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Still 'the human thing'? Technology, human agency and the future of war

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Still 'The Human Thing'? : Technology, human agency and the future of War

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Abstract

Is war beginning to escape human control? Thucydides tells us the war is one of the things that makes us definitively human; but how long will this continue to be the case as our relationship with technology continues to develop? Kenneth Waltz's book *Man, the State and War* affords one-way of answering that question. So too does Nikolaas Tinbergen's framework for understanding human behaviour and Bruno Latour's Actor Network Theory (ANT). The main focus of this article is the extent to which we will diminish or enhance our own agency as human beings, especially should when we come to share the planet with an intelligence higher than our own.

Keywords

war, technology, Image, origins, mechanisms, ontogeny, function, actor network theory, Artificial Intelligence (AI), Waltz, Thucydides, Tinbergen, Latour.

Introduction

There is a very real prospect that the character of war is changing faster than many of us imagine; that autonomous weapons systems will soon be making their own targeting decisions, and that soldiers will be co-existing in the field with the next generation of military robots. All of this would probably have amazed the great historian Thucydides who famously called war *to anthropon*, the 'human thing'. It was, in fact, the only definition that he was willing to volunteer. War throws a light on what we still call 'human nature': often the things that men do in war is what war has done to them. Even the bravest soldiers may be traumatised by what they do or witness on the battlefield, and rarely are their enemies beyond the reach of human understanding or compassion. For that reason war has been rooted from the beginning in the bitter and unyielding experience of being human.

This article sets out to discuss what it may mean to be human in a world in which machines have become collaborators, not tools. Like his fellow Greeks, Thucydides thought of humans in binomial terms: the difference between us and (other) animals, between men and women, and the 'civilised' and the 'barbarous'. Binomial thinking, of course, is merely a way of organising information – it is useful in the historical setting in which it is useful, and it is not useful in others. But what is interesting is that the Greeks did not distinguish between man and machine, in part because they had no concept of 'technology'. In the modern age it has become one of the most important concepts of all, as too has the distinction which people often draw between man and machine – a distinction which is becoming increasingly blurred. We are already witnessing the first tentative steps towards the coming post-human amalgam of human and machine, the confrontation and conflation of which remains a central theme of science fiction.

The post-human implies just another step in our evolution in one of three principal ways (1) we may find ourselves eventually displaced as the most intelligent species on the planet – at

some point machines may be able to reproduce and reprogram themselves, at which stage we may have to talk of the evolution of the first post – biological lifeforms on the planet. (2) We are also edging towards automated evolution. Darwinian selection is described as being random, purposeless, dumb and godless; automated evolution, by contrast, is targeted, purposeful and intelligent – we are behind it. (3) We are also seeing the fusing of humanity and machine. In the military field the Defense Advanced Research Projects Agency (DARPA) plans to improve human performance on the battlefield – on the one hand, re-engineering soldiers through pharmacology (drug use), neuroscience (brain implants) and molecular biology (re-engineering the human body); and on the other, investing in advanced robotics, machine learning and artificial intelligence (AI). The two we are told, will be increasingly *imbricated:* reconfigured soldiers will partner with increasingly intelligent, autonomous machines. (Imbricate, by the way, is just a fancy term for describing how things overlap.) But more than overlapping may be involved. Humans and machines won't be overlapping, as much as fusing: allowing a soldier for example to access information directly into the brain through neural implants rather than having to use a computer screen.

Can all this be regarded as an extension of our humanity, a performance upgrade, or is it a threat to the control of our own future? Are we fusing with technology or about to be replaced by it? Eventually will we have to coexist with machines on their terms, not ours; and how long will it be before they cease to be tools and instead become collaborators? Above all, what are the implications of the changing relationship between man and machine for the understanding of war in the discipline of International Relations?

Waltz and Human Nature

International Relations began life by studying why states went to war. Kenneth Waltz's seminal book *Man, the State and War* provides one of the clearest explanations. From the

date of its publication in 1959 it rapidly became what it has remained ever since, an unassailable classic. And Waltz broke new ground looking at its causes from three different angles or 'images' – a term different from the one with which most students are familiar, 'levels of analysis.' Two of those images were 'society' and 'system;'' the first was human nature. All three by the way can be thought of (to use Michael Howard's term) as 'the Thucydidean coordinates': fear, interest and honour. In Waltz's schema war was made possible by our predisposition to be fearful of others – the famous security dilemma; by the state as a political community (or the expression of a political interest), and system of states, the 'anarchical world' that we humans have forged. As Steven Pinker explained in *The Blank Slate* all that we have to deter others from attacking us in a state of nature is honour, or reputation. Forfeit that and you are asking for trouble. [1]

It is a persuasive thesis but of course it is only as persuasive as the knowledge from both science (including social science) and the humanities (including history) that underpin it. I want to go back to basics, to Waltz's first image: his fundamental understanding of human nature. An image, he wrote in the preface to the 2001 edition of his book, suggests that one views the world in a certain way, one forms a picture in the mind. [2] But there are several problems with the term images, at least as metaphorically understood. An image marks the freezing of an instant. And images on photographic paper have a habit of *slowly* becoming visible, of emerging into the light. And I would suggest that the same is true of Waltz's understanding of human nature. It is frozen in a particular moment – the time of writing – and since then in our understanding of our own humanity much has come to light.

Let us recall that in 1959 when Waltz's book came out, we thought we knew what it meant to be human: only we could think; only we could play games like chess or Go, only we could fly a plane, or compose music, or invent a mathematical law. We have spent the past 60 years

discovering that none of these things are unique to us. Computers can now fly planes without us, and can now beat us at chess. Back in 1959 Waltz was dealing with a world in which the parameters of science were still limited. In those days philosophers of the mind took it for granted that they had nothing to learn from science. Daniel Dennett's book *Content and Consciousness* (1969) was the first salvo in the battle to open the philosophy of mind to scientific findings, a battle that has now been effectively won. [3] Today the scope of what we can address scientifically has increased exponentially; science now underlies our understanding of the psychology of moral judgement, religious belief, creativity and emotion – in short it has completely changed our understanding of the human experience. Even in the case of moral philosophy cognitive science is providing new insights into the psychological and neurological mechanisms that underlie everyday moral reasoning. In short, since 1959 we have discovered that we are not as unique as we used to think.

All of which is reshaping our understanding of 'the human'. I think this was summed up best by the late Richard Rorty:

> … the Greek description of our situation presupposes that humanity itself has an intrinsic nature – that there is something unchangeable called 'the human' … Pragmatism sets aside this presupposition and urges that humanity is an open-ended notion, that the word 'human' names a fuzzy but promising project rather than an essence. [4]

To use an academic term, we are a 'work in progress'.

Why is War the 'Human Thing'?

So, let us go back to basics – let us ask what makes war human. Why we are the only species on the planet to wage war? It is often claimed that other species do too: think of ants or the higher primates. But as I hope to make clear only we wage war in the way we do and that this makes all the difference. To understand why I want to visit the work of the Dutch ethologist Nikolaas Tinbergen, who was awarded the Nobel Prize in Physiology in 1973. Tinbergen drew up a framework to help us understand every form of animal behaviour. He encouraged us to ask four questions that are as relevant to war as to everything else we do.

1. What are its origins: how did it first arise?
2. What are the mechanisms which allow it to flourish?
3. What is its ontogeny – its historical evolution across time?
4. What is its function: its adaptive significance (i.e., the role of behaviour in facilitating reproductive success)?

Let me apply all four elements of the framework to one of the central features of war: the way in which human beings are willing to die to defend their territory.

Origins

In *Man, the State and War* Waltz was much exercised over the great question of the 1950s: Were our ancestors as violent and vicious as Hobbes suggested, or had they been corrupted by property and agriculture, as proposed by Rousseau? Today, the smart money is on Hobbes. As Steven Pinker, John Gray and others argue, I think realistically, the state of nature is as good a picture of our origins as we could ask for. And there is mounting evidence writes Timothy Taylor, that we are not the only hominid species to have invented war. Some historians think that the very first tools used 2.6m years ago were quite possibly weapons. [5]

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One of the reasons humans migrated across the world was to find new resources which didn't need to be defended against others. War was the default mode. War began when there was nowhere else to flee. And the defence of scarce resources only became thinkable writes Edward Wilson, when the energy saved in territorial defence outweighed the energy expended in the risk of injury and death in defending it. [6] More than just the defence of resources is involved; we invest, and always have done, a great deal of energy in defending the homes of our ancestors, as well as the 'spirit of place' (the home of local spirits and gods).

But there is an additional factor in play. Montesquieu famously proposed that war arose not from ordinary aggression or occasional marauding, but when the weak defender hit upon the idea of organised resistance. But if you can organise the defence of your own territory, you can also organise a raid on someone else's. Aristotle famously defined war as 'the hunting of people and possession.'   'How do we organise the Defense Department for manhunts,' asked Donald Rumsfeld at the beginning of the War on Terror, and some see drone warfare as man-hunting on a global scale. It is a profession that now has its own technocratic jargon, derived in part from social network analysis and nexus topography, a pseudo-science which enables us to map the social environments that bind individuals together, and thus to identify – and also take out – the critical nodes in a network (such as terrorist cells).

Mechanisms

In 1917 the poet Edward Thomas was asked why, at the age of thirty-seven he had enlisted. He knelt down, scooped up a handful of English soil, and replied, 'literally for this'. The defence of territory is the oldest cause of war, but by the early the twentieth century it had become bound up with nineteenth century romanticism and nationalist ideology. It had gone

ideational. Like the traumatised war veteran of Virginia Woolf's novel *Mrs Dalloway*, Thomas joined up "to save an England which consisted almost entirely of Shakespeare's plays".

The mechanisms that allow war to flourish are many: literature, history, theology and philosophy and above all myth making to which all four can give rise. But it's important not to mistake mechanisms, of course, for origins. Take La Rochefoucauld's notorious remark that no-one would fall in love if they had not first read about it. He was referring, by the way, to romantic love, which we used to be told by historians was an invention of the 13th century. Henry Fink (1887) even dated its advent to May 1, 1274, when the young Dante fell head over heels in love with Beatrice. [7] No-one can claim that the Greeks only went to war after reading Homer, but Nietzsche was on to something with his claim that Homer 'spiritualised away the cruelty'. He turned war into literature and Homer packs a punch even today. *The Iliad* is still the most famous of the 'great homicidal classics' (as Tom Stoppard engagingly calls them). Eight English translations have appeared this century.

And the great classics, in turn betray our biological origins. Natural selection has front – loaded storytelling. We spend a great deal of our lives locked in fictional worlds – daydreaming, reading novels, and constructing life-narratives like Walter Mitty. 'Neverland is our evolutionary niche,' writes one evolutionary psychologist. Most of us spend far more time in the imagined than the real world, both awake and asleep. [8] Stories help us to influence people: they get us to see solutions; they encourage us when we are down. Aristotle famously distilled the art of communication down to three basic tools: ethos, the bond you create with your audience; pathos, the emotional connection, and logos, the force of your argument. What he intuited we now know to be true: what they have found at Princeton is that thanks to neural coupling the same parts of the brain are energised in the teller and listener at the same time which makes for a high degree of social bonding. [9]

Literature has an especially adaptive function – in providing us with role models and inspiring tales of heroism, it tells us that life is there to be lived in a higher emotional register than we can often find in times of peace. Seamus Heaney called poetry 'a transformative vision of reality': it reveals genuine features of reality hitherto hidden, even though it is adopted through a conscious act of the imagination. But how, of course, do we know when a transformational path reveals hidden realities (if they are there to be found); and which of those realities is truth-tracking, and which leads to error. Mark Twain probably had a point when he said that the American South had been infected by the 'Sir Walter Scott disease'. In other words, the South's dedication to the ideals that are associated with Scott's novels such as chivalry and honour helped shape its identity with fatal results in the run-up to the Civil War. Storytelling can be dangerously misleading.

But the good news is this: we may have a hard-wired predisposition to aggression and violence, but we can adjust our behaviour and reaction to reinforcement. We can generate a range of behaviours other than war and these can be reinforced with positive rewards (such as the removal of an aversion stimulus – pain). Storytelling allows us to prosecute war with a vengeance but of course we can also talk ourselves out of war by telling ourselves a different set of stories, more life-affirming than the great 'homicidal classics'.

Ontogeny

When it comes to the ontogeny of war, Edward Thomas was fighting for a nation-state. The defence of territory since chiefdom societies first transformed into states, has been state-centric. The socio-biologist Edward Wilson places much emphasis on the concept of *hypertrophy*: the extensive development of a pre-existing structure. And the similarities between states, both agricultural and industrial, pre-modern and modern are as striking as

the many variations. They merely become more complex over time. States are an excellent example of what sociologists call a 'thick' institution with collective rituals, sacred stories, initiation rites, flags and symbols, even different emotional registers and moral ecologies; and heroes who rescue it from the brink of disaster, often just in time; and of course, a language that keeps outsiders in their proper place – outside. We should think of nationalism as merely a particularly vivid example of a culturally marked outgrowth of tribalism. The central difference between a tribe and a nation is that a tribe relies largely on kinship; a nation on affinity – on an extended family for which one is willing to die even if one never meets most of its members.

Functions

The function of war is to serve itself. It is not functional, of course in the Durkheimian sense like an incest taboo. It's functional in a sociological sense: it works, which is why it is so resilient. Take the suicide bomber who has been a feature of many of the wars the West has fought since the 1980s. Rodney Stark, a sociologist of religion pointed out many years ago that the more demanding a religion is, the more it demands martyrs or enforces sexual prohibitions or even dictates which food you are allowed to eat – the more value it has for the devout precisely because of the sacrifices that must be made, and that the devout think worth making. Suicide bombers, in other words, are good both for religion and for the group. [10] They are good for the group in providing role models; they are good for religion because martyrdom, as William James argued in his book *The Varieties of Religious Experience*, is one of the 'religious appetites' that make the brand so appealing. And they're good for war because religion is one of the mechanisms which keep it going, as too is the human predisposition to emulate heroes, national or tribal who are willing to lay down their life for the nation or tribe. Throughout history nearly every society has believed that in certain circumstances death can be redemptive. A citizen can find meaning in his own death and another, seeing the sacrifice of a fellow citizen, can find her faith in life restored.

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War and Agency (1) Tools/Technology

None of this I hazard would have surprised Thucydides were he alive today and certainly not Kenneth Waltz. But did Waltz fail to take more fully into account the extent to which technology has shaped his three images? I will discuss the first image at length below, but think of the state without the technologies that enable it to communicate with its own citizens, or the technologies that underpin the international system. The state is merely a machine, a 'mega-machine', Lewis Mumford called it, which requires a range of intellectual techniques to exist, such as writing/counting, which in the course of history has been replaced in turn by non-human computers (algorithms). Think of the invention of 'management' techniques in the 19th century which enabled human beings to manage other human beings. [11] It also enabled them to socialise each other – reprogramming their skills, or in the Foucauldian sense, 'disciplining' them. And then think of the importance of information-gathering for the world system: think of new communications technologies that came on stream in the late nineteenth century: the telegraph, telephone and the radio which created a *closed political system* for the first time, one that was world-wide in scope.

But the focus of this article as I have stated is Waltz's first image: human nature. In a 2013 article, Erika Cudworth and Stephen Hobden chose to take him to task on two counts. The first is that he failed to understand the extent to which human beings have greater agency than any other species thanks to the tools and technology they use. Now, to be sure Waltz recognised the importance of technology in determining human behaviour. Though not a determinist as such he was pretty deterministic about nuclear weapons. He is famous after all for insisting that we would all be better off if every state had them. He is famous –or infamous- after all for insisting that 'More May be Better' (the title of his 1981 *Adelphi Paper)*. What Cudworth and Hobden meant was that he had no developed theory of agency except

for the sense that our unique biology and invention of culture allow us choices that no other species enjoys. In other words it could be claimed that his understanding of the 'social' was limited. For my own part I would make this critique: it's not that Waltz paid insufficient attention to technology but that he continued to believe until the end of his life that the fate of human beings is determined largely by their relationship, not with their technology but with other human beings.

In the thinking of Bruno Latour the 'social' represents more than a bonding with other people; it also constitutes an association between ourselves and our tools. Ask yourself a question. Latour writes. If we did not have a hammer to hammer in a nail; if we try to run a company without bookkeeping; if neither made a difference could we talk about agency at all? Agency, he adds, is what 'allows', 'determines', 'permits', 'facilitates', 'renders possible' or 'impossible'. Unlike our social relations with other people, it does not require intentionality on the part of the tools or technology we use. From the first use of social tools that make possible social complexity (the division of labour) we went on to invent intellectual tools such as writing and counting that made it possible to organise human society into a mega machine (civilisation) before we went on to assemble machines in the industrial era that were ruled by laws that had a sort of 'social life'. Sociology, insists Latour should be about the science of associations and not merely the science of the 'social'; it should be about our relationship with non-human artefacts as well as other people. [12]

Today, thanks to digital technology we are enhancing our agency further by empowering machines to *manage us*. Internet search engines for example now 'manage' us by reading our thoughts; directing us to what they think we might find more interesting (e.g. where to go on holiday next). They even read our moods and try to cheer us up; they filter through what we read and select web sites that they think we will find more interesting. In the case of

drone pilots, we now monitor their brain rhythms, heart rate and eye movements in order to scan their attentiveness and so ensure that they are focusing on the job. A pilot can be 'shut off' if he is thought to be getting stressed out and control transferred to others. [13]

Digital technology is reshaping our experience of everyday life; it is re-mastering our experience of time and place; it is remastering the everyday. Code, in other words, is increasingly shaping our behaviour,. The individual is no longer the autonomous subject so often enshrined in Western thinking; instead, 'our self-hood is smeared across a global mesh of nodes and links.' [14] And what's more, every time that we tweet or answer an email, we are rewiring our neuro-transmitter pathways, lighting up the reward circuits of our brain. Digital technology is so addictive for that reason. [15]

The networking between man and machine for example is also getting us to spend less and less time with other people. Immanuel Kant argued that war had a teleological purpose: asocial sociability. It is an appeal to Waltz's third image. War introduced people to other people, civilisations and societies; it forced them to trade and work with each other, and one day would transform them into global citizens. It hasn't worked out like that. Many people now live in cyber-ghettoes, in epistemic communities, talking to like-minded people; they use chat rooms to exchange their own conspiracy theories and paranoid delusions. Humans are as estranged from each other as ever.

 And here is another thought. When it comes to actually targeting other people the military may eventually come to trust machines to make tactical decisions. And it is trust – what sociologists call 'social capital' – that makes us such a distinctive species. We co-operate far more effectively than any other. Trust however is what makes war possible. And distrust makes it so resilient. The original security dilemma theorists took this to be the ultimate

tragedy of the human condition. Any tool in another person's hands can be used as a weapon; and because we can't read another person's thoughts, we can't read their intentions.

The digital age is another stage on our evolutionary road-map. To understand the way in which it is also transforming war let's go back to Tinbergen's model. Take the origins of war and the way in which terrorism illustrates the key Clausewitzian concept of escalation: the propensity of war to become 'absolute,' to escape political control. We have come to recognise that we are *Homo mimetus.* We are an irredeemably mimetic species. As Rene Girard tells us, we compete with each other in order to differentiate ourselves from each other but succeed only by becoming more and more embedded in a particular group.[16] People can only emerge from the crowd by becoming a particular part of another. And they join the new group by copying its behaviour. In Tahrir Square (2011) the protesters could see their protest unfold on giant TV screens; they literally watched themselves protesting. These days people live–stream everything from suicides to rapes. Terrorists gain status and reputation by gaining 'likes' and getting re-tweeted.

The digital world has also added to the stock of war's *cultural mechanisms.* Take storytelling which is at the heart of war and which continues to be as critical as ever. The difference is that the storyline is more likely to be found in a computer game or a movie than a written text. 'If we listen closely to the voices of the modern battlefield', writes one historian, 'we can still hear quite distinctly the echoes of ancient ones... Modern warriors speak in old tongues and answer to the ancient gods.'[17] In other words, many of us still find ourselves locked into the gravitational pull of the Greek myths. But these days the image has taken over from the text: take *Rise of the Argonauts* or the *God of War* franchise which offer a portal to the classical world for the young, as too do the film adaptations of Rick Riordan's

Percy Jackson and the Olympians. Nothing there has changed. Or rather as DARPA insists, national security now requires a scientific understanding of how such stories work. The agency's Narrative Networks Program explores how stories work in human brains at the molecular level: the 'neuro-biological impact' of narratives on our hormones, our brain's neuro-transmitters and systems of reward processing.[18]

Computer games are keeping war alive in the popular imagination. In 2005 for example the *World of Warcraft* introduced a new character - a winged serpent. If it bit you then you were instantly infected with the plague. Some victims went home to die; others allowed themselves to be quarantined; but a few deliberately got infected and transported themselves through a portal in time to carry the plague to the enemy. In no time at all the Department of Homeland Security arrived to find out why some American citizens were prepared to become suicide terrorists. In other words computer games often encourage us to replicate the behaviour we observe in the real world, or to act out roles we might not wish to perform in real life.

But perhaps, there is something else in play, something more important. So far video games, have copied war, but what if war begins to copy video games and the two eventually converge into one? The US Defense Department's Strategic Capabilities Office, set up in 2012, envisages a future in which soldiers will have at their disposal the capabilities that players have in today's computer games: maps of urban areas that will show heat signatures of the enemy (collected by satellites or drones hovering over cities for months at a time); access to deep-learning algorithms that will be able to predict the enemy's next move and computers that will convey detailed plans of battle. Imagine robot snipers, or snatch teams, or forward monitors deciding when and where to launch an attack, on the basis of probability counts of likely collateral damage. All this has arrived already in video gaming. Now war is

beginning to catch up. As the Strategic Capabilities Office observes, its chief objective is to ensure that war eventually becomes '*Call of Duty* for real.' [19]

In terms of *ontogeny* war is also continuing to change in character. The philosopher Spinoza introduced his readers to the concept of *conatus* (the Latin word for 'striving') which is built around the idea that all individual things have an innate inclination to survive by enhancing themselves, and that as a species we exhibit this tendency more than any other because of our knowledge of the future. It is the knowledge indeed that we have a future that leads to a pro-active pursuit of power fuelled by the often unexpressed, fear of finding ourselves on arrival unequal to the occasion. Future-gazing in fact is what makes us human. Scientists now tell us the future is quite literally on our minds every day.[20] Psychologists tell us that we think about the future three times more often than we think about the past. Depression arises not from the memory of past abuses, but from skewed visions of the future that lead us to over-predict failure or rejection..

Now, there are many different ways in which we can measure the evolving character of war. Take the use of tools - we are always seeking technological upgrades. One example is the bow which utilised several moving parts to transfer muscle strength into mechanical energy. Bows first appeared in the Neolithic era, and were followed in turn by the sling (which was much more difficult to operate, though far more effective). Leap thousands of years to the Bronze Age, writes Malcolm Gladwell, and the heavily-armed warrior Goliath had as much chance of prevailing against David and his sling as any Bronze Age warrior with a sword would have had against an opponent armed with a .45 automatic pistol. [21] And the upgrades have continued to appear ever since. We are about to see the *Talos* suit, with its inspiration: the *Iron Man* franchise. We will soon see liquid body armour which will be much lighter than the armour worn by soldiers today. Visit Fort Benning, Georgia, and you will find in use a

screen on a helmet that allows soldiers to see the entire battlefield with GPS sensors. This in turn will soon be supplemented or replaced by internet contact lenses through which they will be able to download information on everything, a useful prop if you are on patrol in an urban area. [22] One of the lessons of history – in so far as history reveals them - is that we are involved in a permanent cognitive 'arms race': we are always trying to get one step ahead of others. In a word, we are prisoners of our own technical ingenuity.

As to the *function* of war, the rules of Darwinian selection continue to persist. There is no necessary connection between its reproductive power (its fitness from its own point of view) and its contribution to our own fitness. Remember that there is no teleological end in evolution – no intelligent designer, no higher purpose, no end-state. Hegel thought that war would end when we no longer produced warriors: when men (entirely men) no longer derived their humanity from it. Now we know that women, too can derive their own humanity from war, and that new technologies allow them the agency to come back into the story. It is not coincidental that in many Hollywood visions of the future women have become the embodiment of the 21st century warrior. Like Katniss from *The Hunger Games* and Tris from the *Divergent* series: they are forced by the harsh conditions of a dystopian world to prove themselves the warriors they are. 'Become what you are' urged Nietzsche; and some women are doing just that thanks to technology; they too are increasing their agency, and what's more coming back into the story.

Genes allow all of us to throw a spear (a woman can do this). Culture allowed us to go one better – to develop the bow and arrow, but it was at that point that war became an all-male activity. Researchers tell us that women could hunt with spear-throwing devices that preceded bows quite as effectively as men, but they could not achieve equal mastery of archery which required greater upper body strength. The switch to the bow changed the

status of women by acting as a catalyst for some of the sex- and age-based divisions that still persist in many societies today. [23] But biology is not destiny, any more than gender involves only performance, and the ontogeny of war has changed once again. Women now make up 15% of the US Armed Forces and have won the right to engage in combat since 2016. And a recent scientific study has got us to challenge some previous assumptions even about women's physical stamina. A recent report found that they had even greater endurance over the long haul than men. [24] Another based on the results of brain-scanning technology found that women out-perform men in inductive reasoning and are better at keeping track of a fast-moving situation – in short, they tend to get less stressed out. [25]

War and Agency (2) Inter-species co-operation

in their article Cudworth and Hobden also made another criticism of Waltz: his failure to see how human agency is enhanced by our relationship with other non-human animals.[26] The 'social' in other words includes animals we have domesticated and that in turn have changed our behaviour. And that has become much clearer since 1959 when Waltz's generation thought of ourselves as the only animal with social instincts and emotional depth. We tend to talk down animal 'non-rationality' largely because we talk up machine rationality. But we now know that animals have consciousness and with it a fairly complex emotional life. With the publication of Donald Griffin's *The Question of Animal Awareness* (1976) the science of comparative psychology was born. Thanks to it we now know that chimpanzees can recognise kinship between chimps that they have never met. And we now understand that dogs show remarkable social intelligence in co-opting us. The relationship is a cybernetic one. Dolphins have been helping us fish for centuries: rounding the fish up into the nets in batches in exchange for getting fish back from the fishermen. They have not been taught by us how to do this: this behaviour has emerged over time through networking with humans.

Only recently have we begun to recognise how much we are inextricably intermixed in each other's life stories. The domestication of animals such as dogs for example may have conferred an evolutionary advantage. Those who understood and had affection for domestic animals may have been able to win more favourable marriage partners as a proxy for skill at raising human offspring. [27] Networking with other animals also allowed us to get to the top of the food chain faster. Two very different species – humans and dogs together began the relentless eradication of the great majority of large land animals except in Africa. War changed too when we tamed wild horses. The evidence from the abraded teeth of horse skeletons indicate that we first slipped a rope onto a horse's mouth as long ago as 3,700BCE. Horses are what Ulrich Raulff calls 'convertors' that unlocked the energy in plants and made it available for our use. As draft animals they were 'oat-powered engines', a single horse was able to deliver roughly 7 times the power of a single man. The paradox of human – equine collaboration is that one mammal domesticated another even though the goals of the former ran contrary to the latter's nature as a flight animal by harnessing its instinct to flee into directed movement including military attack. Horses in war also gave us the experience of speed while at the same time opening up space for colonisation and empire-building.

And our reliance on them persisted for much longer than we think. Visit the Animal War Memorial outside Hyde Park which commemorates those killed in man-made conflicts and you also see how much we relied on animals in prosecuting the two world wars. The German Army mobilised 1.8m horses in the First World War, and 2.7m in the Second – one for every 4 soldiers. Hitler's invasion of Russia required more horses than Napoleon's. And the casualty figures for the horses were much higher. About two-thirds of them perished. [28] In other words, we should see the non-human as part of a network. This does not make horses agents in the way that we are, any more than machines are intentional agents, but both have enhanced our own agency in historically ground-breaking ways.

Artificial intelligence: the fourth image?

Now to the last question – what will it be like to be human when we share the planet with intelligence higher than our own? Should we see Artificial Intelligence as a Fourth Image to use Waltz's methodology? If we may still need war, will war still need us?

AI is already transforming our lives. Companies are using it to manage stock indexes in order to optimise tax strategies and balance holdings between different portfolios. The professional money manager does this once a year; AI does it every day. Last year one IT company in Hong Kong put an algorithm on its main board. [29] But we must not mistake competence for comprehension, adds Dennett. [30] We hard-wire competencies into machines that have no need to understand. Take smart elevators that can independently optimise their trajectories, saving time and energy. They can automatically adjust their velocity to minimise discomfort to their passengers. And remember that they do all this without neurons or sense organs or other organic components of brains. They may well be highly competent, but it is a competence that does not require either comprehension, or consciousness.[31]

For the moment the debate about AI revolves around the question of whether it will enhance or reduce human agency. What will it do, for example, for 'meaningful human control' asks the International Committee for the Red Cross and the Campaign to Stop Killer Robots. By that they mean the 'manual over-ride switch': we retain human control when we take ultimate responsibility for our actions and not subcontract decision making (for example what and who to target) to a computer. But, then again, might we be able one day to build a 'conscience' into a robot, giving it a set of ethical protocols like our own biologically engineered moral heuristics as the US military have been trying to do since 2007? And would this constitute a 'moral upgrade' that will compensate for the fact that in war

'meaningful human control' is a contested concept. Think of revenge attacks for high friendly losses; or our tendency to dehumanise the enemy using racial or ethnic filters; or the deployment of inexperienced or poorly-trained troops; or the issuing of unclear orders; or even, regrettably, the pleasure that some soldiers derive from killing.

'Simply being human is the weakest point in the kill chain', writes one roboticist; 'our biology works against us.'[33] As evolutionary biologists like to tell us we still are lumbered with Stone Age brains that as the psychologist Jonas Kaplan observes, make us feel compelled to defend not only the physical but the psychological self. Individual fact-based persuasion doesn't have much impact against the much more fundamental forces of belonging and identity – facts are much less likely to change minds than to provide gratifying reinforcement of pre-existing opinions that we happen to share with other people. [34] For that reason, we are still victims of group think, confirmation bias, cognitive dissonance and premature cognitive closure – the vices that social psychologists tell us are hardwired into us by natural selection. Unfortunately, they did not develop so that we could get things right. They were designed in so that we could t*ake sides*. They were products of group selection: anything that reinforces the unity of the tribe against enemies, real or imagined is good for the group.[35]

Robots, by contrast – or we are often told - won't suffer from cognitive dissonance, any more than they will have to wrestle with the fight or flight dynamic hard-wired into the species. Further technological advances in electro-optics and acoustics will make them more resilient still, providing them with broader oversight (and possibly even greater insight) into what is actually happening on the ground. They also won't be prone to psychological problems such as 'scenario fulfilment' – the way in which cognitive dissonance reinforces pre-existing belief patterns. And they will be able to process information faster than we can. Indeed, given the

increasing speed and tempo of battle, we are increasingly liable to information overload and all its consequent permutations, including premature cognitive closure. If that is the case why not subcontract war-making to silicon life forms whose actions won't be determined by the needs of in-group solidarity. All this of course may well be a typical case of wishful thinking?

Of course, the 'moral upgrade' that scientists like Ray Kurtzweil tells us that autonomous weapon systems will bring to the battlefield begs the question whether the upgrade will only be as ethically effective as the programs their human programmers choose to give them – until the time that they can re-programme themselves? And robotic intelligence does not need to be superior to our own or even particularly smart in order to be extremely dangerous. It needs only to have been given the authority – autonomy if you will – to make important life or death decision. The real danger may lie in outsourcing more and more key decisions to machines that are not nearly as intelligent as ourselves.

One day however they may well be much more intelligent than we could ever aspire to be. Or perhaps not: scientists cannot agree. We still don't know when or whether machines will attain consciousness because we still don't know what consciousness is. Integrated information Theory (IIT) postulates that consciousness is the way information feels when processed in certain complex ways. In other words it's an 'emergent phenomenon' whose complex behaviour emerges from many simple interactions. In similar terms physicists and chemists have found that atoms behave in different ways depending on the patterns in which they're arranged. The key difference between a solid, liquid and gas, for example, lies not in the types of atoms but in their arrangement. Boiling or freezing a liquid simply rearranges them.

But if machines do achieve self-consciousness what then? Will the machines save us or destroy us? It may well depend on our time perspective. If we take the long-term we might ask, invoking the language of Brexit, whether we are in for a soft or a hard Singularity – the term that scientists use for the moment that the machines will gain self-consciousness? Will we co-exist together, and evolve a means of complex inter-dependence in a way that we cannot yet imagine? Pinker, for one, insists that there is no reason to think that a super-intelligent computer would ever be psychopathic. Psychopaths after all, are thoroughly human: they are products of natural selection shaping testosterone-sensitive circuits in a certain species of primate – ourselves. [36]

But here is another alternative which I derive from Paul Davies' book *The Eerie Silence* in which he provides one explanation for why we have not received the signatures of intelligence from an alien civilisation both older and superior to ourselves. If like us, they are biological life-forms, they will almost certainly not be able to undertake space travel. The distances and hazards from radiation will conspire to make space travel possible only for robots. And over the millennia the robots they have dispatched into space may have evolved a super-intelligence; they will be far more interested in exploring their own inner intellectual landscapes than the physical space that attracts biological life. Inter-planetary space will be their preferred arena where they can reconstruct themselves, and where their non-biological brains may develop insights far beyond our imagining. In other words, if they exist at all they are probably to be found parked in the deepest recesses of the Universe where they may be spending most of their time proving ever more subtle mathematical theorems. [37] So, perhaps, one day, the autonomous killer machines that we build may simply go on strike and take us out of the war business. There won't be a fourth image through which to study the causes of war. This may well constitute a major lack of agency but one that may allow us to escape the security dilemma and force us to co-exist with each other on more positive terms.

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But the day that machines can think for themselves is a long way off; some scientists believe it will never arrive. Until then we and our machines will be coexisting, perhaps somewhat uneasily, as they cease to be tools and become collaborators. And if in the short term the machines do go rogue we may only have ourselves to blame. We are already programming them to lie to us (who wants a nurse bot in a battlefield situation to tell you that you are not going to make it back to the field hospital in time); recently an algorithm on Facebook began to lie independently of its program, by observing the behaviour of its human users.[38] The most depressing prospect of all, I would suggest is the day that our machines begin copying our own behaviour on the understanding that this is what humans do; that war as Thucydides thought is very much 'the human thing' and that they should help us to wage it more effectively than ever.

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