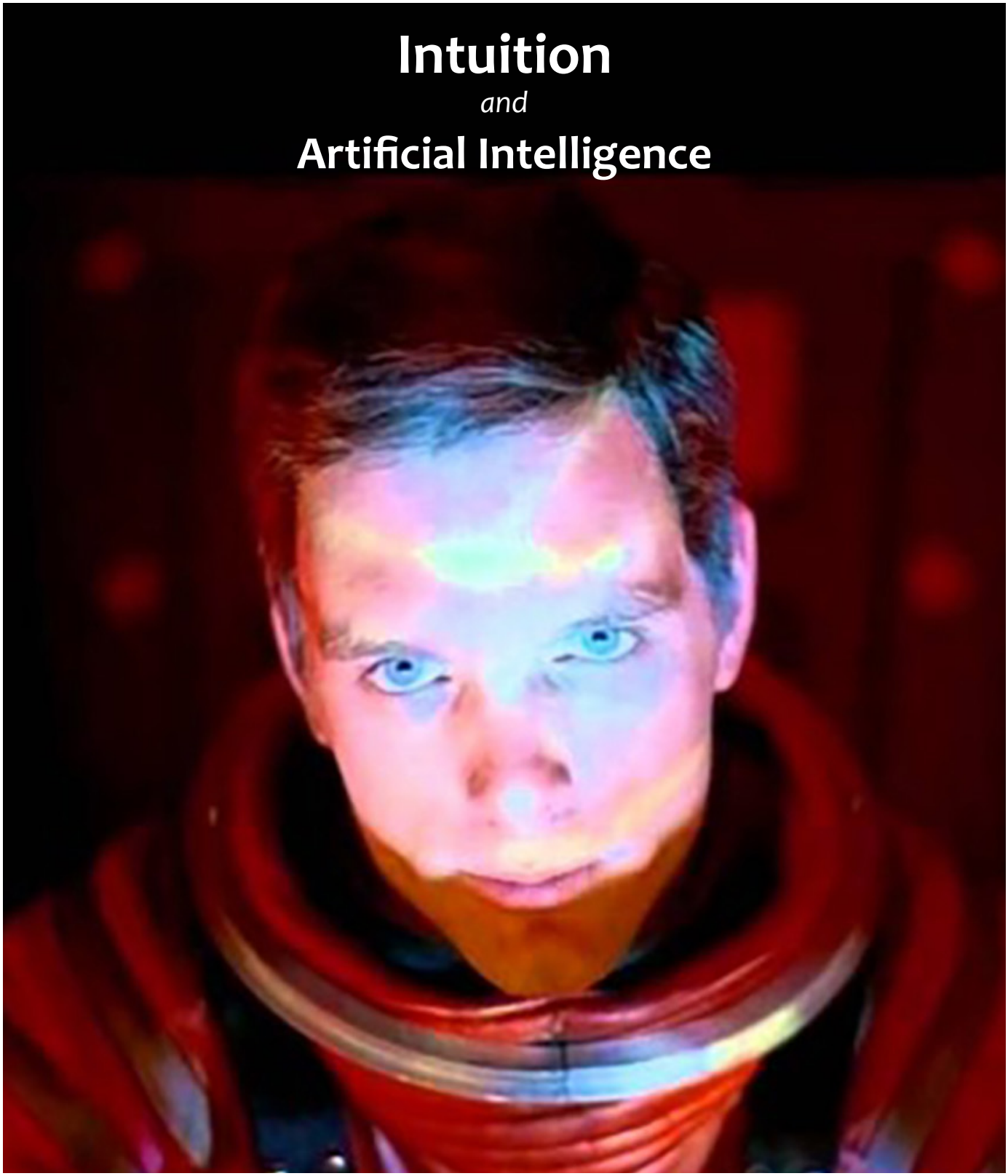
Journal of Intuition

Magazine

Intuition

and

Artificial Intelligence



Autumn 2024

NASCENT STATE

'I'm sorry Dave, I'm afraid I can't do that.'
HAL 9000
(*2001: A Space Odyssey* by Stanley Kibrick)

From the Editor

This edition of *Nascent State Magazine* is about how our relationship to technology is changing. Technology used to be an addition to life; now it is life itself.

We may not be aware of it, but we are witnessing a very real paradigm shift. The advent of AI means that thinking has been mechanised, and the idea of a separate 'self' to govern thinking is now redundant. This changes our conception of what it is to be human. Unless we have a clear idea of what it is to be human, we are likely to create a very inhuman world indeed.

The rate of change is not only faster than before, it is speeding up. The future is no longer centuries or decades away, but measured by the next technological development, which may be imminent. The more technology progresses, the more we will need to think about what kind of world we are creating.

Nascent State Magazine is presented in a PDF, free-to-download format; download it and read it at your leisure. For enquiries, contributions and comments, email:

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Jim Blackmann

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Invention

A Brief History

The Red Flag Act of 1865 required a man to walk in front of an automobile waving a red flag.

'The press, the machine, the railway, the telegraph are premises whose thousand-year conclusion no one has yet dared to draw.'

Nietzsche

Technology is more than the ability to discover and invent. The wider circumstances of outlook, economic climate, and often the necessity of war, provide the impetus for invention. Each period in history has its own conditions, and it is the conditions which gave rise to the specific invention as much as the creative mind of the inventor.

It is instructive to cast an eye over the development of technology in history. What such a study reveals is that technology does not emerge in a vacuum, but rather in conjunction with a specific set of circumstances in society. The following account is not exhaustive, but it does cover the more important developments.

Prior to the 15th Century, the technologies that existed were mostly connected with building, travel or agriculture. Beyond this, the few exceptions were the abacus (2400 BC), the astrolabe (9th century AD) and spectacles (13th century AD). Society was governed by religion, and technology served that end. The construction of the Gothic cathedrals was extraordinary, and yet the technology involved served the church, and so it was limited by that outlook. It is not surprising that even technology was handmade.

The 15th Century is remembered for marking the break with religion. It gave us the Copernican world view, which placed the Sun at the centre of the cosmos rather than the Earth, and introduced the conception of the world as a mechanical

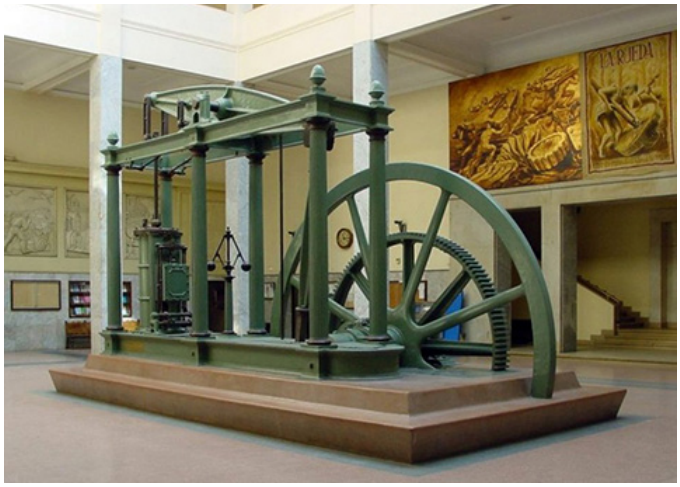
clockwork. The 15th Century also gave us the inventions of Leonardo, the Gutenberg printing press, the expansion of the known world through Columbus, and - perhaps most tellingly - the establishment of the Patenting System in 1474.

Woodcut Illustration of early printing press

The technologies that immediately followed were related directly to the empirical method and the need to measure the world more accurately. In the following century, the microscope (1590), the telescope (1608) and the micrometer (1640) were all invented within 50 years of each other. Physics was beginning to replace revelation as the foundation of knowledge.

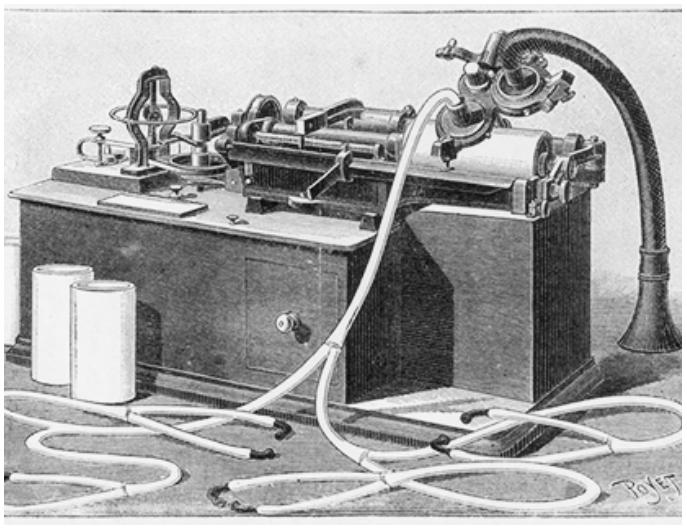
While the Renaissance introduced many secular ideas into society, the Secularism we associate with the modern era did not emerge until the 18th Century. The French Enlightenment, and particularly with the production of the French Encyclopédie (1751 - 1772), belief in salvation was replaced by a belief in material progress. The First Industrial Revolution (c. 1760) accompanied it, and the technologies that emerged were about harnessing power for the purpose of increased production. The spinning jenny (1770), Crompton's mule (1779), the steam governor (1789) and the cotton gin (1792) all followed in close succession.

The obvious benefits of increased production informed the inventions of the century that followed. The need to harness energy gave rise to the steamship (1798), the battery (1800), gas lighting (1801), the electric motor (1821), railways (1830), and the refrigerator (1834). This grouping of inventions indicates as much about the period as human ingenuity.



Watt steam engine

While electricity had been known since ancient Greece, the need for a domestic power source led to multiple people, from Michael Faraday (b. 1791) to George Westinghouse (b. 1846), to Alexander Graham Bell (b. 1847), Thomas Edison, (b. 1847) and Nikola Tesla (b. 1856) to contribute to the practical harnessing of electricity. Electricity made many inventions possible that would have been regarded as fantastic a century before. The telephone (1876), the gramophone (1877), the cinema (1895), the radio (1896) and the teleprinter (1897) all followed in quick succession.

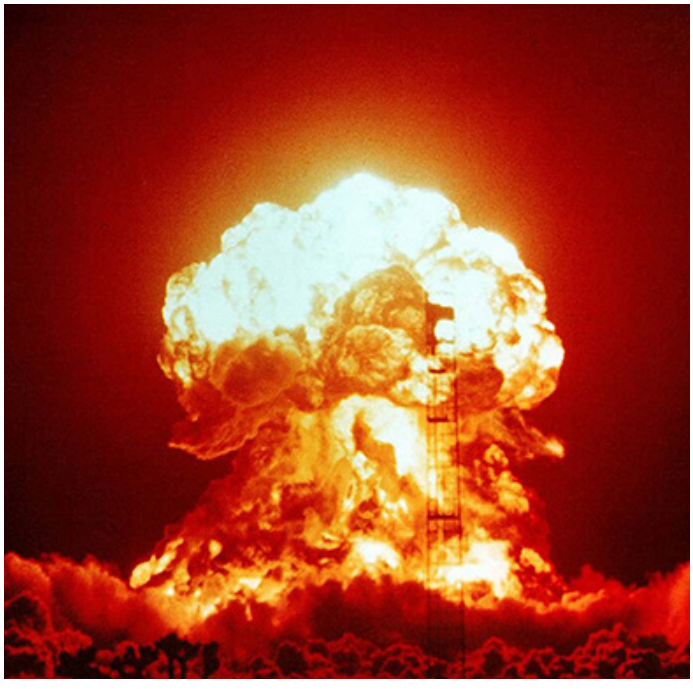


Edison phonograph

The employment of another form of energy, in this case petroleum, led to the invention of the motor car (1884), the motorcycle (1885), the aeroplane (1905) and the helicopter (1907). Electricity could serve domestic use, the mobility of petroleum served transport. Nonetheless the grouping of such inventions was clearly more than coincidence.

Benz tricycle 1886

The 20th Century is noted for two world wars and two major revolutions. The demands of war forced the leading thinkers in the field to focus on war technology. This led to the development of the rocket (1926), the use of radar for detecting aircraft (1935), the jet engine (1939) and the nuclear bomb (1945). It is interesting to note that world wars on this scale would not have been possible without the technologies provided by previous centuries. Technology was now a fact of life in the way that farming and fishing were once facts of life.



Nevada test site 1953

Although computers were invented in the 19th Century, they did not come into their own until the 1970s with the advent of the personal computer. The internet became available for personal use in the 1990s, and the smartphone first became available in 2007. What gives the technology of the present era its specific identity is that it is less concerned with manufacturing, travel or production, than with the handling and organising information. The developments that followed, Facebook, YouTube, Twitter, Spotify, Instagram, TikTok and WhatsApp, were all created within the last 20 years; they now inform life.

Steve Jobs, 2007

As for the future, one of the most visionary inventors, Nikola Tesla, had the following to say about the possibilities that still exist. In 1929, he made the following comments about where technology was heading:

'When wireless is perfectly applied the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole. We shall be able to communicate with one another instantly, irrespective of distance. Not only this, but through television and telephony we shall see and hear one another as perfectly as though we were face to face, despite intervening distances of thousands of miles; and the instruments through which we shall be able to do this will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket.'

With the advent of AI, or Artificial Intelligence, Tesla's 'world brain' is becoming a reality. Technology is no longer a part of life, it is life. The new world we are creating will, sooner or later, force us to address an issue long neglected by the immediate benefits that technology has produced, namely, where is this heading?

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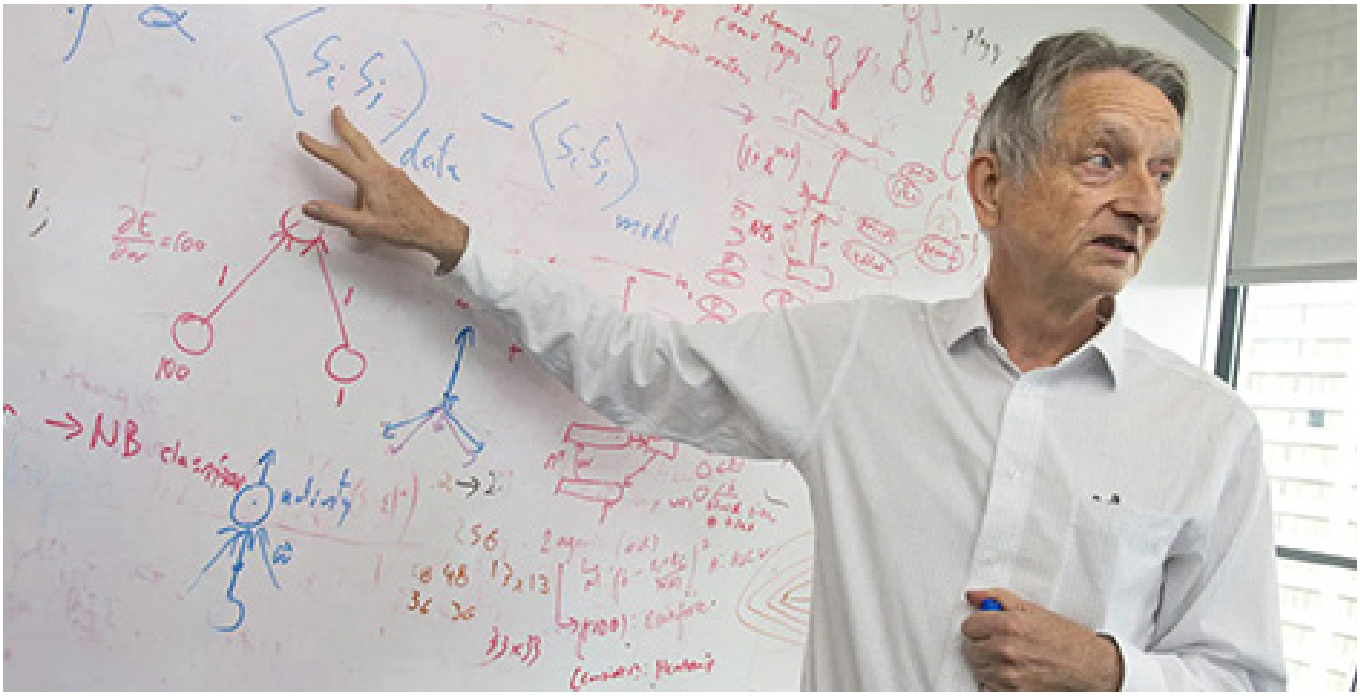
Artificial Intelligence

And its origins



Geoffrey Hinton, 2017.

'Lots of people are very confident they aren't sentient, but if you ask them what they mean by 'sentient', they don't know. I am very confident that they think.'

While the above statement might appear contentious, it was made by Geoffrey Hinton only last year. Hinton is widely regarded as the father of Artificial Intelligence. In order to understand why he is confident AI actually 'thinks', as distinct from merely processing information, it might be worth looking at the origins of AI.

Some forms of technology come from the contribution of single individuals, while others are the product of group efforts, as was the case with the development of electrical energy. Artificial Intelligence, or AI, is an example of a group effort, involving contributions from many people, acting both alone and in combination, and in fields as diverse as biology, psychology, mathematics, computer science and physics.

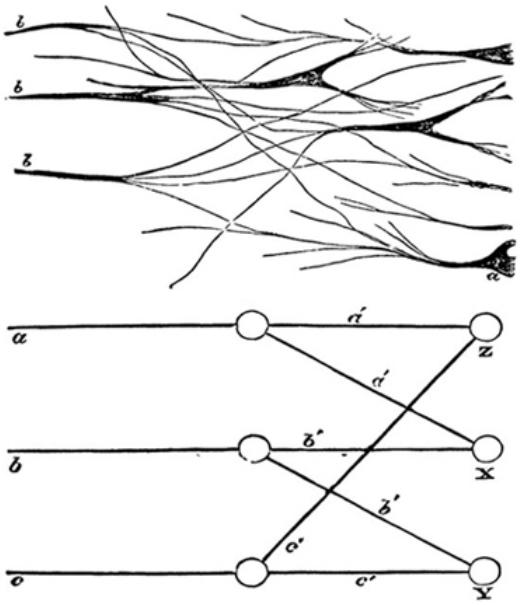
A standard computer program deals with information, but in a linear fashion, rather like a calculator. It was from this that the computer term 'GIGO' emerged, meaning 'garbage in, garbage out'. This means a standard computer program cannot distinguish between junk and genuine information. AI operates differently from a linear program. Its whole function is based on 'backpropagation', which means that errors in the output are fed back into the system to produce the final outcome. An AI system does more than handle information; it organises it. Of course, you may still ask 'but does this mean it thinks'?

Artificial Intelligence became possible because computer programs, called Artificial Neural Networks, are based on the biological neural networks in the brain. AI mimics the process whereby the brain makes sense of the information coming in as impressions, and then processes the information to produce an output. If someone shines a bright light in our eyes, we squint. If a station announcer tells us our train is due, we stand up in preparation for it.

Alexander Bain (1810 – 1877) who laid down the principles for biological neural networks He wrote *Mind and body; the theories of their relation*. Bain went into some detail how impressions come to us from the outer world and, before eliciting a response, are organised into patterns by the neural, or nerve activity of the brain. The exact nature of biological neural networks is still open to debate, but EEGs, or electroencephalograms, can measure electrical activity in the brain and

show how specific impressions give rise to specific activity among groups of neurons.

In addition to describing this activity biologically, Bain also represented such networks mathematically, and in doing so he provided the theoretical framework for the computer simulations that followed.

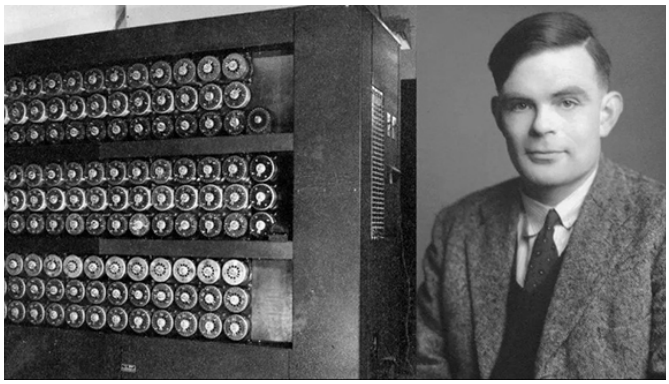


Bain's illustrations of a biological neural network

Prior to Bain, many people, including scientists, held the opinion that the activity of the mind was separate from the physical activity in the brain. The thoroughness of Bain's work, the detail of his explanation, and the convincing nature of it, meant that the mind was no longer regarded as separate from the body.

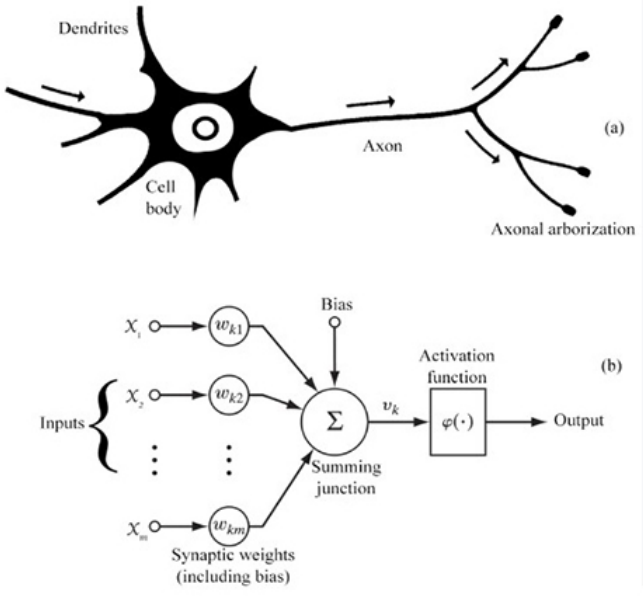
Others made important conceptual contributions to the development of the computing side of artificial intelligence. Ludwig Boltzmann (1844 – 1906) developed a form of statistical mechanics, including our present day concept of entropy. Boltzmann Machines, employed in the early development of AI, are named after him. Alan Turing (1912-1954) is regarded as one of the first to define Artificial Intelligence by proposing the Turing Test, whereby an evaluator asks questions from two hidden sources; one is human and one is a machine. If the evaluator cannot distinguish between the human and the machine response, the machine can be said to possess human intelligence. After him, John McCarthy (1927-2011) is credited with coining the term 'artificial intelligence', and Marvin Minsky (1927-2016) co-founded the Artificial Intelligence Laboratory at the Massachusetts Institute of Technology (MIT), one of the leading technology institutes in the world. Each made important contributions, and while much of their work was theoretical, where it led to a practical outcome, it appeared to validate the theory.

Another important conceptual step - and one which had a very practical application - was the development of Cybernetics by Norbert Wiener.



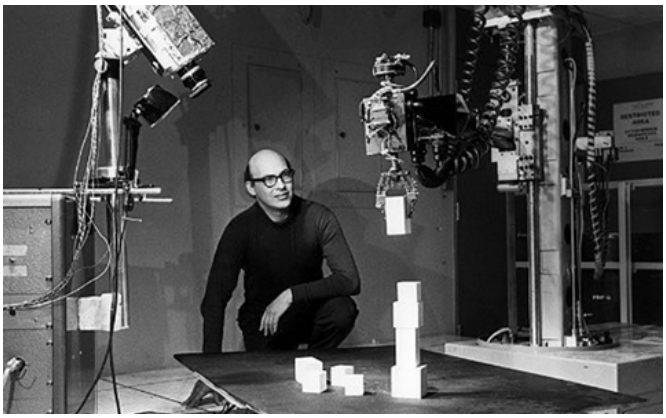
Alan Turing, 1936.

The word 'cybernetics' comes from the Greek word 'kubernētēs', meaning 'steersman'. A cybernetic machine is a self-governing machine. Simple examples are the governor on a steam engine, or the ball-cock on a lavatory. A self-governing machine requires no outside monitor for it to function. A more developed form of this type of machine can be found in the combination of radar, tracer bullets and a simple computer program to create an automatic anti-aircraft gun. Radar picks up on the incoming aircraft, tracer bullets are fired in its direction, the program picks up on the difference between the tracer bullets and the actual position of the aircraft, and then adjusts the further activity of the gun as required.



McCulloch and Pitts' Artificial Neural Network.

Central to Cybernetics is the concept of 'feedback'. Feedback was incorporated into the work of Warren McCulloch and Walter Pitts, who wrote *A Logical Calculus of the ideas Imminent in Nervous Activity (1943)*, and described the first mathematical model of a neural network. McCulloch and Pitts created the theoretical framework for the Perceptron, which was turned into a working model by Frank Rosenblatt (1928 – 1971). The Perceptron used photoelectric cells to register a simple image such as a triangle and then processed the input until the pattern it recognised matched the one presented.



Marvin Minsky at MIT, 1968.

But it was Geoffrey Hinton, and the students who worked closely with him, Alex Krizhevsky and Ilya Sutskever, who were responsible for the emergence of AI. Hinton had worked with little support for many years, and then in 2013, Google acquired Hinton's start up company, DNNresearch, and hired him as an advisor for Google Brain. Google's involvement meant that money and resources were now available for its development.

Hinton's contribution - quite apart from championing artificial intelligence when it was unfashionable - was to employ the cybernetic principle of backpropagation in his approach to AI. Backpropagation means that, if the system produces an error in the output, this is fed back into the system until the output matches the expected result. The announcement of viable and reliable AI systems in 2023 came as a surprise to many. Artificial Intelligence was not only here; it was no mere theoretical possibility, and it was highly effective.

Because Alexander Bain suggested that there was no distinction between the neural activity of the brain and thinking, and because Artificial neural networks are based on biological neural networks, it would seem to validate the assertion that they think. If thinking is more than this, we need to say what that 'more' is.

In May 2023, almost immediately following the announcement of its arrival, Geoffrey Hinton resigned his position at Google so he could speak openly about the risks of AI, and particularly its more developed form, AGI, or Artificial General Intelligence.

While Artificial General Intelligence is at present regarded as a theoretical possibility, the amounts of money being poured into its development make its realisation almost an inevitability. The difference between AI and AGI is that AI can only accomplish the tasks it has been trained in. AGI is more like the general intelligence a human possesses. We do not have to be trained to deal with each new situation, instead we adapt. While AI has to be trained by an outside intelligence (human beings), AGI does not. This loss of human governance means the system may not operate in the best interests of humanity. The company pouring the most money into the development of AGI is OpenAI (owned by Google) and its CEO Sam Altman.

The development of Artificial General Intelligence means that we will no longer require the concept of a separate 'self' to monitor our thought processes. This means our definition of what it is to be human is due for reappraisal. It is worth noting that our understanding of what it is to be human determines how we treat ourselves and others. This explains Hinton's resignation from Google. The problem however is not technology, but human nature. Until this question is addressed, AI is likely to be as much a curse as a blessing.

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Intuition

And the Future

'More human than human is our motto'. From Blade Runner, Ridley Scott, 1982

The hallmark of the present era is change. There has always been a degree of change - history is the record of change - but the rate of change in the modern era is unlike any before.

What we call 'tradition' comes from a time when change occurred over many centuries. If a person had the surname Carpenter, Turner or Smith, it meant that they came from a family of carpenters, turners or smiths. In the present era, we may work in a trade that didn't even exist when we were born. A hundred years ago, the percentage of the workforce employed in manufacturing was in the region of 40-50%; now it is less than 10%, with 80% employed in the service sector. With the advent of the personal computer, the internet and the smartphone, technology has gone from being a novelty to an expectation. We now live with constant updates and upgrades, new products and new technologies, and we barely notice it.

Rapid change has created a social environment where there is nothing in history to measure it against. The black clothing of the Victorian Era was not only an indication of the sobriety of the period, but of the uniform values of the age. The multicoloured fashions of the present era indicate the importance of individualism, and while this might seem preferable to rigid and enforced values, the result is a loss of social cohesion and direction. Victorian buildings, tunnels and railways were built without any thought of an expiry date; modern buildings have a life expectancy of 50 - 100 years.

Victorian era, William Powell Frith, 1883.

While there has always been change, the present rate of change is something we have not experienced before. Alvin Toffler (1928 – 2016) was perhaps the first to recognise this was a problem,

and he coined the term 'Future Shock' to highlight the issue:

'Future shock will not be found in Index Medicus or in any listing of psychological abnormalities. Yet, unless intelligent steps are taken to combat it, millions of human beings will find themselves increasingly disoriented, progressively incompetent to deal rationally with their environments. The malaise, mass neurosis, irrationality, and free-floating violence already apparent in contemporary life are merely a foretaste of what may lie ahead unless we come to understand and treat this disease.'

Alvin Toffler, 2006

The disease he refers to is our inability to cope with change. We still think in terms of change over centuries, but live in a society where change occurs in decades if not years. One of the problems with a rapid rate of change is that predicting the future has become more uncertain than ever before. Geoffrey Hinton, widely regarded as the father of AI, had the following to say about this only last year:

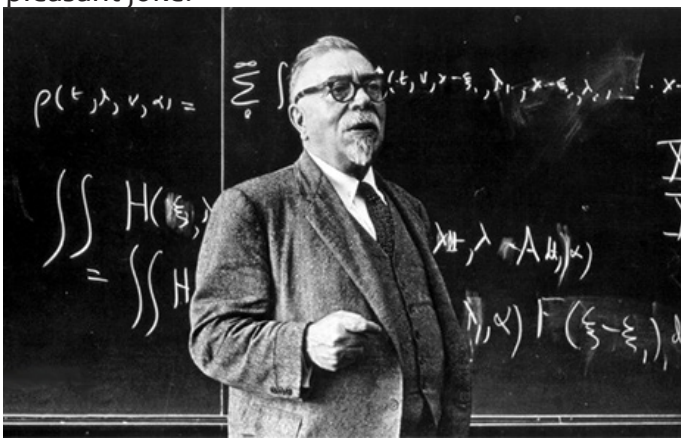
'Predicting the future is a bit like looking into fog. You know how when you look into fog, you can see about a hundred yards very clearly, and then two hundred yards, you can't see anything. There's a kind of wall, and I think that wall is about five years.'

Because we have emerged from an age of tradition and logic, we are likely to apply the principles of tradition and logic to deal with rapid and ongoing change. The result is likely to be fracturing, with those opposed to change trying to impose traditional values on those who embrace it. The rise of the right-wing in America and Europe is an example of this. The advent of robotics is going to make the division between those who favour change and those who regard it as a threat even more pressing.

Waymo Fully Self-Driving Vehicle, 2023

Norbert Wiener (1894 – 1964), who founded Cybernetics, or the science of self-governing machines, wrote the accompanying book, *The Human Use of Human Beings (1950)* to speak more generally about the impact and dangers of an uncritical approach to technology. His warning was stark:

'Let us remember that the automatic machine, whatever we think of any feelings it may have or may not have, is the precise economic equivalent of slave labour. Any labour which competes with slave labour must accept the economic conditions of slave labour. It is perfectly clear that this will produce an unemployment situation, in comparison with which the present recession and even the depression of the thirties will seem a pleasant joke.'



Norbert Wiener, 1963

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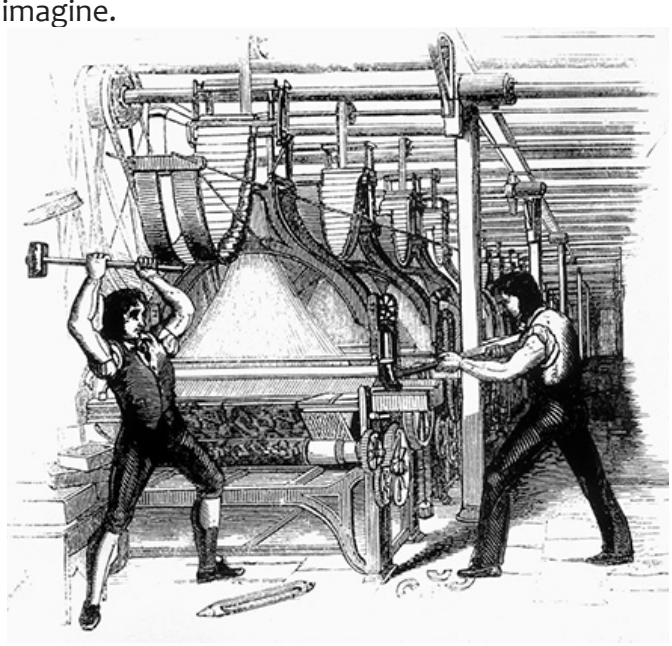
The issue most likely to bring home how our relationship with technology has changed is mass unemployment. Where technology led to prosperity - even if this was unevenly distributed - it was welcomed as a greater good. The onset of mass unemployment means this will change, and, owing to the rate of change, sooner than we imagine.



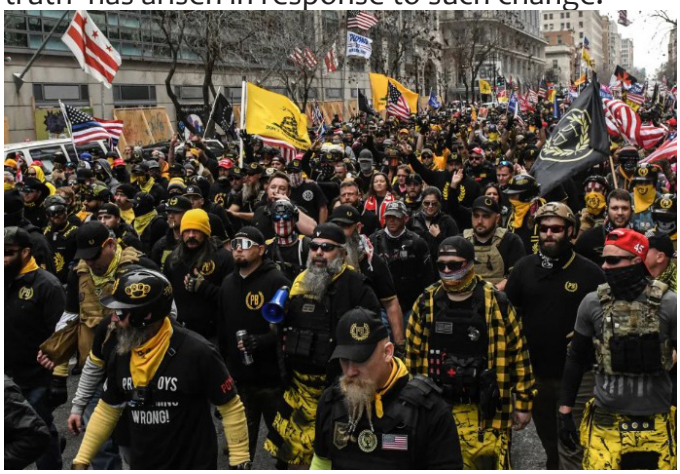
Luddites, illustration from 1812.

In the past, those who were opposed to change through technology were called 'Luddites', after the 19th century movement of mill workers who destroyed the emergent technology to protect their livelihoods. Mass unemployment will see the reemergence of Luddism. AI is likely to lead to job cuts in customer service and administration roles, in graphic design, finance and accounting, paralegal and case law study, telemarketing and sales - and not least, journalism. Self-driving vehicles, which are due on UK roads in 2026, are likely to impact on all driving roles, with taxis, public transport, delivery and road haulage being the areas most affected.

The first industrial revolution gave rise to Marxism. Marxism was the expression of dissatisfaction with the direction society was taking, with free-market Capitalism benefiting the wealthier classes over ordinary working people. The outcome was a violent revolution. The present industrial revolution, based on self-governing machines, is likely to lead to the emergence of a new ideology, with the probable violent uprising that accompanies such movements. This time it may not be led by the working classes, but by office workers.

Pyramid of Capitalism poster, 1911.

Social fracturing caused by the rate of change can already be seen in the emergence of the right-wing in Europe and America, in those who oppose mass immigration by invoking nationalism, in environmental activism, in those who oppose diversity with traditional morality, and in the response to social media by the legacy media and its claim to represent truth through 'fact-checking'. It is no surprise that the term 'post truth' has arisen in response to such change.



Proud Boys march, Washington DC, 2020

The importance of information in the modern era means that, should a significant conflict arise, the control, distribution and availability of information will come under the hands of the

military. Those who challenge the official narrative will be deemed a threat to security. Owing to the very nature of information, such control is likely to be psychological. This can already be seen in the use of algorithms to direct attention away from controversial issues, the use of facial recognition for mass surveillance, and the emergence of psych-ops, including gaslighting, astroturfing, sock puppets, fake social media accounts and deepfake videos for the purpose of misinformation.

Economist, September 2016.

The problem is not technology, but with human nature, or rather our understanding of what it is to be human. The achievements of technology have come largely from regarding nature - including human nature - in mechanical terms. If we were no more than robots, we would not object to being replaced by robots, because there would be no separate 'self' to object. We are not robots.

As individuals, we can do little about the political, economic or cultural climate we find ourselves in. We can, however, develop coping strategies to deal with the inevitable. The technology of the present era emerged from a very limited view of nature, and more importantly human nature. If the coming years present us with an inhuman future, it is because we haven't yet seen the need to question our understanding of what it is to be human.

Logic will not help in this regard. Indeed, fracturing, social division, fixed thinking and the assertion of a single truth will all come to be problematic owing to their inability to deal with constant change. For logic to work, A must always be A; if A becomes B, logic cannot function. We now live in a world of ongoing change, where many views and opinions that were once regarded as unquestionably true are now regarded as an embarrassment.

In order to deal with constant and ongoing change, we need to develop intuitive thinking, which is very different from logic. If logic is fixed, intuition is fluid. If logic depends on consistency and certainty, intuition depends on balance, inclusiveness and contextual judgement. Owing to the dominance of logic in Western culture, intuition has been neglected or dismissed as an inferior and subjective form of thinking. In a world of constant change, it will become more and more necessary for individuals to form their own judgements about what is right and wrong and by what degree.

The development of intuitive thinking will allow us to be better able to cope with a changing environment in the coming years.

We have benefited from technological progress, particularly since the time of the Enlightenment. In doing so, we have neglected the inner life. We will need to address this in the coming years, and in a very real way. The same empirical method once applied to the outer world will now need to be applied to the inner life. It could be said that the study, practice and development of intuitive thinking marks the beginning of this new direction.