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Semantron was founded in 1992 by Dr. Jan Piggott (Head of English, and then Archivist at the College) together with one of his students, Richard Scholar (now Senior Tutor at Oriel College, Oxford and Professor of French and Comparative Literature).

The photographs on the front and back covers, and those which start each section, are by Ed Brilliant.

Editor's introduction: *ex umbris*

Neil Croally

Summer 2020

Torn between the war against cliché and the rhetoric of praeteritio

In late March, purely for entertainment's sake, I had recourse to the guilty pleasure of watching some episodes of *Spooks*.[1] Soon this turned into an obsessive need to watch the episodes of all ten series. Yes, that is nearly 100 hours of television – for someone who does not own a television. But what was the attraction? At first, I merely indulged a love for representations of the secret world, however inane or fantastic. Co-incidentally and (I suppose) remarkably, there were the Dulwich connections: not only of two of the starring actors, Rupert Penry-Jones and Raza Jaffrey, but also of the use of Sydenham Hill station and the nearby woods as the site of a secret assignation away from the febrile atmosphere of the 'grid', and of Crystal Palace Sports Centre as the place where a jihadi cell met under cover of a weekly five-a-side knockabout. But moving through the series, I began to marvel at two apparently incompatible features of the show.

The first was the wish, unsurprising in a series about the security services, to dive boldly into ethical dilemmas, more specifically into an examination of Utilitarianism.[2] One can only admire the direct, no-nonsense way in which centuries of philosophical reflection are cast aside, as the spies come down without fail in favour of the majoritarian position, whatever the cost to individuals and to themselves. Of the many examples of this unsubtle philosophizing, my favourite was in the episode when a dastardly plot to blow up the House of Commons with bomb-laden submersibles ordinarily used by Colombian drug cartels is foiled by MI-5's use of a weapon of last resort, namely, an electro-magnetic pulse that stops all electrical equipment from working. Contemplating the horror of what he has done (as always, this is from the balcony of Thames House, overlooking the flickering night-time city), the head of D-Section (Harry Pearce, played by Peter Firth) is consoled by Ruth Evershed, the analyst played by Nicola Walker. She reminds him that, while a small number of people on life-support machines and the like may have died – nine, it turns out, because St. Thomas' emergency generator has fortunately kicked in –, his actions have saved thousands. Pearce, battered, unhappy, resigned, fragile, asks: 'Is it always about the Maths, Ruth?' 'I think', she replies, 'sometimes it is.'[3] There you are: problem solved; no more thinking required. A reader may object: crude utilitarians are not necessarily bad people, and they may, after all, be right. Furthermore, TV drama has neither the time, inclination nor expertise to engage in high-level philosophical reflection. This is true. However, it is noticeable – easier, this, when

[1] *Spooks*. BBC TV, 2002 – 2011: 10 series, 86 episodes. I note that, in the USA, the series was titled MI-5. I don't know the reason for this change but the word 'spooks' sets off Philip Roth's representation of some of the USA's problems with race in *The Human Stain*.

[2] Please see Aiken Furlong's piece in this volume (p. 87 – 114), which thoroughly analyses the ethical issues and which also, independently, refers to *Spooks*.

[3] Series 9, episode 1. The exchange takes place near the end of the episode (53.28 – 53.58). Available on *BBC IPlayer*.

you watch at least an episode each day – how less and less time is given over in the series to the necessary agonizing over these sorts of difficult moral decisions. Speed of (non) thought can become a habit. Lack of attention to nuance can become a propensity not just to decisiveness but also to rude calculation, to carelessness, to sociopathic judgement.

At the same time as this rather conventional philistinism, *Spooks* displays a gleeful, postmodern abandon in its representation of self. Set up as a drama about people who are always pretending to be other people in order to discover the truth about other people, who are also often pretending to be other people, the characters become less and less sure about their own identities, about identity itself, as well as about whom to trust. This hall-of-mirrors, multiple-personality, fractured-identity feature of the show reaches its apogee in the character of Lucas North, played by Richard Armitage. When he first appears in the show, North, arrested while on operation, has been (tortured) in a Russian prison for 8 years. He is returned to the UK as part of a swap. This is pretty generic so far. And, as we need to root for a new hero, North is a good operator: tough, resilient, and resourceful. But it begins to emerge that he is not who he says he is. He has in fact murdered another young Englishman (the real Lucas North) while working abroad in Senegal. The real Lucas North had already been selected for MI5, in which our hero seamlessly takes his place, incredible though it may seem that a security service dedicated to identifying people by ransacking and playing with identities cannot identify someone it has itself selected. But what we now have is not only an actor playing a character who plays other people, but an actor who plays a character who is playing another person playing other people.

As representative realists,[4] we may be used to the idea that what we experience is not the external world, but only an image or a representation. But the spooks, the spectres, or the ghosts, seem to be mounting up in this increasingly crazed scenario.[5] The show – in its representations of the blurrings and overlappings between actors, spies and ordinary people, in its depiction of betrayal, deception and ambiguity as the common currency of social exchange – is a smorgasbord of self-referentiality, that jewel in the crown of postmodernist literary theory. Of course, committed postmodernists will relish noting that we are watching actors playing people who are acting in a drama where their job is to play a part (as well as, out of duty, their part). Further, as new actors are brought in for maternity cover, to bring fresh blood, or to allow a departing actor's career move, those actors are very clearly trying to prove themselves. Has their 'performance' been good enough to warrant a 'run' in the team? Has their audition for MI-5, or 'MI-5', been successful? But perhaps *Spooks* does display and play with these postmodern insights: the self is multiple; the common observation about some actors – that they seem not to have their own personality at all – is actually true of all of us.[6] Or, to put it another way, we delve

[4] A respected colleague once asked me (rhetorically, of course): 'Surely we are all representative realists?' For a good introduction to John Locke and representative realism, see Dunn 2003.

[5] In his book *Spectres of Marx*, Jacques Derrida, in his typically punning way, introduced the concept of 'hauntology' (which, in French, sounds very much like *ontology*). Ghosts of the past, neither quite absent nor present, haunt our present. Aren't characters on TV or film always sorts of ghost? For Derrida on spectres and screens, see 1993: 100—1: 'The spectre is also, among other things, what one imagines, what one thinks one sees and which one projects — on an imaginary screen where there is nothing to see. Not even the screen sometimes, and a screen always has, at bottom, in the bottom or background that it is, a structure of disappearing apparition.'

[6] Thomson 2015, mainly concentrating on the differences between Olivier and Brando, is an excellent investigation of this topic.

into our wardrobe of masks for each role we play; we search for something to make (our) voice(s) heard, something to make sound(s) through (a *persona*). We are not grounded, and have no depth. *Spooks*, two-dimensional as it necessarily is, also has no depth. It represents MI-5 not so much as a security service as a security surface.

As it happens, while I binge-watched *Spooks*, I was reading John Farrell's biography of Richard Nixon, and Sue Prideaux's of Friedrich Nietzsche. Both books require as much a commitment of time as *Spooks* and, while apparently different both to each other as well as to the TV show, they both betray an interest in the varieties and compromises of power, in the multiplicity of self-presentation, in the distortions of history and the unreliability of narrators.[7] So, in the shadows of disease and political turbulence, I have chanced upon an *ad hoc* trinity of reflections on power, and on the limits and possibilities of the self.

A few words about this year's issue. I am very happy that I have been able to include the arresting and evocative photographs taken by Ed Brilliant. The writing has been organized under headings taken from Ancient Greek (translations are given below). This has allowed previously unforeseen groupings of essays: drone technology sits next to Chaucer, for instance, and quantum theory is tied up with law and morality. The use of the Greek concepts is a reminder that the divisions of human knowledge are local and historical rather than fixed.[8] Many of the essays in this volume are written by students now in their final year at the College. However, there are a number of essays which were entered for the Gareth Evans Essay Competition (open to Middle School students), with the youngest of the essay writers currently in Year 9. (Essays can be reached from the contents page by clicking on the title.)

Neil Croally
Editor
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Works cited

Derrida, J. (1993) *Specters of Marx*. London
Dunn, J. (2003) *Locke: A Very Short Introduction*. Oxford
Farrell, J. (2017) *Richard Nixon: The Life*. London
Foucault, M. (1970) *The Order of Things*. New York
Prideaux, S. (2018) *I am Dynamite! A Life of Friedrich Nietzsche*. London
Roth, P. (2000) *The Human Stain*. Boston
Runciman, D. (2019) *Where Power Stops. The Making and Unmaking of Presidents and Prime Ministers*. London
Thomson, D. (2015) *Why Acting Matters*. New Haven

[7] Runciman 2019 is a more journalistic but no less entertaining treatment of some of these same themes.
[8] For a lengthy discussion, see Foucault 1970.

The Greek terms

poiēsis	*ποίησις*	making
technē	*τέχνη*	skill, craft
oikos	*οἶκος*	house, home
logos	*λόγος*	word, reason, logic
historia	*ἱστορία*	enquiry
polis	*πόλις*	city, state
nomos	*νόμος*	law, custom
phusis	*φύσις*	nature

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logos

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Female temptation and devastation through hair in epic poetry

Alex Mellis

Bishop Joseph Hall personified the sin of mankind as a woman with a 'loose lock erring wantonly over her shoulders'. Spoken between 1641-56, this image continues in John Milton's epic poem *Paradise Lost*, first published in 1667, and highly resembles the character of Eve, the first female and vehicle of the Fall of Man owing to her ultimate transgression. Alexander Pope's satirical mock-epic poem *The Rape of the Lock,* first published in 1712, clings closer to this image with the story of the theft of a lock of hair from the alluring woman Belinda. Throughout this genre of poetry, the trope of an enticing yet destructive woman is prevalent, as established by the Fall of Troy fought over the queen Helen, said to be the most beautiful woman at the time. The hair appears to represent a certain femininity both pursued and feared by men at the time, and loose hair is a rich and frequent, if problematic, symbol of womanly lure and vice.

There are several descriptions of Eve's hair in *Paradise Lost*, all appearing to reinforce or foreshadow the disobedience to come while metaphorically or literally veiling her mind and spirit with her beauty.

> So spake our general mother, and with eyes
>
> Of conjugal attraction unreprov'd,
>
> And meek surrender, half embracing leaned
>
> On our first father; half her swelling breast
>
> Naked met his under the flowing gold
>
> Of her loose tresses hid. (iv. 492-496)

Here, the 'loose tresses' are highly significant, with the same description as the 'loose lock' of Hall's image. The adjective 'loose', here, suggests a certain carelessness, or more likely unbridled disobedience and even chaos central to the character of Eve, who defies the command of God to perform 'man's first disobedience' (i. 1), the ultimate transgression of eating the apple in the garden of Eden. Furthermore, the adjective also carries a meaning of sexual promiscuity or indiscretion, reinforced by the explicit nature of her 'swelling breast \ naked', as well as the pair's lustful and ostensibly sinful intercourse after they eat from the tree. Their nakedness, and both sinful and sexual acts, would be somewhat shocking to the seventeenth-century reader and appears to fuel the common characteristic of a sexually excessive woman active in literature previously and thereafter, a character which often leads to a decline or degeneration as seen with the Fall of Man. The hair concealing this act is also important as this loving yet seemingly immoral act is 'hid'. This appears to continue this idea of feminine destructive and seductive trickery and almost personifies the hair as it appears a part of Eve's sly presentation. This act of concealment is also very similar to the description from lines 499-500, as 'Jupiter \ on Juno smiles, when he impregns the clouds', both objects obscuring a nude sexual act and appearing to be agents in the apparent deceit at hand. This idea again appears earlier in the book:

She as a veil down to the slender waist

Her unadornèd golden tresses wore

Dishevelled, but in wanton ringlets waved

As the vine curls her tendrils, (iv. 304-307)

The hair is once again used as a façade, a 'veil', cementing the common trope of female beauty being deceptive and dangerous. Bishop Hall's description emphasizes this, also featuring 'a painted hide shadowed with a fan not more painted' and 'painted cloth and skin', displaying the anxiety around female presentation and cosmetics, and the attributed dishonesty. Additionally, Eve's hair being 'dishevelled' and 'unadornèd' not only reinforces her characterization as somewhat unruly and rebellious before the Fall; it also suggests a certain uncontrolled madness seen in classical mythology, often in dreadful mourning or Dionysian cult celebration. Lastly, as the 'vine curled her tendrils', Eve more closely resembles the leafy garden the pair are in, but the image connotes an ominous creeping or even strangulation.

Alexander Pope's mock-heroic poem *The Rape of the Lock* was published 45 years after Milton's own epic and focuses on the theft of a lock of a beautiful girl's hair by the noble Baron. However, unlike preceding epic writers such as Milton, Virgil or Homer, Pope satirizes the genre by presenting this trivial theft in the grand scale of other epic poems. This begins with the title, as although 'rape' here means to snatch or carry off, the violent sexual connotations of the word heighten the gravity of the poem as well as criticize eighteenth-century materialism and self-obsession. The object of the verb is almost juxtaposed and emphasizes this criticism, as, rather than the kidnapping of a woman or queen such as Helen of Troy, it is referring to a lock of hair. The stakes are thereby comically lowered to a personal and material level. With descriptions of the hair itself, the trope of allure and deception is again present. The 'curls' are 'well conspir'd to deck . . . the smooth ivory neck' (ii. 21-22). Once again, the female character is described metonymically reduced to her hair, which itself appears to have more agency and cunning than the person attached. Nor are any of these descriptions in any way positive or endearing, with 'conspir'd' inciting suspicion into the reader by suggesting the 'curls' are working together as an antagonist in the poem. This idea is taken further, even presenting the hair as a beautiful, tempting trap designed to ensnare the unaware man:

Love in these Labyrinths his Slaves detains,

And mighty Hearts are held in slender Chains.

With hairy sprindges we the Birds betray,

Slight lines of Hair surprise the Finny Prey,

Fair Tresses Man's Imperial Race insnare,

And Beauty draws us with a single Hair. (ii. 23-28)

Pope presents Belinda's hair here as an obvious trap into which countless men will gladly and naively fall. The two sexes are here distinctly distanced and separate, as womankind is objectified and reduced to the single superficial quality of 'Beauty', and is contrasted with 'Man's Imperial Race', the curiously powerless victim in this exchange. Appealing womanly qualities are applied to the traps and snares in

this extended, almost Homeric metaphor, as the prey is ensnared by 'fair tresses', an adjective normally applied to a beautiful maiden rather than a snare, and the masculine yet vulnerable 'mighty hearts' are 'held in slender chains', with 'slender' suggesting a fragility and perhaps femininity and once again flipping the gendered power dynamic. Here, scepticism and suspicion of womanly beauty and desire is once again evoked, with the dichotomized imagery of brilliant, personified 'Beauty' incarnate, and the terrible theme of the perilous and devious snares and traps presenting the female figure as bipolar and dishonest, purely through the relation to the woman's hair and the metaphor of entrapment . However, the granting of female agency through the active, restraining actions of the metonymical hair is arguably positive as despite being 'slender' and 'slight', 'Man's Imperial Race' is tricked and triumphed over, lending more credibility to the text as a more pro-feminist mutation.

In Pope's poem, Belinda's lock, with its virginal, pure, and here, even celestial qualities, is the undeniable and sought-after subject of the story. The theft of such a lock is presented ironically on a truly epic scale, being compared to the fall of the 'Imperial tow'rs of *Troy*' (iii. 174). This is an allusion to Homer's *Iliad*, both the foundation of the genre Pope satirizes and arguably of western literature, and the comparison to a benign theft of a single curl of hair heavily criticizes eighteenth-century vanity and elitist self-importance. The conclusion of the poem appears to elevate Belinda and her hair to a godlike status, as the 'Muse shall consecrate' her 'Lock' to 'fame' (v. 149). The ancient link is reinforced with the appearance of a 'Muse', often appearing as an inspiration or audience to ancient Greek and Latin poetry and literature, and here both divining Belinda's hair and perhaps Pope's poem as an Epic. The godlike appearance of the tresses continues from earlier, with the illustration of a 'radiant trail of hair' (v. 128) continuing the celestial theme as well as alluding to the classical god Apollo, perhaps even acting as a comparison. The hair holds beautiful, divine qualities almost justifying its theft by the Baron, as 'not all tresses . . . shall draw such envy as the lock you lost' (v. 144-5).

In both Milton's and Pope's epic poems *Paradise Lost* and *The Rape of the Lock*, the trope of a sly, rebellious and often characteristically beautiful woman is reinforced. They are often metonymically reduced to their hair, which in itself can be personified and granted qualities seen in the women, as well as being quintessentially feminine and fertile. However, the often active nature of the hair is both troublesome and empowering, being seen both to conceal potential sins or ensnare a naïve admirer. Nevertheless, the presentation in both poems is overall endearing, as the divine attractiveness of the figures are emphasized and accentuated to often be the subject of destructive desire on the part of male pursuers.

Bibliography

Fish, S.E. (1998[2]) *Surprised by Sin*. Cambridge, Ma.
Hall, J. *The Works of Joseph Hall*. 5th edition. London
Milton, J. (1667) *Paradise Lost*. 2000 edition. London
Pope, A. (1712) *The Rape of the Lock*. 2007 edition. London

The point of madness: surrealist cinema's struggle for survival

Alexander Lewis

'I believe in the future resolution of these two states, dream and reality, which are seemingly so contradictory, into a kind of absolute reality, a surreality.'

- André Breton

André Breton's revolutionary vision for Surrealism was never realized in his lifetime. Surrealists believed that through automatism and liberating the unconscious mind, they could form a more empathetic society. By viewing surrealist art, literature or cinema with its dream-like and hallucinatory qualities, one could gain a window into the artist's unconscious mind, and looking at life from another person's unfiltered perspectives in this way, one could acquire a new advanced form of empathy, and fresh perspectives on major issues. Surrealism in Breton's lifetime realized only one half of his hope, and in that achieved very little.

Since the birth of Surrealism, it has transcended various mediums and disciplines, from comedy and music to the more famous surrealist cinema, art, and literature. In the origins of Surrealism, the key mediums were art and literature, with works such as Max Ernst's *The Elephant Celebes* and Breton's automatist book *Les Champs magnétiques*. These media had a number of advantages for early surrealists, primarily in their accessibility to creators in only needing a pen and paper, and their suitability to the automatism practised by many surrealists. However, they also had some disadvantages. Literature and Art were to many consumers inaccessible genres, particularly the working class who would be key in the Marxist revolution that Surrealism supported, if it was to ever succeed. As well as their perceived inaccessibility, they also had a far smaller potential audience, as the distribution of art and literature was far more limited. These disadvantages were where Surrealist cinema could thrive.

Through film cameras, surrealists could capture a surreal image in a more authoritative and 'real' way, through camera techniques such as superimpositions, overexposures, accelerating or decelerating footage: they could create novel images which maintained a photographic quality making it difficult to decipher the real from the surreal. Early surrealist filmmakers such as Luis Buñuel and Jean Epstein realized that the camera could capture the dream-like quality of their vision while maintaining the façade of an unquestionable reality. The most important landmark for surrealist cinema was the release of *Un Chien Andalou* in 1929. The film's creators, Buñuel and Dalí, used shocking imagery such as the slicing of a woman's iris with a razor and the film's non-existent narrative in an effort to provoke and agitate the avant-garde bourgeoisie of the Parisian art elite. The film's creation process was essentially the stringing together of Buñuel's and Dalí's dreams and only had one rule: 'no idea or image which might lend itself to a rational explanation of any kind would be accepted.' The film was a huge success, eliciting great praise from the very people it sought to insult, and earning its creators entry to Breton's close-knit group of surrealists. However, despite the film's spreading the surrealist style and

movement, it did not achieve Breton's goal. The film only presented a dream world, and was consequently absent of almost all meaning, doing little to promote the Surrealist's aims. From the beginning, Surrealism was defined by others, and there was nothing to prove or disprove anyone's interpretation.

As Surrealism developed, it suffered from its lack of a cohesive identity, perhaps inevitably due to its nonconformist and unlimited subject area. None of this is clearer than in Salvador Dalí, the most famous surrealist; as André Breton began to reaffirm Surrealism's Marxist ambitions, he began to alienate artists such as Dalí who were far more focused on the expressive and even commercial aspects of Surrealism. Relatively soon after joining the Surrealists, Dalí left for America and found huge success on his own. This was the issue that Surrealism faced; Dalí had stolen the Surrealist name and moulded its identity to suit his own purpose. As its most famous artist, he defined what Surrealism meant and effectively neutered any political impact that Breton hoped it could achieve. Dalí's commercialization of Surrealism can easily be seen in his collaboration with two major capitalist companies, Disney and De Beers. De Beers used Dalí's work alongside the slogan 'Diamonds are works of art' to establish one of the most exploitative and immoral industries in the world today. And while *Destino,* the short produced by Disney and Dalí is a masterpiece, the ruthless business practices of the Walt Disney Company and Disney's own problematic views undoubtedly undermined the liberal ideals of Surrealism.

The dichotomy between Surrealism's roots and what it came to be associated with can be seen in the resurgence of surrealism in films in the 1970s. Works from directors such as Terry Gilliam and David Lynch, maintain surreal visuals and style, but differ significantly from the films produced by filmmakers early in the surrealist movement. One major area is in their length. Early Surrealist films were almost entirely short films while those of the 1970s were feature-length. In these films, directors often tried to reconcile dreams and reality in their own way. This quickly became a pitfall of surrealist cinema While attempting such a task, many began to rationalize the surrealist elements of their films. Surrealist scenes began to be reserved for Hollywood dream sequences, nightmares, drug trips and psychotic episodes, the fine balance that Breton dreamed of, although attempted, remained unrealized, as reality seemed to ceaselessly dominate that of the dream. In films such as Gilliam's *Brazil*, although being more expansive in its use of Surrealism than merely for hallucinatory scenes, it still drew a line between dream and reality, rather than intertwining them into a true surreal film. Such films, owing to their rationalization of the surreal, could face accusations of betraying their surrealist roots.

Hailing from films such as *Un Chien Andalou*, with its confused sense of time and space, and its absent narrative, the surreal films of the 1970s seem to resemble far more the traditional films of their time. However, it would be wrong to fling accusations of betrayal at such films without appreciating their development of surrealist cinema. Although perhaps not fully succeeding, far more than their predecessors, such directors had begun to refine Surrealist cinema where it could aspire to be what Breton had hoped for. Films from such directors as Lynch and Gilliam incorporated meaning and interpretations into their films, attempting to tell a story through surrealism while still maintaining the enigmatic beauty of the surreal. There was nothing for such directors to betray, as the surrealist cinema of the 1920s and 30s was far more focused on disrupting the cultural expectations and restrictions of the medium to allow for future developments. *Un Chien Andalou* was a film that didn't tell a story or take a stance, but instead forged a path ahead for future films. Without *Un Chien Andalou*, surrealist

cinema couldn't have matured into what it is now, but without the refinement that directors like Lynch, Gilliam and Jodorowsky provided it would merely be a form of eccentric entertainment.

One recent film which marked another milestone in Surrealist cinema was Robert Eggers' *The Lighthouse* released in 2019. The film is set on an island lighthouse, and studies what happens on the island as the two characters are left alone over an undisclosed time. Eggers employs a new strategy in this film, first creating a situation grounded in reality, and using period-perfect sets, costumes and dialogue, to reinforce the realism. Eggers then intertwines the film with surreal stylized visuals, dialogue and moments. Through this he creates a film where dream and reality are inextricably linked and the audience is forced to form their own interpretation ranging from those viewing the island as a sort of Purgatory to those who believe that there is only one character and that the other is an insane projection. Eggers used black and white film and an almost square aspect ratio to further imprint a surreal feeling onto every scene. While also lending an aged feel to the film encouraging immersion in its period setting, the conscious decision to film in black and white forces an almost otherworldly and less precise feeling on the film, making viewing the film a dream-like experience, while the square aspect ratio encourages feelings of constriction and enhances the hallucinatory and uncanny nature of the film. The film, despite the importance it grants the story's various interpretations, has a number of similarities with *Un Chien Andalou* and other surrealist films. For example, the film has a deeply visceral scene where Pattinson dashes a seagull against a rock, while other scenes feature Dafoe's repeated flatulence. Like Dalí and Buñuel, Eggers uses juxtaposition frequently, but perhaps more importantly, a viewer seeing either *The Lighthouse* or *Un Chien Andalou* will take away something entirely different as another person who saw the same film. *The Lighthouse* was a major evolution in surrealist cinema, dramatically improving upon the blending of dream and reality, but at this point one has to ask: will Breton's vision ever be realized?

Perhaps it is the fate of Surrealism to never find the perfect balance, after all reality and dreams are by their very nature subjective, one man's dream is another man's reality. It is likely that for many such a balance had already been struck years before *The Lighthouse* and perhaps even before the resurgence of surrealism in the 70s. And equally likely, many people will never see their resolution of dream and reality. Or perhaps they may one day and then lose it the next. Reality is always shifting just as our dreams and aspirations are also evolving. Breton's fabled resolution may have come and gone. At the point where dream and reality would cease to fluctuate and there would be an exact point of resolution, Surrealism, its core purpose as a force for change, would lose all importance.

Sources

André Breton, *The Surrealist Manifesto* (originally published in 1924)
Luis Buñuel (1982) *My Last Sigh*. Minneapolis
The Dalí Museum: https://www.youtube.com/watch?v=rp2PRA0qaD4
Roger Ebert: https://www.rogerebert.com
Facets: http://facets.org/blog/exclusive/surrealist-cinema-and-the-avant-garde/
Film Inquiry: https://www.filminquiry.com/surrealist-cinema-100-years-psychedelia/
Metropolitan Museum: https://www.metmuseum.org/toah/hd/surr/hd_surr.htm
Smithsonian Magazine: https://www.smithsonianmag.com/

The future of solar power

Dennis Orlov

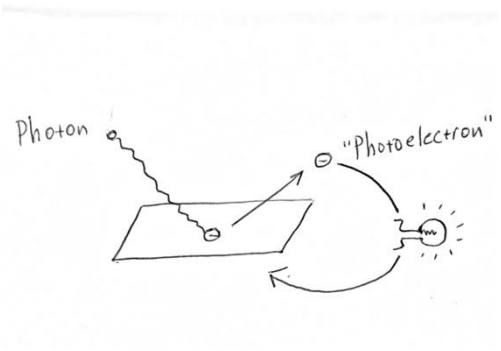
Humans are truly an energy-hungry species. We have this strange obsession with extracting all the energy we can from everything around us. And even if it isn't from DIRECTLY around us, we will search underground or investigate the far reaches of the cosmos to power our various commodities, tools, and cities that define the modern-day Earth. The expense of maintaining and advancing a modern-day Earth, however, lies in how we harness the energy to power it. Fossil fuels, (namely coal, crude oil, and natural gas) have been the main source of this energy, accounting for around **80%** of the world's primary energy use. As the name suggests, fossil fuels are derivatives of plant and animal fossils that have been put under pressure for millions of years, with crude oil and natural gas coming mainly from water-borne lifeforms such as plankton as well as plant material, and coal from decayed trees, as well as mostly land-based plant material (this is, however, a generalization – fossil fuels can be composed of all deposits of decayed organic materials). The aforementioned fuels all have one thing in common: they are hydrocarbons, and therefore burn well. And through this shared quality, their use as an energy source has evolved over the years, from lighting up oil lamps for simple heat and light, to natural gas power stations (which accounts for the largest source of energy in the UK) for powering capital cities.

Over the past few decades, the costs inflicted on third-parties through the usage of fossil fuels as an energy source have become more apparent through research, through which they have been linked to global warming (owing to emission of carbon dioxide, and leading to climate change), destruction of the environment due to extraction (most commonly mining and drilling), and the release of various chemicals that cause damage to both the environment and people's general health (such as sulfur dioxide, which kills two birds with one stone by causing both acid rain AND pulmonary inflammation). This, combined with the limited availability of fossil fuels as well as rising energy needs, is the recipe for both an energy crisis as well as an environmental crisis. The solution is a switch to a different energy source.

While various different energy sources have been experimented with in relation to the realization of said crises – namely, nuclear power (using heat generated from chain reactions caused by nuclear fission to heat water into steam, where a turbine can convert this kinetic energy into mechanical energy, after which an electrical generator converts this into electrical energy), as well as various forms of renewable energy –, the vast majority of them aren't capable of meeting the ever-rising energy demands of civilization. Currently, the world demand for power sits at around 16 terawatts, which is expected to rise with every year (about 30 TW expected by 2050). Wind turbines can feasibly produce around 2-4 TW, biomass 5-7 TW, tidal energy at around 2 TW, and geothermal can produce 9-7 TW (however, only a small fraction of this is feasible due to significant drilling and exploitation costs). By harvesting energy from the largest fusion reactor in the Solar System – the Sun- the Earth's energy needs can be met. Hypothetically speaking, if the earth was covered entirely in solar cells with 100% efficiency, we could generate 1.2x10^5 TW of energy, and around 3.6x10^4 TW if all land on earth was

covered in solar cells. While this is a hypothetical scenario, the difference in energy that can potentially be harvested is still substantial.

Solar cells, also known as PV (Photo Voltaic) cells, were first introduced in the 1950s. Photons (light) are converted into electricity via the use of semiconducting materials which exhibit the photovoltaic (similar to photoelectric) effect. A solar panel is composed of much smaller solar cells, which are made out of silicon (being the second most abundant element on earth) in a crystalline structure. The cells are made out of two types of silicon, a p-type silicon, which contains an excess of 'holes', and an n-type silicon, which contains an excess of electrons in its outer shell. They are known as 'p' and 'n' type silicon because they hold a negative and positive charge, respectively. This is done by 'seeding' or 'doping' each silicon with another element, namely phosphorus into the top layer of silicon (adding extra electrons) and boron into the bottom layer of silicon (resulting in fewer electrons, ergo a positive charge). Because one of the types of silicon has an excess of negatively charged electrons, and the other has a deficit, they have opposite charges, creating an electrical field. The border between these two different types of silicon is known as the p-n junction. By understanding this, it is possible to see how through the photoelectric effect the solar cells can create a circuit and generate electricity.



When a photon (a particle of light) strikes a material that exhibits the photoelectric effect, it gives an electron enough energy to free itself from the material (which, thereafter, is commonly known as a photoelectron), as shown in figure 1. This can also be shown where:

Energy (of the photon) – Energy taken to release the electron = Kinetic Energy of the electron

The above equation can be changed into something that is more standard by employing Planck's constant, a number that links the amount of energy a photon carries to its respective electromagnetic wavelength. This constant is denoted by the letter 'h' and is equal to 6.62607015×10^{-34} Js (Joule-seconds). To calculate the photon energy, one must multiply the frequency of the light in hertz by Planck's constant. Because the frequency (**f**) of light (or other repeated, continuous actions) is equal to its velocity (speed) divided by its wavelength (distance of one 'repetition'), the equation for photon energy results in $\mathbf{h \bullet c/\lambda}$, where c is the speed of light, and $\boldsymbol{\lambda}$ is the wavelength. The energy taken to release the electron is known as the 'work function', or the minimum energy (from the photon) required to release an electron from a specific surface (different elements have different work functions) and is denoted by the Greek symbol '$\boldsymbol{\phi}$'. Therefore, the Kinetic Energy (**Ek max**) of the photoelectron is equal to $\mathbf{h \bullet c/\lambda - \phi}$, or $\mathbf{hf - \phi}$.

When an electron is freed from the outer shell in the silicon, it is drawn to the n-side of the silicon, pushed by the electric field created by opposite charges. This electron is collected in the top layer of the solar cell, (which is made out of a conductive material) and flows through an external circuit, where it can power appliances or be stored as electrical energy in batteries. The electron (now without charge)

flows through the circuit back into the solar cell, now entering one of the holes in the Silicon p-side, so nothing is used up or worn out. As such, electrons act as the only moving part of a solar cell.

As it stands right now, solar panels have an approximate efficiency of 15-20% in converting sunlight into energy that can be used in homes. Whilst this may not seem like much, it is far more than the approximate 0.3% efficiency of the sunlight used to grow plants and burn them (i.e. biomass). The theoretical limit for a single-junction cell would be around 33%, as going higher than this would require the layering of solar cells. By layering solar cells, different elements with varying work functions can capture the low, medium, and high-energy photons, resulting in efficiency that is in the 40-50% range. However, in order for the panel to work, the crystallographic lattice (which is also present in silicon cells) has to run through the entirety of the cell, and for that to happen the materials must be grown very slowly so that the lattices align – this being a very expensive process (costing around $40,000 per square metre).

Through higher levels of research and development, more and more different compounds have been tested in solar cells, with two of these standing out in particular. When using a hybrid organic-inorganic lead or tin halide-based materials, it allows for high efficiency combined with low cost. These are both known as perovskite-structured compounds, which are named after a type of mineral found in the Ural Mountains. Because perovskites have a layer-based structure, they have a broad absorption range, are cheaper to produce, and absorb more light than silicon, allowing for thin and even flexible solar cells/panels. Furthermore, perovskite-based solar panels have a high absorption coefficient, which means that the rate of decrease of intensity as it passes through the material is high, resulting in better absorption of sunlight. All of this means that you end up with a cheap, flexible, and more efficient solar panel than normal silicon PV cells. This has proved to work very well, with the highest ever recorded single-junction efficiency currently standing at 27.3% (using a 1cm^2 solar cell), accomplished by a tandem silicon-perovskite cell.

With such advances in this technology occurring, it is easy to see how this technology could be seen as what will power the future. And in fact, this technology has already evolved to the point where it is seeing a huge increase in use around the world. The increase in installation of solar cells has exceeded even Greenpeace's expectations, as shown in figure 2. Furthermore, in areas with a high concentration of solar radiation, such as Saudi Arabia or the United Arab Emirates, the technology can allow for electricity to be cheaper than when using other sources. In the UAE, the **Mohammed bin Rashid Al Maktoum Solar Park** covers 77 square kilometres, situated around 50 kilometres south of the city of Dubai. Whilst the global average for producing electricity from coal stands at around £0.037 per kilowatt-hour (this is equal to one kilowatt of power sustained for one hour), the cost per kilowatt-hour that the owners of the solar park are pledging to sell for stands at around £0.02 – this being around 46% cheaper than the price of coal.

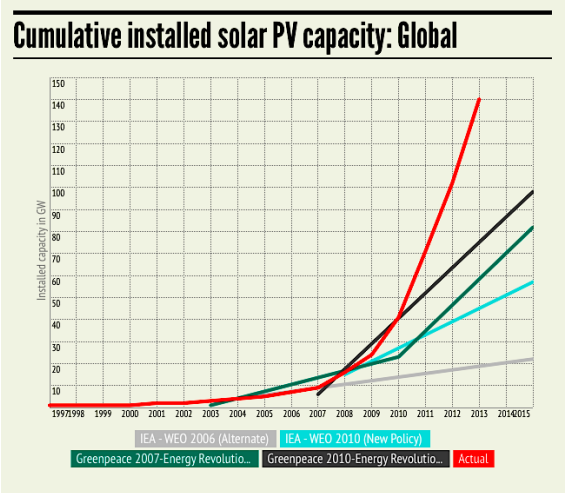


Figure 2

However, despite all of its advantages, there are still drawbacks to using solar energy. The first being that. owing to perovskites and similar innovative technologies only being recent, solar cells are still

generally quite expensive, especially when aiming to optimize efficiency. Furthermore, as the vast majority of cells that are currently in use are made from silicon, it takes a huge amount of time and resources to change panels in large solar farms/parks. Another key issue is that solar radiation is not evenly distributed around the earth. The amount of power that can be generated from solar radiation can be shown with the following formula (and therefore be used to compare how much each country can generate):

Energy = Total Solar Panel area • Solar panel efficiency • Annual average solar radiation • performance ratio

E = A • r • H • PR

(The performance ratio is defined as an evaluation of the quality of a photovoltaic installation.)

If taking the same exact solar panel, with **A, r,** and **PR** remaining constant, the only variable quantity is the annual average solar radiation, measured in Kilowatt-Hours per metre squared or kWh/m^2. In Saudi Arabia, the quantity is around 2600 kWh/m^2, whereas in Norway, this stands at around 200 kWh/m^2. This means that certain countries have a considerably larger potential for solar power production, unless there is a way to store and transfer said energy, which leads to another problem: solar energy storage is expensive. Solar farms and parks which have access to an excessive amount of solar radiation (such as the one near Dubai) must invest huge sums of money into Lithium-Ion batteries, and even more into finding methods to transfer this energy. Finally, solar panels themselves aren't entirely environmentally friendly. The production of solar panels involves the handling of hazardous and toxic compounds, and their shipment indirectly leads to greenhouse gas emissions from transportation vehicles.

To sum up, photovoltaic energy has been, and still is, an ever-increasing and revolutionary form of energy. With every year, solar panels become more efficient, cheaper, and induce a wider range of applications than before, even seeing some use in systems such as drones. While there is an environmental debt to pay with production of solar panels, it is still miniscule compared to the amount of pollution and greenhouse gas emissions that result from the combustion and processing of fossil fuels. And, as storage of energy and transportation of energy are being more researched, the world could one day redistribute the energy resulting from solar hotspots, and power the world as we know it.

Bibliography

Dechert S. (2015) '*Greenpeace Aces Renewable Energy Forecasts. Surprised?*' Clean Technica. Available at: https://cleantechnica.com/2015/03/30/greenpeace-aces-installed-renewable-forecasts-surprised/. [Accessed 5 August 2019]

Dhar M. (2017) '*How Do Solar Panels Work?*' Live Science. Available at: https://www.livescience.com/41995-how-do-solar-panels-work.html. [Accessed 2 August 2019]

Husseini T. (2018) '*New world record set for perovskite solar cell efficiency*', Power Technology. Available at: https://www.power-technology.com/news/new-record-perovskite-solar-cell-efficiency/ [Accessed 5 August 2019]

Moore A. (2017) '*Collecting Electrons from Photovoltaic* Cells', Advanced Science News. Available at: https://www.advancedsciencenews.com/collecting-electrons-photovoltaic-cells/. [Accessed 2 August 2019]

Photovoltaic-software.com. 'How to calculate the annual solar energy output of a photovoltaic system?' Available at: https://photovoltaic-software.com/principle-ressources/how-calculate-solar-energy-power-pv-systems. [Accessed 16 August 2019]

Snaith H. (2017) 'Photovoltaic solar energy: from the photoelectric effect to global power generation and beyond', Royal Society. Available at: https://royalsociety.org/science-events-and-lectures/2017/04/kavli-lecture/. [Accessed 1 August 2019]

Apocalypse Now: the dehumanization of American soldiers in the Vietnam War

Hal Howe

Apocalypse Now (1979), directed by Francis Ford Coppola, is without a doubt one of the most influential movies in my life, not only because of the way it was shot and put together but also in its poetic symbolism. Although many viewers and critics alike choose to disregard in-depth analysis of the film's meaning, I find it hard to ignore the genius behind this tale of man's descent into insanity. *Apocalypse Now* is a modern retelling of the novel *Heart of Darkness,* by Joseph Conrad, which follows a man's journey down a river in an attempt to find a man named Kurtz who penetrated to the farthest reaches of the Congo and established himself as a god. Marlon Brando was Coppola's Kurtz, the villain of the film, while Martin Sheen played Captain Willard - an officer eager for a mission who is sent to assassinate Kurtz. However, what the film is really about is the psychedelic confusion, violence, fear, and nightmarish madness of the Vietnam War, and how the journey towards evil (The Heart of Darkness) corrupts a man's soul. In my own interpretation of the film, the Vietnam war is the ultimate dehumanizing ordeal, in which each step closer to the front line (the heart of darkness) brings a new level of insanity. Colonel Kurtz is a man so inhuman by the time the film starts that he represents the heart of darkness, the root of all evil. In this essay I will discuss the importance of Willard and his crew's journey towards this.

The film opens with Willard's face superimposed on images of warfare, presenting from the outset the turmoil within his mind. The imagery of the jungle, fire and helicopters flying across screen, along with the sounds of helicopters show the interchangeability of his life in and out of warfare, almost as if his brain were hardwired to summon this appalling imagery. The song 'The End' by The Doors is playing behind the images, adding a commentary:

> This is the end Beautiful friend this is the end
> Can you picture what will be so limitless and free desperately in need
> of some stranger's hand in a desperate land

A montage of shots of Willard drunk, dancing, crying and hitting things are shown over a monologue, 'When I was home after my first tour it was worse. I'd wake up and there'd be nothing.' Coppola already offers some insight into the characters disjointed state of mind, a man well past his breaking point, haunted and yet famished by the horrors of war. Willard is an extremely isolated character, throughout the film he makes a noticeable effort to disassociate himself from his group, ostracizing himself, making no effort to improve the way others perceive him. This is even displayed through the cinematography, with Willard hardly ever sharing the frame with others, and always being shown in close-up, which gives the audience a sense of intensity and vulnerability. This man is clearly already dehumanized by war, desensitized to acts of horror and disconnected from humanity. This is how his character can make as far as the heart of darkness, where others couldn't: he had already lost his mind.

Willard and his crew of men, named Chef, Lance, Clean and Chief, spend most of their time cruising down the river, but their journey to Kurtz is interrupted by three main stops along the way, each giving insight into the next level of insanity within the depths of Vietnam. The first is where Willard starts the journey and meets the infamous Colonel Kilgore (played by Robert Duvall), who was originally named Colonel Carnage but was changed to Kilgore as Coppola felt 'carnage' was 'too on the nose'.[1] Kilgore and his men represent the first stage of insanity along this river, the desensitization of men who love war. The juxtaposition between the massacres they commit on and off screen, such as his merciless napalm strike on the Vietnamese with the absurdity of playing *'Ride of the Valkyries'* during an airborne attack and ordering men to surf the waves whilst artillery flies around their heads, represents the stage of insanity where war becomes sport.

'Do you smell that? Do you smell that? Napalm, son. Nothing else in the world smells like that. I love the smell of napalm in the morning. You know, one time, we had a hill bombed for 12 hours. When it was all clear, I walked up. We didn't find one of them, not one stinking dink body. But the smell, you know, that gasoline smell. The whole hill . . . it smelled like . . . victory. Someday this war's

[1] *Hearts of Darkness: A Filmmaker's Apocalypse* · *Documentary* · 1991 · Directed by Fax Bahr, George Hickenlooper and Eleanor Coppola.

going to end.'

This small speech of Colonel Kilgore, along with the throwing of 'death' cards on the corpses of the Vietnamese, demonstrates disregard for human life, and yet his squadron share a sense of camaraderie and comfort that is in great contrast to the next stop.

The second stop on the descent into madness is the Playboy Bunny show at a US Army base. In this scene we see crowds of soldiers lined up to see what the US Army has to offer for entertainment – a dance from three playboy bunnies – which of course sends the crowd wild. However, the performance quickly turns sour as soldiers clamber over each other to reach the stage, and this swiftly descends into a chaotic fight between the troops. These fights amongst themselves exhibits the soldiers' lack of empathy for anyone but themselves, as well as their frustration concerning the fact that they are trapped in Vietnam. The Playboy Bunnies represent home and the fact that they are just out of reach is all the more infuriating to them and symbolic to the audience. The Playboy Bunnies dance sexually with army assault rifles, exciting the crowd still more. These converged ideas of sex and violence shows the soldiers' skewed perception of the war and home, to a point where they are positively turned on by violence.

Of course, Willard doesn't take part in the stampede; he sits watching from the side, always alone, always isolated. Vietnamese women and children are seen watching the show through the railings of the base. This image symbolizes the imprisonment of the native people in their own country, as well as the forcing of the strange American culture onto them. Colonel Kilgore and his men have no empathy for the enemy, but these men are one step further: they no longer care for anyone but themselves.

Before the last stop on the river, the group come across a Vietnamese boat, carrying supplies. The murder of everyone on board soon follows, after a woman running to save her puppy is mistaken as hostile movement. The women is left alive but wounded and as the Chef and Chief try to save her, Willard shoots her without flinching, once again proving his unsparing nature. Lance becomes the puppy's surrogate father, carrying the dog around in his uniform. The crews final stop along the river of dehumanization is Do Long bridge, an army outpost that seems to be under never-ending attack. The place is scattered with fairy lights, illuminated by flares and explosions. The men fighting there seem to be cemented in perpetual psychedelia. The madness and panic of the place, along with the eerie fairground music underscoring the visuals makes a circus out of the battleground, symbolizing how far down the river of insanity the men here are. In fact, when Willard and his crew arrive, soldiers jump

into the river with suitcases begging them to take them home, a completely un-soldierly and irrational response. The soldiers that reach Do-Long bridge have completely lost sight of reality, exemplified and amplified by Lance tripping on acid whilst he and Willard move through the war zone, symbolizing his acceptance of madness. This could be interpreted as meaning that, if you accept the madness, you can survive, which is why Lance and Willard are the only ones who survive out of the crew, as the rest of them still shared some compassion for one another and themselves.

Lance is seen taking in the warfare as if he were watching fireworks or having some kind of spiritual awakening. According to Sam Bottoms, the actor who played Lance, to portray his character's descent into acid, he tried a lot of drugs on set, even during scenes. For the most part he smoked marijuana and took acid, but for this scene Bottoms admitted to being on speed during filming.[2] So when Coppola notoriously said, 'My film is not about Vietnam, it is Vietnam,' one can understand where he was coming from. When Willard encounters the men who are left fighting on the hills, they all seem to have lost their minds, most notably the character named Roach, who seems to be in some kind of trance, and yet can kill his target with a grenade launcher without a glance. When Willard asks him if he knows who's in command, he simply says, 'Yes,' and walks away. These men are so far past their breaking points from journeying through not only the jungle's but their own innermost evil , they have been completely dehumanized, losing sight of who they are. They no longer have any compassion for their enemy, their comrades or themselves. This scene is filmed in total darkness, lit by the flames and flares of the battle. It's interesting to notice how the film gets darker and darker as they go further down the river, symbolizing their proximity to the heart of darkness.

When they finally arrive at their destination, Colonel Kurtz and his tribe of worshipping natives,

[2] *Hearts of Darkness: A Filmmaker's Apocalypse* · Documentary · 1991 · Directed by Fax Bahr, George Hickenlooper and Eleanor Coppola.

Lance and Willard are the only ones left, allowed to survive because of their acceptance of their dehumanization and inner evil. Kurtz is a man who has descended far further into the depths of madness and evil than any other man, and so possesses the heart of darkness. This is subtly alluded to by the photojournalist's (played by Denis Hopper) words, 'The man is clear in his mind, but his soul is mad.' Kurtz's followers are referred to as his children, which references the lyrics of the song 'The End' right at the beginning of the film:

> Lost in a Roman wilderness of pain
> And all the children are insane
> All the children are insane

It is possible to interpret this as meaning that Kurtz's followers have all been through the descent into madness as well. When Kurtz and Willard first meet, Kurtz is portrayed as a sinister looming figure, never fully lit and never filmed from the waist down. This apparent stylistic choice seems deliberate and is extremely effective, but in fact Marlon Brando was filmed in this manner as a result of his shame towards his gigantic weight at that time.[3] Kurtz seems to know what Willard was sent to do, 'He knew more about what I was going to do than I did,' and yet he makes no effort to stop it. When he is killed by Willard, it is in an almost sacrificial way, foreshadowed by the sacrificial killing of the cow by his followers. I believe that by killing Kurtz, Willard takes on the heart of darkness, winning the prize of knowing

[3] *Hearts of Darkness: A Filmmaker's Apocalypse* · Documentary · 1991 · Directed by Fax Bahr, George Hickenlooper and Eleanor Coppola.

his own mind and accepting his own evils. This idea is strengthened when Willard steps out in front of Kurtz's followers and they kneel to him, sensing the heart of darkness within him and becoming his followers. Even Lance kneels, becoming integrated within the tribal community. This is shown even before they arrived at the temple as Lance performed a spiritual dance that looks remarkably similar to Willard's drunken dance at the beginning of the film. This dance is also performed by an American at the temple who we can assume was the last man sent to kill Kurtz. Could it be that this dance is a representation of the completion of their dehumanization? If so, that would amplify the point I made earlier concerning Willard already being past that point right at the beginning of the film.

The spirituality and symbolism in *Apocalypse Now* is hard to ignore and so, although I don't believe Coppola had this whole idea thought out in his head before production started, I believe that, during the 16 months of filming, these ideas and themes came to fruition. This is a very spiritual and almost supernatural take on the story, but its symbolic nature doesn't make this film an inaccurate portrayal of how it really felt to be in Vietnam. Many soldiers who fought in the Vietnam war and other wars regard *Apocalypse Now* as one of the most truthful adaptations of how it really feels to be in a war zone. This film brilliantly presents how war brings about the dehumanization of men as they journey further into the depths of man's own evil.

Magical Realism in art and literature

Will Colledge

Coined as a term in 1925 by the German Art critic Franz Roh, *Magischer Realismus* was a new take on the existing anti-expressionist movement of *Neue Sachlichkeit*, or New Objectivity, and developed throughout the early and mid-20th century as not only a topic in Art, fronted by artists like Frida Kahlo and Hans Reudi Giger, but in Literature too, with key writers such as Gabriel García Márquez and Haruki Murakami. However, the artistic side of the genre was born in post-war Central Europe, which allowed for far more liberal and expressionistic explorations and experimentations in the arts. The literary aspect of Magical Realism came about from the culture and everyday life in Southern America, especially in Columbia, often cited as the spiritual birthplace of the literary genre.

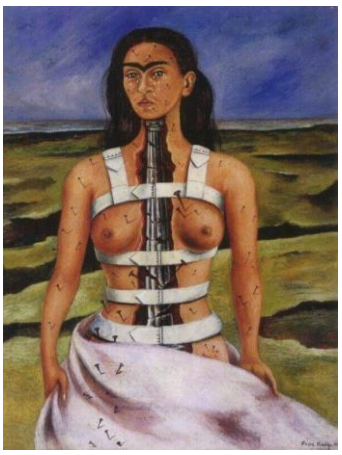
It is easy to confuse Magical Realism with the Fantasy genre, a more widely known and understood genre, which owes its mainstream popularity to books such as J.K Rowling's hugely successful *Harry Potter* series, as they encompass the fantastical elements of Magical Realism, but lack aspects that make it genuine Magical Realism. The genre can be separated into three categories of tropes; fantastical elements, arguably the simplest aspect, set within a realistic setting or tone; authorial reticence, a withholding of information by the narrator and a progression of the story in a logical order with relative indifference towards the events; a plenitude of often disorientating details aided by a layering of elements within the story. While the majority of these traits apply to literature, in order to ascertain whether the two genres are inherently the same, it is key to our understanding of them to see if they apply to Magical Realism in art as well.

Fantastical elements are the most recognizable trait of the Magical Realist genre, as it composes the 'Magical' within Magical Realism. Often the phantasmagorical phenomena that occur in the stories of the Magical Realist writers connect the traditional, the folkloric and mythological, with the modern or the contemporary setting of the novel or story, often calling back to the oral tradition of storytelling that was so prevalent prior to the development of the printing press. The Nigerian author Ben Okri's book *The Famished Road* (1991) follows the story of Azaro, a spirit child or abiku, living in a nameless Nigerian town.

The story combines the spirit world and the real world seamlessly, allowing for fantastical and magical events in a realistic setting, and also comes from the tradition of African Religious Realism. African Religious Realism comes from a vast combination of ethnic beliefs that have a wholly oral tradition rather than a written one, and this allows for certain supernatural and folkloric events that transform it into Magical Realism. Additionally, one of Haruki Murakami's recent works, 2005's *Kafka on the Shore*, consists of two interconnected yet apparently completely separate storylines; one of a boy called Kafka Tamura, a boy fleeing from an oedipal relationship at home and subsequently being tied up as a suspect in a murder investigation; the other of a boy called Satoru Nakata, employed to find lost cats due to his supernatural ability to speak to the cats themselves. The two stories intertwine and complement one another while remaining separate, and once again taking inspiration from religious tradition, in this case the Japanese Shinto religion.

On the side of art, the magical elements that the artists choose to put into their work often stands out with a less understated vibrancy than in its literary counterparts, yet the fantastical aspects are still present in many of them. Franz Radziwill (1895-1983), was a German artist who studied architecture formally and studied the human figure closely. Turning to art prior to the war, his experiences during the war came out in his art on his return to Germany in 1919. Many of his works, allowed in the state of Weimar Germany and by his membership of *Freie Secession*, took on elements of both realism and fantasy, with great landscapes displaying apocalyptic skies and unnatural coloration, and his portraits and still life paintings incorporating not only his understanding of the human figure, but also his vibrant imagination. *Conversation about a Paragraph* (1929) displays two nude young women on a bed,

in perpendicular positions faced in opposite directions. While all of the elements of Radziwill's painting are plucked from the real world, what sets the work apart as a work of Magical Realism is the element in the centre of the paining: the small angel that flies out of a hole in the wall. The angel, similar to those prevalent in Christian artwork, appears to be surrounded by faint clouds, as if it were from another world. This introduction of a piece of religious symbolism as a physical manifestation in an otherwise wholly realistic world setting aligns it with the trope of Fantastical Elements that has previously been set out. In a similar vein, the Mexican artist Frida Kahlo (1907-1954) used her suffering and mental torment, both through her constant struggles with injuries sustained in a car accident in 1925 and polio as a child, as well as her flawed relationships with the artist Diego Rivera, to create her artworks, as well as a large influence from Mexican folklore. After months in hospitals and the ordeals of many surgeries, Kahlo painted the self-portrait *The Broken Column* (1944). In it, we see the visage of Kahlo herself, in her personal style, nude from the waist up, wearing a corset like brace. However, the fantastical element in the image is the replacement of her own spine with a crumbing and broken ionic column. Hinting at not only her fervent femininity, but also her broken nature as a person due to her battles with illness and injury, Kahlo's realistic style combined with the fantastical approach to human nature create a piece of Magical Realism that applies itself to the genre as a whole. While admittedly a superficial aspect to the idea of Magical Realism, fantastical elements are by no means unimportant, and the addition of an aspect of fantasy into and otherwise completely real world is inherent to the genre. As they apply to both literature and art, and often are born from similar traditional ideas, the additions of fantastical elements allow the two sides of the genre to be considered the same thing.



The next trope lends itself more naturally to the literary genre. Authorial reticence requires a narrator to withhold information and elements to lend itself to a logical order of events and to be ostensibly indifferent towards the seemingly supernatural events taking place. Franz Kafka, the acclaimed German author of the early 20th century, was an author very capable of this trait. In his 1913 short story *Being Unhappy,* the narrator is visited by a ghost of a boy, and responds as if he has just seen a visiting

stranger. The narrator says 'I looked at him a while, then said "Good Evening!" and took my jacket off the fireguard not wanting to stand in front of him half dressed', displaying a sense of apathy and nonchalance towards a situation that is completely out of the ordinary. Gabriel Garcia Marquez' 1967 book *Cien Años de Soledad* treats supernatural events in a similar way. The priestly character Father Nicanor, when he has failed in his attempts to beg for money to build a cathedral, begins to float after drinking hot chocolate. While the event does garner him more money, it is treated by the narrator in a very calm way, shown by the old beggar's complete nonplussed reaction to it. This reticence allows for the sense of mystery that Magical Realism is famed for.

Comparatively, it is difficult to see authorial reticence within Magical Realist art due to the absence of an author and by the same token the absence of a story. As it is a visual medium, any withheld information is simply non-existent rather than delayed. 20th-century artworks of this genre tended to focus on the visual experience of art, so lacked any attempts at an order of events akin to a story. Indeed, often they lack even the slightest sense of logic at all. Colleen Browning (1918-2003), an Anglo-American painter, experimented with the ideas of illogicality and disorder, seen most clearly in her *Rio Bamba Restaurant Mural* (1950). The scene depicts multiple distorted figures beneath a deep red sky. The painting is devoid of logic, with two large hands protruding from the ground, floating umbrellas and an anthropomorphic cactus inhabiting the seemingly random landscape. While Magical Realist books tend to be full of mundane details to cement the order of the story, the works of Magical Realist art are often devoid of a story or a logical sense of order, which makes it harder to consider them the same genre.

The trope of a large amount of details that add a disorientating effect to the piece of work is however, something that can apply to both sides of the argument better than authorial reticence. In Gabriel Garcia Marquez' novel *Crónica de una Muerte* Anunciada (1981), the narrator returns to the scene of a crime after 20 years to create a complete chronicle of the events. The story jumps around from character to character as he interviews each, but there is no easy flow. At any given moment, the murder victim, Santiago Nasar, can be alive, yet in the next he can be lying outside his front door with his entrails hanging out. The disorientating yet logical narrative movements in the book are created by the mass of details that form a complete picture in the head of the reader yet seem completely out of place in their own right. Márquez uses a similar technique in *Cien Años de Soledad*, where he combines a linear and circular narrative structure, so as to lay out the events of the story, but then return the reader to key moments, leading to a passage of time that disorientates and confuses the reader until the final moments, aided by the aforementioned authorial reticence.

A disorientating amount of details is an element that lends itself to art naturally, if the effect is desired by the artist. While some prefer simplicity and rigidity, others prefer a maelstrom of colours and details to highlight the intended themes of the piece, simultaneously confusing and overwhelming the viewer.

The American Ivan Albright (1897-1983) created his own particular style, with detailed, naturalistic drawings and a specific colour palette, as well as multiple shifts in perspective. His 1943 commissioned piece *The Picture of Dorian Gray* demonstrates the decay and the effect time has had on the titular character, and Albright filled the background of the painting, as well as the surface of the figure, which stands in the centre, taking up a most of the picture plane, with horrific details of degradation and rot. The items that litter the canvas are almost unrecognisable souvenirs of decadence and wealth, and they meld together into a mixture that highlights the themes of age and lust, while also overwhelming the viewer with an attack on the senses. Both art and literature have the ability to create a confused and bewildered reaction in an audience through the use of a plenitude of details and perspectives not normally seen in any genre, which allows for the alignment of the two sides of Magical Realism.

Visual art and literature are inherently different things. Despite the differences that are unavoidable between the two mediums however, it is possible to see Magical Realism in art and Magical Realism in Literature as very similar genres, yet harder to see them as the same. While they can share more physical elements, such as fantastical examples of the supernatural or the strange, through descriptions and narratives, it is far less possible for a work of art to comment on or show a physical representation of the passage of time due to its intrinsic limitations as something that has only one physical plane. Information cannot be withheld by an artist and postponed, as a painting is something taken in in a single moment, while a book can reveal its information in any order it pleases. It is not possible to consider the two sides the same, but it is possible to acknowledge and celebrate the similarities and the ways in which the two are thematically and tonally linked, through more than just a name.

Bibliography

Arn, J. *Rediscovering the Painter Whose Grotesque Subject Matter Kept Him out of the Canon,* https://www.artsy.net/article/artsy-editorial-rediscovering-painter-grotesquesubject-matter-canon (13/8/19)

Colleen Browning Online http://www.artcyclopedia.com/artists/browning_colleen.html (13/8/19)

Craven, J. *Introduction to Magical Realism,* https://www.thoughtco.com/magical-realismdefinition-and-examples-4153362 (10/8/19)

Kafka, F. (2007) *Metamorphosis & Other Stories*. Suffolk

Frida Kahlo Biography, https://www.fridakahlo.org/frida-kahlo-biography.jsp (12/8/19)

Kraftgenie. *Franz Radziwill,* http://weimarart.blogspot.com/2010/06/franz-radziwill.html (12/8/19)

Magical Realism, https://en.wikipedia.org/wiki/Magic_realism#Painters (10/8/19)

García Márquez, G. (1967) *Cien Años de Soledad*. Colombia

(1981) *Crónica de Una Muerte Anunciada*. Colombia

Haruki Murakami; The Official US Website, http://www.harukimurakami.com/resource_category/profiles-link (12/8/19)

The future of drone technology

Luca Franchi

Drones, formally known as unmanned aerial vehicles (UAVs), are airborne robots that are either remotely controlled or flown autonomously using advanced flight software algorithms in conjunction with global navigation satellite systems (GNSS) and onboard sensors.[1] Interest in drones has been growing rapidly over the last few years but the drone dates back a hundred years to Nikola Tesla, an inventor famous for his work in wireless power transmission, alternating current and so much more. He introduced remote control technology in 1898. Right from the birth of this technology, he appreciated its huge military potential, noting that it would 'lead to permanent peace between the nations' because it would be a such a destructive deterrent.[2]

Recently, drone usage has become very common and is used across many industries. To name a few; UAVs are used in film making, site surveying, firefighting and precision agriculture.[3] The list truly goes on and is growing by the day, but perhaps one of the most widely known use of drones is its military use. Just as Tesla predicted, the military applications of this technology are endless and destructive. Large UAVs can be mounted with sensors, cameras, thermal imaging devices, trackers and, of course, weapons. One of the most crucial applications of drone technology today is their use in war zones. They are often used as a means of reconnaissance of unknown areas and enemy tracking, broadcasting live video to ground troops and thus protecting their lives. Ultimately, in any situation in which the military can avoid the risk of harm to humans, a UAV will be used. However, drones often form a more active, aggressive part of the force too, when mounted with weapons such as missiles or machine guns. The Pentagon states that airstrikes by the American-led coalition fighting the Islamic State had killed at least 1,257 civilians in Syria and Iraq by the end of January this year whilst AirWars, a university-based monitoring group estimates at least 7,500.[4] Owing to drones' ability to kill terrorists without putting lives at risk, they have been the main weapon used in the fight against terrorism for over a decade. While they offer an antiseptic impression of combat on the home front, the true number of civilians killed is *shrouded in secrecy*[5] and President Trump has only added to this problem by allowing the CIA to keep the number of civilians that are killed in airstrikes outside of the Afghan, Iraqi and Syrian war zones secret.[6] Military drone use is a controversial topic and has sparked many debates regarding the ethics of their use.

[1] https://internetofthingsagenda.techtarget.com/definition/drone.
[2] https://www.laphamsquarterly.org/spies/rise-drones.
[3] https://www.dronezon.com/drones-for-good/what-are-drones-used-for-and-best-drone-uses/.
[4] https://www.nytimes.com/2019/03/30/opinion/drones-civilian-casulaties-trump-obama.html.
[5] An action plan on U.S. drone policy – recommendations for the Trump administration (Stimson) - https://www.stimson.org/sites/default/files/file-attachments/Stimson%20Action%20Plan%20on%20US%20Drone%20Policy.pdf.
[6] https://www.thebureauinvestigates.com/stories/2019-03-07/trump-tells-cia-dont-tell-world-about-dead-civilians.

The public opinion of this technology is often very negative. The field of drones has a stigma surrounding it and one of the main reasons for this is the fear of the unknown. The general public isn't very well educated on the benefits of drone technology and so there is great worry as to what the purpose of drones is and who is accountable for their actions, as there is no visible pilot. Furthermore, drones get bad press because they are so accessible; they're powerful, affordable and far beyond what's previously been used.[7] Because of this, it takes very few malicious uses of the technology for it to get a bad name. Perhaps the most reported on use of drones in recent times, was the disruption caused to London Gatwick airport in December 2018. Following reports of drone sightings close to runways, hundreds of flights were cancelled, affecting approximately 140,000 passengers; it was the biggest disruption to aviation travel since ash from an Icelandic volcano shut the airport down in 2010.[8] The airport had no other choice but to cancel this huge amount of flights and delay even more because of the immense danger drones pose to planes. The University of Dayton Research Institute has demonstrated exactly this. In a test designed to imitate a mid-air collision at 238 miles per hour with a hobby drone, it was shown that the drone didn't shatter upon impact, rather it tore the leading edge of the wing right open, boring its way into the structure.[9] The events in London in December 2018 were incredibly revealing and exposed a massive weakness in national security; if a hobby drone can cause so much fear and disruption and so little can be done to stop it, the question of what a more advanced drone is capable of is risen. Indeed, the chief operating officer at Gatwick airport Chris Woodroofe noted that 'drones are a UK aviation issue, or even an international aviation issue' when describing how the military had unsuccessfully attempted to bring the drone down for 24 hours.[10] In the UK at least, this single event gave drones a very negative reputation.

More generally though, with this large event aside, drones come with an expected issue of privacy. UAVs present unique privacy challenges thanks to the way information is collected; the ability to gather data from previously impossible vantage points distinguishes UAV use from video surveillance cameras and other such technology. Drone use raises a broad range of issues in the 'collection, retention, use, disclosure, and eventual safe destruction of personal information'.[11] The United States' view on the matter has undergone great change since 1986, when the Supreme Court ruled that the use of a private plane by the police to detect hidden marijuana plants in backyards did not constitute a search since observations were made from 'public navigable airspace'.[12] However, in 2001, it was decided that the use of thermal imaging constituted a search and thus required a warrant. This change is representative of the growing concerns regarding drone technology; laws and regulations are getting ever tighter in a field in which the technology keeps developing.

Although for many it may seem that drone technology is already getting out of hand, we are just beginning to harness its true capabilities through novel applications. Drones lie right at the heart of

[7] https://www.droneflyers.com/why-do-drones-get-such-bad-press/.
[8] https://en.wikipedia.org/wiki/Gatwick_Airport_drone_incident.
[9] https://udayton.edu/momentum/stories/udri-drone-test.php.
[10] https://www.dpa-international.com/topic/gatwick-works-contingency-plans-drone-sightings-continue-urn%3Anewsml%3Adpa.com%3A20090101%3A181221-99-306226.
[11] Privacy and Drones: Unmanned Aerial Vehicles – Ann Cavoukian Ph.D. Information & Privacy Commissioner Ontario, Canada - https://www.ipc.on.ca/wp-content/uploads/resources/pbd-drones.pdf.
[12] California v. Ciraolo 476 U.S. 207 (1986). Supreme Court - https://supreme.justia.com/cases/federal/us/476/207/.

future society and, if used sensibly and correctly, will vastly improve human life on earth. One area in which we are looking to implement the technology is in assistance for the emergency services. There is vast strain on the emergency services in the UK and the number of calls to the 999 are increasing rapidly every year, with over 23,000 calls per day in January 2018.[13] In May of 2016, the proportion of category A (immediately life-threatening situation) calls responded to within the target 8 minutes was 70.5%.[14] Although this percentage may seem high, for life-threatening situations such as cardiac arrest, the target 8 minutes is even too long and so the proportion and response times need drastic improvement. Many people are beginning to turn to drones to assist with this. A fleet of ambulance drones may be deployed in cities to help ease the strain on emergency support teams and would drastically improve survival rates. Drones would be able to deliver lifesaving technologies such as automated external defibrillators (AEDs) and cardiopulmonary resuscitation (CPR) aids. In the European union, roughly 800,000 people suffer from a cardiac arrest each year and only 8% survive. This is a direct result of the slow response time of support as brain death will start to occur in just 6 minutes.[15] A student at the Technical University in Delft, the Netherlands, has designed a prototype for such an ambulance drone and has considered the technologies to be involved. The incorporation of a two-way video supported communication channel between 999 operators and first responders through the drone will massively improve first care. Successful AED usage by the public is currently at 20% but Alec Momont of the TU Delft claims that this can be increased to 90% through personalized instructions and communication through the drone.[16] GNSS with the utmost precision (±20cm) may be used in order for the drones to navigate their surroundings safely and efficiently and a combination of cellular and satellite telecommunications (5G ubiquitous communications) may be employed to provide continuous, reliable, bidirectional voice and data communications. Advanced AI and machine learning algorithms will provide autonomous drone operations and activation of appropriate emergency procedures.

The plans for future drone use are truly limitless and so this essay only picks out a handful of these ideas to discuss. A very hot topic at the moment is the use of drones in delivery systems. Indeed, Amazon has been working substantially on its *Prime Air delivery drone*, a hybrid aircraft capable of vertical take-off and landing (VTOL) as well as sustained forward flight.[17] This will massively increase the efficiency of current delivery systems, but as with most of these drone applications, there is great worry as to privacy issues. Both the ambulance drones and these delivery drones will need to carry onboard cameras and data gathering components and as they will work in urban environments, will fly over people's properties. There are a huge amount of regulations prohibiting such use of drones, especially in larger cities where there are total flight restriction zones as well as countless rules to follow. To give a sense of just how revolutionary delivery drones will be, Amazon has stated that their fully electric drone can fly up to 15 miles and deliver packages under 2.3 kilograms (75-90% of purchases) in under 30 minutes.[18] This service is likely to be debuted in the USA and the company claims that it'll be in use in a matter of

[13] Statistical Note: Ambulance Quality Indicators (AQI) - https://www.england.nhs.uk/.
[14] Statistical Note: Ambulance Quality Indicators (AQI) - https://www.england.nhs.uk/.
[15] https://science.howstuffworks.com/life/inside-the-mind/human-brain/brain-death1.htm.
[16] https://www.tudelft.nl/en/ide/research/research-labs/applied-labs/ambulance-drone/.
[17] https://www.theverge.com/2019/6/5/18654044/amazon-prime-air-delivery-drone-new-design-safety-transforming-flight-video.
[18] https://www.theverge.com/2019/6/5/18654044/amazon-prime-air-delivery-drone-new-design-safety-transforming-flight-video.

months although it will be many years until the federal aviation administration (FAA) will agree to its use in major cities.

Not only is this technology being realized on Earth, but NASA has developed a helicopter for use on the planet Mars. The small, autonomous rotorcraft will travel as a carryon to the Mars 2020 Rover Mission. Construction is already complete, and this is a real piece of technology today. Developed at JPL, the drone is a demonstration to show just how far this technology will take us. The drone itself required some incredible engineering to construct. Mars' atmosphere is 1% as dense as Earth's and so it was a great challenge to generate enough lift for the drone to fly in such conditions.[19] This mission in particular really highlights the power of such technology and shows just how quickly the world is changing.

In order to allow such revolutionary change to be brought about however, the public view of drones must be changed, regulations altered, and people educated on the technology. The technology has proven and will continue to prove to be extremely helpful to us as a society and its evolution into more impactful applications must be embraced with caution. I believe in the inevitable widespread implication of drone technology in future society but am also weary of the problems it poses. We must stagger the introduction of such technologies and be sure to control its progression ourselves in order to prevent creating a *big brother* element to society. Although in larger cities around the world there are millions of stationary cameras filming our every move, UAVs offer a unique vantage point – one to be used in moderation and with care. Bill Gates says 'Drones overall will be more impactful than I think people recognize, in positive ways to help society'[20] and Vladimir Putin stated 'You need to put drones under control; you need to lay out certain rules of engagement in order to prevent or minimize collateral casualties. It is extremely important.' The contrast between these two incredibly accurate quotes perfectly summarizes the responsibilities we have as we enter this new era.

[19] https://www.nasa.gov/press-release/mars-helicopter-to-fly-on-nasa-s-next-red-planet-rover-mission.
[20] https://www.geekwire.com/2013/bill-gates-jeff-bezos-overoptimistic-drones/.

Tarantino's vision of violence

Gabriel Proctor

In *Turner and the Barbershop*, John Berger states that 'violence is implicit in Turner's vision of nature itself'.[1] The same may be said about the films of the director Quentin Tarantino. Instead of violence being implicit in Tarantino's vision of nature however, it is central in his portrayal of life. In an

interview with BAFTA on the 14th of August 2019, Tarantino proclaimed 'one of the reasons why Tomas Edison invented the camera is to film violence'.[2] This essay explores two films directed and written by Quentin Tarantino and through doing so this essay argues how his normalization of violence through the constant conflation with positive ideals is indicative of the wider culture and the constant portrayal of graphic violence in the media.

Tarantino's third film *Jackie Brown* (for which he both wrote the screenplay based on a novella by Elmore Leonard and directed in 1997), depicts violence in relation to sexuality. This is established early in the film in the second scene where he presents a video called 'chicks with guns'. The subject is of scantily clad women demonstrating a variety of machine guns and assault weapons. This prompts the response 'check out this gun here' from Ordell Robbie (the character played by Samuel Jackson). In this phrase the conflation between sexuality and violence is made clear. The character is referring to the weaponry in the same way he would usually crudely and casually refer to a woman he may pass on the street. This fascination and sexualization of weaponry in this way simultaneously introduces his misogynistic character and profession as a gun salesman. The main storyline revolves around the illegal import of large sums of money from Mexico. In addition to his illegal business activities, Ordell has ruthless tendencies. These characteristics are first exposed in the interaction which he has with a lesser character Beaumont Livingston (played by Chris Tucker), who acts as a source of comic relief as the plot unfolds. In this instance (and through this character), humour plays a large role in softening

[1] Berger 1980.
[2] Tarentino.

the violent themes of the narrative making it more accessible to the viewer, while also allowing the film to be somewhat light-hearted. This comic theme is further shown when Ordell Robbie makes Beaumont Livingston get into the trunk of his car with the intention of taking his business associates by surprise during a transaction and shooting them, and then casually driving away as joyful music begins to play. The upbeat tune ceases when Beaumont is shot by Ordell. It is clear to the viewer that doing so was the plan all along. The use of upbeat music in relation to violence presents the viewer with a somewhat confusing juxtaposition as they struggle to understand whether they should empathize with the characters or not. This technique is similar to that employed by the director Martin Scorsese whose biographical films about particular villainous characters make the viewer question why they are empathizing with characters who are often engaging in morally bankrupt acts.[3] Unlike other Tarantino films, violence in *Jackie Brown* is never explicitly shown on screen. When Chris Tucker's character, Beaumont, is shot, it is shown from a distance. Similarly, when the body is revealed to Robert de Niro's character, a shifty ex-con named Louis Gara, the viewpoint angle is almost seen from the perspective of the body. No blood or gore is actually shown.

The story continues and the eponymous character, Jackie Brown, (played by Pam Grier) is arrested with 50,000 dollars and large quantities of cocaine by two policemen. Ordell Robbie goes to a bond broker named Max Cherry (played by Robert Forster), who then pays the bail and picks up Jackie Brown. Max, after seeing Jackie Brown for the first time immediately falls in love, again implied by the soundtrack and the use of romantic music. Both characters subsequently drive away in Max's car. While on the road Jackie Brown looks for cigarettes in the glove compartment but instead finds a gun. This is a further example of the conflation of pleasure and pain which establishes the film's narrative. Being dominated by this juxtaposition of love and violence continually places the viewer on edge making for uncomfortable viewing. Jackie and Max then go to a bar but afterwards Ordell follows Jackie Brown home. What follows is a tense exchange between the two main characters. When the violence is threatened or implied in the conversation one of the characters turns the light off. This suggests that whatever violence is going to occur will be hidden from the audience and hence violence is normalized in the sense that the viewer no longer can see the brutal reality. The next morning Max goes to Jackie's house in order to recover his 'borrowed gun'. In this situation the two potential lovers are reconnecting because of a weapon which further fuels the narrative cocktail of sex and violence. The film ends with Jackie Brown navigating a way to benefit from both the corrupt detectives and Ordell, and the concluding scene in which Jackie kisses the bondsman hence completing both the romantic and criminal narratives in a satisfying way.

Quentin Tarantino's previous film, *Pulp Fiction* (written and directed 1995), presents violence to the viewer in a stylized and gratuitous manner, playing down the brutality of the characters and allowing the audience to empathize with them through the normalization of the gory reality of the action. The opening scene sets the tone for the rest of the film while also allowing for the themes which resonate throughout the film to be established early on. This initial scene presents a couple, played by Tim Roth and Amanda Plummer, who are sitting in a typical American diner discussing robbing banks. The conversation is normal in its tone however abnormal in its somewhat violent subject matter. The subject of the conversation is normalized due to the tone of the speech and hence, so is the implied

[3] *Goodfellas* (1990), *Casino* (1995), *Gangs Of New York* (2002), and *The Wolf of Wall Street* (2013) are all examples of films directed by Martin Scorsese depicting particularly villainous characters.

violence. The couple kiss passionately before robbing the bank establishing love and crime as key themes throughout the film.

These series of frames are mirrored in the following scene in which John Travolta and Samuel Jackson's characters, Vincent Vega and Jules Winnfield engage in a somewhat normal or banal conversation. Vince makes the following casual observation from his European visit *'they have the same shit that they have over here . . . In Paris you can buy a beer in McDonalds . . . You know what they call a Quarter Pounder with Cheese . . . They call it a Royale with cheese!'*[4] Subsequently, as they exit the vehicle, it becomes clear that their intentions are somewhat dark: weaponry is shown which implies impending violence. In the following scene love is shown being linked to violence as the protagonists discuss their boss throwing another man off of a balcony for giving his wife a foot massage. At the centre of this conversation are the themes of love and violence and throughout the film the question of the role of love as the motivation for violence is continually posed.

The next section of the film concerns a boxer named Butch Coolidge (played by Bruce Willis) and the fight which Vince and Jules' boss, Marcellus Wallace (played by Ving Rhames), paid him to fix. The profession of the boxer conflates violence with entertainment as people endure pain in order to put on a show. This is also combined with the excessive amounts of money that are associated with boxing conjuring themes of the commodification of violence. This triggers comparisons between the hitmen Vince and Jules shown earlier in the film and the Boxer, Butch. The main narrative surrounding the boxer concerns a missing watch which Butch attempts to retrieve because of its sentimental value: a value established when the character is introduced to us as a child being lectured by an army man named Captain Koons (played by Christopher Walken) who fought with his father. The story which the captain tells the boy is that he comes from a long line of people who have fought in wars. Violence is therefore prominent in his lineage causing him to respect his forefathers by becoming a boxer. This establishes violence as a dominant theme in his life. After the fight (which the character played by Bruce Willis was paid to lose), it becomes apparent that not only did he win, but he also killed his opponent. He is made aware of this in the taxi home when the driver asks him whether he feels remorseful about the death. He replies that he has no regrets which therefore adds to the theme of the normalization of not only violence but death. When they return to his room Butch and his French girlfriend named Fabienne (played by Maria de Mediros), engage in fellatio. The implication here is that he is rewarded for his ruthlessness this introduces the concept that not only the normalization of violence but also its glorification which is being examined. This normalization is further shown in the subsequent scene when Butch wakes to the sound of gunshots: the soundtrack to a film being aired on the TV in his hotel room. This again expresses the commodification of violence in the form of entertainment while also portraying how violence has been normalized in popular culture: perhaps a justification of the film's stance as it is already commonplace in the film industry already.

Butch gets angry and throws a fit as he comes to realize that the sentimental watch has been returned to his apartment. For the first time here aggression as the dark side of violence is expressed. The boxer is then forced to return to his apartment where he finds a gun which he realizes belongs to Vince Vega

[4] Royale With Cheese - Pulp Fiction (2/12) Movie CLIP (1994) HD - https://www.youtube.com/watch?v=6Pkq_eBHXJ4&t=90s.

who is using the bathroom. Vega is subsequently shot by Butch as he exits the bathroom. This is somewhat comic due to the careless mistake he has made and therefore leads to violence being again normalized. After he gains possession of the watch, he has a violent altercation with Marcellus Wallace. They end up in a sex dungeon where Butch manages to escape while Wallace is being sodomized in the other room. Butch then returns to the basement with a samurai sword and kills the rapists. In this instance killing is deemed acceptable as it prevents further crimes against the criminals. This illicits audience empathy. The third act cuts back to John Travolta's character Vince, who accidentally kills someone in a somewhat comic fashion, hence again normalizing violence. The final section of the film summarizes the main theme; violence is cool. Jules Winnfield acts both heroically and calm as he successfully stops the robbery suggested in the opening scene with no loss of life: ironically in the end pacifism prevails

In conclusion, an exploration of the way in which one of my favourite film directors has chosen to display and subvert violence, has made me consider the pros and cons of the normalization of violence within the media. Unfortunately, we live in a digital age where graphic images of war are constantly circulating the internet and the news channels on television. In the words of Lisa Coulthard 'Tarantino roots his violence more firmly within a filmic fantasmatic space of artifice and reflexivity'.[5] While it is a sad reality that such suffering exists perhaps it is necessary for violence to be shown in ways which are not so brutal in order to help us cope with the sad reality of the damaging effect which violence has on the real world.

Bibliography

Berger, J. (1980) 'Turner and the Barbershop', from *About Looking*. London

Coulthard, L. (2009) 'Torture Tunes: Tarantino, Popular Music, and New Hollywood Ultraviolence', *Music and the Moving Image* 2.2: 1 - 6 (https://www.jstor.org/stable/10.5406/musimoviimag.2.2.0001)

Tarantino, Q. 'Why His Films Are So Violent | On Directing', https://www.youtube.com/watch?v=SytTJzhhwOA&t=268s

[5] Coulthard 2009: 5.

Rebellious female characters in Chaucer's *The Canterbury Tales*

Jack Probert

For many, one of the first lines of the Knight's Tale, describing how Theseus 'conquered al the regne of Femenye', is representative of Chaucer's attitude towards women in *The Canterbury Tales* at large: Chaucer's women are reduced to being props in tales concerned with concerns he has deemed beyond them. However, Marion Wynne Davies' view that Chaucer's women are either 'repressed by a misogynistic regime' (indeed, we see women like Griselda and Emelye very much trapped within the narrow role afforded to them by their society) or 'discovered to have challenged that system and forged relatively individualistic identities for themselves' seeks to challenge this position, arguing that Chaucer's rebellious women, through their construction of their own identity, thus resist the medieval patriarchy.[1] What Davies fails to recognize is that her assertion that Chaucer's women have 'individualistic identities' proves problematic when considering their lack of a truly female voice. Chaucer succeeds in giving his rebellious women a voice; yet he cannot give them their own.

One such rebellious female character is Alisoun of the Miller's Tale, a deceptive wife whose sexuality is actively celebrated, not condemned, by the story, which, in fact, pins more of the blame for her extramarital affair with Nicholas on her husband for attempting to control such a young wife; yet while she manipulates structures and figures that would repress her, she still falls victim a degree of sexual possession at the hands of Nicholas. We see Absolon's advances ridiculed as Alisoun makes him 'her ape', a metaphor bursting with suggestions of Absolon being a source of hilarity through the associations that 'ape' has with a sense of humanity twinned with an animal inferiority, as he tries to gain her affections in what might be considered a courtly manner (he is, after all, commonly identified as the courtly lover archetype). Moreover, we see her husband fall into her and Nicholas' trap because of his constant desire to possess her, demonstrated by his first fear upon hearing of the coming flood being for '[his] Alisoun, [his] wyf'. It is certainly significant that he is persuaded to go along with Nicholas' outlandish request because of Nicholas' promise that '[his] wyf [he will] wel saren, out of doute'. Both men arguably fail to gain Alisoun's affections because they objectify her: Absolon's serenaded formalities of courtly love and her husband's desperate attempts to control her are both sources of such comedy because they both deny her any sort of autonomous sexuality in such a relationship. That it is Nicholas to whom the Miller tells us Alisoun has *actively* 'graunted' her love is significant: he is not as easily identifiable as a figure of religion as Absolon, a monk, is or as a figure of the patriarchy as her husband is, instead being an astrologer. Unlike the other men, he seems to recognize her sexuality in a way that he can arguably only do due to this suggested lack of affiliation to the repressive system of Christianity and the wider misogynistic views of society that the carpenter and his attempts to domesticate Alisoun represent: Nicholas represents a relationship dynamic that, through transgression away from traditional gender roles, allows Alisoun a greater deal of autonomous sexuality. While his approach is also one of objectification, it does acknowledge her as a sexual object in how he '[holds] hir harde by the haunche-bones', 'haunche-bones' implying her to be an object through its connotations of meat, which suggest that she is like a piece of meat or even a farm animal

[1] Davies 1992: 108.

to him. This is, of course, by no means an approach deserving of praise and this is why to term the Tales' women as successful in their rebellion is difficult. While Alisoun does exhibit sexuality, having her own 'desyr' for Nicholas, and uses her understanding of her own status as an object in the minds of all three men to get what she wants from the situation (that is, sexual gratification and some degree of escape from a world that attempts to domesticate her and remove her sexuality altogether), she still remains trapped within it. It is at this point where Chaucer's stance becomes problematic: he critiques this oppressive system through humour, yet, as Mary Carruthers insists, Jill Mann's argument 'that the Christian values of *pacience*, *suffrance* and *pite* are feminized by Chaucer into the figures of Constance and Griselda'suggests that he is still operating within this system, despite having identified its issues.[2] What we cannot avoid is a conflict between this simultaneous criticism and praise of a value system that Chaucer ridicules here but uses to praise Constance and Griselda elsewhere. It appears that although Chaucer's characters are aware of their oppression, he remains trapped within a patriarchal view of relationships, the traces of which we see in how Alisoun is forced to both manipulate and bear a system where she remains an object in any one of her three possible suitors' (and, crucially, Chaucer's) minds.

Furthermore, a figure with similar issues is the Wife of Bath: as an irreverent female narrator, defying oppression with a bold sexuality that her choice clothing of 'hosen of fin scarlet reed' and its associations with lust and desire suggests, emphasized by the use of tautology in 'scarlet reed', perhaps implying a degree of saturation to this sexuality. She offers a crucial counterpoint to many of her fellow women in the Tales: as Alisoun does in the Miller's Tale, she stands out as a challenge the medieval value system, forging an alternative identity for herself by her subsuming the traditionally male role of a clothmaker, in which the Narrator describes her to have 'hadde swich an haunt' during her section of the General Prologue. She has become neither the wife nor the nun, refusing to fall into the only two identities left to other women in the Tales. She also questions why, if God allows five men to ask for her hand in marriage, 'men thane speke of it vilenye': she is glaringly aware of the hypocritical Christian value system that would seek to repress the sexuality and independence that she champions. Given this, why, then, does Elaine Tuttle Hansen's argument, as summarized by Peter G. Beidler that, in this character, Chaucer ultimately accepts 'the medieval antifeminist rejection of women' that she believes he 'seems to want to challenge' fit so well?[3] While the Wife's prologue does indeed cast her as a woman displaying autonomy and sexuality to be lauded by any feminist critic, it is her tale that proves problematic: it is a lacklustre, noncommittal inversion of power dynamics that can only negatively impact our evaluation of her character and Chaucer's perception of women. The tale centres around sexual violence: a knight of King Arthur finds a maiden by a river and rapes her 'By verray force' and 'maugree hir hed'. This depiction, focusing on the 'force' of such a violation, and portraying the maiden as an object of his lust and nothing more, is key to the story, functioning as a condemnation of male sexual predation. Indeed, when compounded by the Wife telling us that people reacted to this rape with 'swich clamour/And swich pursute unto the king Arthour', which likely mirrors the reader's own reaction to such an event, it is clear that the story aims to antagonize the reader against this act of sexual possession and cause them to condemn it; however, the tale's final pronouncement that women desire 'sovereynetee/As wel over hir housbond as hir love' thus becomes problematic. 'Sovereynetee' denotes a strong sense of authority and power, which is laudable in terms of 'love', which perhaps implies a

[2] Carruthers 1993: 536.

[3] Beidler 1995: 109.

sense of sexual autonomy here; yet arguably when applied to one's 'housbond', the act of possession from the beginning of the tale is mirrored in the Wife's ideology here. Instead of standing out as a woman fulfilling Davies' ideal of 'a relatively individualistic identity', the Wife of Bath is arguably what Tuttle Hansen terms a 'product of the masculine imagination against which she ineffectively . . . rebels':[4] while admittedly she is in control of her sexuality and commands autonomy, her creation of an sexuality for herself that merely imitates that of a man, as expressed in her tale, limits her to surviving in a misogynistic system to which her author can offer no alternative. In her, perhaps the most significant obstacle to a strongly feminist reading of Chaucer presents itself: can Chaucer, a man writing in a misogynistic, patriarchal society, effectively create rebellious, autonomous women with their own identities without perpetuating at least some of its hypocritical, limiting values and attitudes? Chaucer seems so aware of mechanisms for controlling women in his society, as shown by the Wife of Bath's criticisms of them in her prologue and the way in which the Miller's Tale is able to ridicule many of them; yet when writing female characters, he is limited by a 'masculine' perception of femininity.

Indeed, it seems that Chaucer has created supposedly rebellious female characters who, as Peter G. Beidler[5] argues the Wife of Bath to do, '[reproduce] and [reinforce] masculine attitudes'; however, in this criticism, it is certainly important to acknowledge the influence of Chaucer's wider world. Chaucer does seem aware of this: without it he simply could not have created such sharp comedy, exemplified by how Absolon's pretensions of courtly love are reduced to farce in the Miller's Tale. What proves problematic is that Chaucer both uses irony and comedy to critique a system that does not allow women true independence and supports the same system in his adherence to Christian virtues in valuing other women in the Tales. To say that the Tales have female characters who successfully break out of a patriarchal literary tradition is not only to ignore how these same women are still forced to construct any alternative identity using the same misogynistic language and forms that they, and Chaucer, are trapped within but also to ignore the existence of the work of Christine de Pizan and other female authors. De Pizan's work moves beyond the societal trappings that appear to limit Chaucer: one of her earlier works, a poem titled 'Alone Am I', details a mourning lover who choosing to continue on her own in a rejection of the normative structure of femininity upon which Chaucer relies. As her career at the French court progressed, so too did her writing, which grew into what Jill E. Wagner accurately describes as having 'anticipated the feminist necessity of Virginia Woolf's 'a room of one's own' but [building] on a grand scale and [following] medieval tradition in deliberately selecting a city, not a room';[6] Wagner draws a significant parallel between De Pizan's construction of an eponymous City of the Ladies, the premise of a rebuttal of the misogynistic views of women propounded by her contemporary male authors, and Saint Augustine's construction of the City of God, which is arguably the crucial difference between De Pizan and Chaucer. Chaucer's Tales remain concerned with the same structures and seek to expose them without understanding the necessity of different language and schemata of relationships to achieve this; yet where De Pizan succeeds is in her use of these structures to provide legitimacy to an alternative voice, thus fulfilling Davies' idea of 'individualistic identities' to a greater extent.

[4] Hansen 1992: 35.

[5] Beidler 1995: 109.

[6] Wagner 2008: 69.

So, where do these limitations leave the rebellious women of *The Canterbury Tales*? It has become clear that a feminist criticism of the work raises issues regarding its author's inability to construct an identity for women that is not in part dependent on men, a key tenet of Davies' more positive reading of the text. Therefore, the label of a text that is truly pro-female in this way is difficult to apply. While Chaucer's more rebellious women find ways to manipulate the system in which they are trapped, it is still a trapping system; however, this is only to an extent. The Tales do have redeeming features, and this largely comes in Chaucer's use of form. One first key element is that of the Narrator, who, while they are a masculine voice imposing upon women, is at least giving women a voice: it is certainly significant that the Narrator commands the Miller to 'tel on' during his prologue, conceding that he tell his tale first instead of letting 'some bettre man' speak first and thus 'lat [the order] werken thriftly'. In this, the Narrator indulges the transgressive, drunken Miller and his disregard for the 'proper' order of storytelling, something exemplary of the pluralistic attitude that runs through the text and is so positive in how it allows women a degree of representation: in contrast with Chaucer's key source text, Boccaccio's 'Decameron', which features only young gentlemen and women, the Tales embrace a wider range of society. Indeed, simply by creating a text in which every walk of life, from Knight to Cook, is represented, Chaucer does, to some extent, aid a feminist cause in raising interest in female voices: regardless of how we critique her depiction and tale, the Wife of Bath is a developed female character, crucially possessing the independence that Boccaccio's female narrators, who cannot even leave Florence without some men to guide them on their journey. Furthermore, in the two more rebellious female characters discussed here, characters like the Wife of Bath are not explicitly criticized: we are left to judge her for ourselves. Similarly, in the Miller's Tale, Chaucer focuses any morals that the tale contains around the Distichs of a Dionysius Cato, about whom little else is known, a figure removed from the Christianity and medieval society that seek to oppress her sexuality, reminding us throughout of his warning against a disparity in ages in marriage, reiterating often that 'youthe and elde is often at debaat'. In his Tales, Chaucer creates a kaleidoscope of voices and leaves the reader to judge them; however, this pluralism is limited by an inability to stray far beyond established power dynamics. Chaucer's Tales may give a documentary-like focus to these women but are still impacted by the scope of his lens: he can invert and critique, but he cannot conceive a true alternative.

To conclude, it is problematic to label characters such as the Wife of Bath and Alisoun as successfully rebelling against their society; however, it is not correct to disparage Chaucer's depiction of women in the Tales either. What it really seems to be is a proto-feminist work, insecure regarding its portrayal of fully developed women, but at least moving towards this: pragmatically speaking, it is a strong positive that he has given a voice to a group to which his world generally did not, although arguably his perception of women is limited in its depth by an inability to forge a 'separate' voice and identity for them, instead constructing them as imitations of men, trapped in an oppressive system he recognizes but cannot escape.

Bibliography

Beidler, P. (1995) *The Wife of Bath: Case Studies in Contemporary Criticism*. 1st ed. Bedford/St. Martin's

Carruthers, M. (1993) 'Review of Jill Mann, *Geoffrey Chaucer (Feminist Readings)', Speculum* 68(2): 535-537

Davies, M. (1992) ''He conquered al the regne of Femenye': feminist criticism of Chaucer', *Critical Survey* 4(2): 107-113

Hansen, E. (1992) *Chaucer and the Fictions of Gender*. Berkeley

Wagner, J. (2008) 'Christine de Pizan's City of Ladies: A Monumental (Re)construction of, by, and for Women of All Time', *Medieval Feminist Forum* 44(1): 69-80

The text used throughout was the 2005 Penguin Classics Middle English Edition (ed. Jill Mann)

oikos

Environment

Alexander Poli

When you hear the word 'environment', you very well may think of the gases surrounding the earth and causing the 'greenhouse effect', the warming of the Earth that makes it possible for life to survive on the Earth. But that warming is also the thing that could spell the downfall of the ecosystems of the world, if it is allowed to grow too much. However, this is not the only 'environment'. An environment gets its name for being the thing that surrounds or fills an area or a concentration of lifeforms, thus the word 'environment' is also applied to, for instance, a petri dish filled with agar, or a vivarium. An environment is not always a habitat, but a habitat is an environment.

Environments are extremely important to the survival and welfare of all lifeforms; for instance, we will perish – and many lifeforms are perishing – if we allow the damage to the greenhouse layer to get too severe; or an animal will not survive placed in an environment with wildly different conditions, physical or social, as a human placed in an unfamiliar social environment, such as a new school where they know nobody, can experience heavy detriments to mental health. An environmental change can provide the force to break a link in the meticulous infrastructure of an ecosystem. However, the ecosystem relies on everything being exactly ordered. Everything feeds on or is fed upon everything, so if one link collapses, any links above it will also collapse.

A stable environment is essential for the survival of everything. The most important rule in this equation is simply that no part of an environment is worth more or less than any other part. The tiniest bee is worth just as much as we are. If the bees die out, a huge amount of plants will also die out and have huge impacts on anything that ate those plants, including us. In fact, we may be exempt to the rule, but not in the way we think. We have failed to understand this simple rule, and have thus hugely damaged the environment. Because of our elevation and isolation from the ecosystems of the world, we have alienated ourselves. As such, we have nothing to give to the ecosystems of the world. Our development is unnatural, and has no place in an ecosystem. Thus, we are the one thing in the ecosystems that represents no link and is thus lower in importance than everything else. This is to the extent that our extinction, or us never having evolved would have been vastly better for the ecosystems of the world. However, we are alive, and if we want to save the environment and the ecosystems of the world, it will require a drastic change in mindset. We will need to recognize that we will have to make sacrifices and revoke some of our quality of life for the greater good, and stop thinking selfishly.

But why? Why should we, as a species, care about every other species? Why should we be the only species that puts ourselves down to help other species? Even animals in symbiotic relationships only help the other animal for their own personal gain. The answer to this is that, firstly, we have a moral duty. Because of our intelligence, we have transcended the need to fit into ecosystem, and because of our intelligence, we have consciences. Thus, it is morally wrong according to most human standards, to let millions of lifeforms perish by our hands. However, this is a principled argument. A different, perhaps practical reason is that nature is beautiful. Most people, as humans, love nature in some form or another. That enjoyment will be wrenched from you forever if you allow the beautiful aspects of

nature to die. More importantly, we are not entirely alienated from environments. The more we destroy the environments, the more we destroy ourselves. Take ecosystems. Losing certain animals, we lose certain foods, for instance bees. Losing wolves lets rabbit and deer destroy lands and make them barren. And take the main environment, that is, the blanket of greenhouse gases surrounding the Earth. The heating up of the Earth has caused more extreme weather, resulting in deaths. And finally, we must suffer to ensure the safety of our species. Even if you do not care about any other ecosystem, you probably care about your survival and the survival of your species. And if we do not stop exploiting the world, we will run out of resources and food. If the Earth does not stop heating up, we will be killed by weather more extreme than ever before. The environment will recover, and new species will evolve. But we will not.

Should we abolish the FED?

Jan Ptacin

The Congress created the Federal Reserve System in 1913 through the enactment of the Federal Reserve Act. Arguably, if so desired, the Congress could repeal the mandate of the FED (Koba 2012). In the act the FED received it's 'dual mandate' of maximizing employment and stabilizing inflation, and a third objective of long-term interest rate moderation. The FED, as a system comprising of 12 regional banks, united through the Board of Governors and the Federal Open Markets Committee (FOMC), represented a new type of central bank. It aimed to balance public and private ownership as well as to accommodate the political lobby of both progressives and established banking institutions. Its institutional set-up makes the FED independent of the election cycle. This should ensure objective, data-backed monetary policy and prevent the government's incentive to lower interest rates and or enhance credit creation via other means. Today, the FED's balance sheet is over 20 % of the nearly $21 trillion U.S. economy, a figure that reached 25% after the intervention preventing a further escalation of the 2008 Great Recession. Experts question the efficacy and the conduct of specific types of monetary policy, however. Could there be an alternative to the Federal Reserve's monopoly on the creation of money?

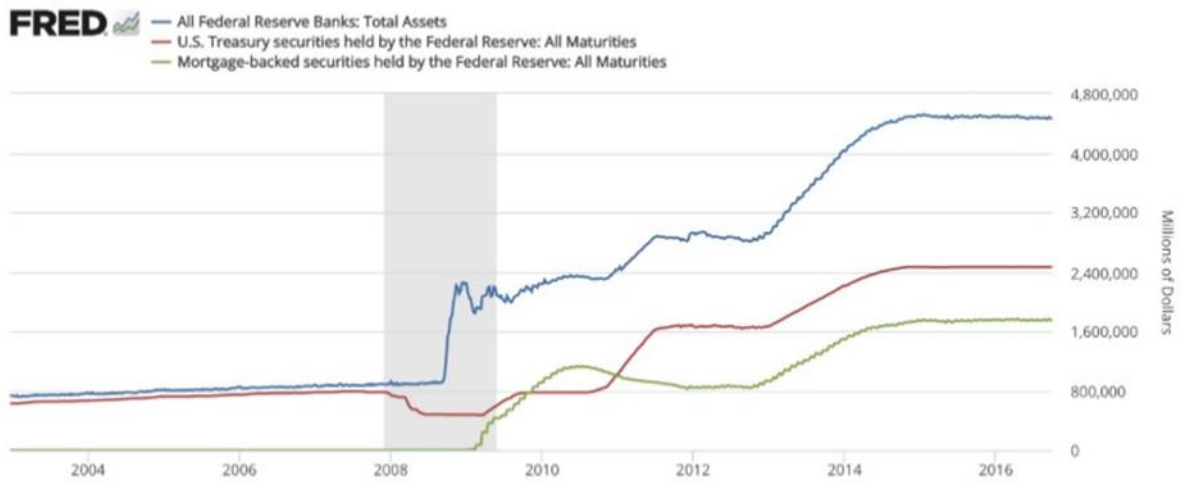


Table 1: Board of Governors of the Federal Reserve System (U.S.), All Federal Reserve Banks: Total Assets

As of today, over 1 in 10 Americans are in favour of abolishing the system despite not knowing what the FED does (White 2017). A 2017 WalletHub survey found that 16% of Americans think the Federal Reserve creates consumer credit scores, which it does not. Furthermore, over half do not know when the FED last raised interest rates (White 2017). Speeches of former Chairman Alan Greenspan, which introduced the word fed-speak to the mind of the educated public, the covert loans to systemically important institutions (including foreign investment banks such as UBS or Credit Suisse) totalling over 16 trillion dollars, as well as accusations of artificially low interest rates contributing to the Great Recession are only a few of the many reasons the electorate fears the FEDs political unaccountability. A 2010 Bloomberg Report even shows that over 50% of Americans believe the FED 'should be reined in or abolished' following the general lack of transparency in its practices. The Federal Reserve's effective,

yet costly and arguably undemocratic, response to the 2008 Great Recession is, however, only one of historical examples which can be invoked against the case for a monopolist central bank (Zumbrun 2010). A controversial sub-section of the Republican Party, the Tea Party movement popularized by former Senator Ron Paul, goes as far as to argue that the FED's actions systematically undervalue the dollar, artificially interfere in the credit market through instruments of monetary policy such as open market operations, and in doing so exacerbate the booms and busts of the economic cycle.

However, most respected monetary policy economists are in favour of independent central banks, the FED not being an exception. Over 99% of leading economists agree (79% strongly agree, 20% agree) that selecting candidates for FOMC membership based on their political views would lead to worse outcomes. They argue the FED provides five vital economic roles. The FED runs the payment and clearing systems, issues the dollar, acts as the lender of the last resort, regulates commercial banking, and administers monetary policy (White 2012). How would the current functions of the Federal Reserved be conducted if it were to be abolished? What are the risks and the possible benefits of such a system?

Firstly, the inter-bank payments system can be administered privately via Clearing House; such was the case before the Federal Reserve Act. Even today, a large proportion of the payments system (over 50% of the U.S. banking market) is provided by the Clearing House Payments Company (White 2012). Such clearing house companies are also able to take on the regulation of the commercial banking sector through requiring their member banks to adhere to standards and examining the member banks' financial records. Clearing houses can further fulfil the lender of last resort role, as it is in the interest of the member banks and the clearing houses to ensure the liquidity of the financial system and to thus prevent liquidity traps, in effect providing mutual insurance (White 2012). The role of the lender of the last resort can also be taken by a consortium of well-connected and financially endowed decision-makers, such was the case in the panic of 1907. The stock market fell almost 50% from previous years peak over the three weeks when John P. Morgan and other individuals pledged to inject the necessary liquidity (Aliber and Kindleberger 2005)

Secondly, just as Visa, American Express, and Citicorp today issue redeemable travellers' checks, ordinary banks would be able to issue private currency (White 2012). For instance, in Hong Kong, three banks issue currency privately. HSBS, SCB, and Bank of China are authorized by the Hong Kong Monetary Authority (HKM). The HKM promotes laws to create a more stable financial system. The HKM, however, acts as a monetary authority without the traditional roles the FED fulfils in the U.S. economy. Moreover, if private mints issued the coins, the supply of money could self-regulate and thus avoid the necessity of centralized monetary policy. A decentralized monetary policy could avoid most problems of centralized monetary policy such as, but not limited to (1) time lags (it takes almost two years for the effects of federal funds rate changes to be fully reflected in the economy); (2) the distortive impact on wealth distribution and market incentives as monetary policy interferes with and impacts bond markets globally; (3) distortions caused by unconventional money supply manipulations such as in large-scale asset purchases (quantitative easing). Further, such an injection of liquidity needs to be removed at a rate matching the recovery (assuming the recovery follows) to prevent heightened inflationary risk once the liquidity and normal economic conditions are restored.

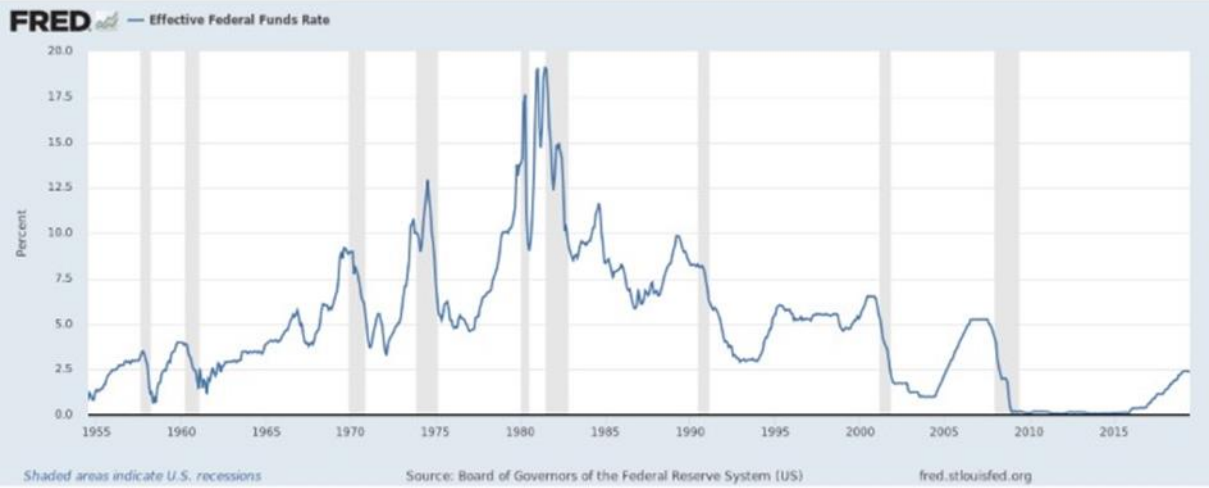


Table 2: Board of Governors of the Federal Reserve System (U.S.), Effective Federal Funds Rate

Self-regulation could also set a market-determined interest rate. This rate would be formed by information dispersed in the credit market. In turn, the interest rate would reflect the current risk-preference of households, corporations, and the financial system. Therefore, market-set interest rates have the potential to stop the artificial exaggeration of bubbles and crashes arising due to discretionary monetary policy. Such argument holds regardless of whether the wrong discretionary policy is inflationary (such as the FEDs before the 2008 crisis, when the FED did decrease the short-term federal funds rate, but the long-term interest rate did not increase) or deflationary (such as the FED's policy leading up the Great Depression).

Former FED Chairman Ben Bernanke has accepted the Federal Reserve's role in causing the Great Depression by stating 'You're right, we did it. We're very sorry. But thanks to you, we won't do it again' at a conference to honour Milton Friedman (Bernanke 2000). According to Friedman, the Great Depression was a result of the failure on the side of the Federal Reserve to expand the money supply following a severe banking crisis. As one-third of all banks failed, the crisis resulted in a 35% contraction in the money supply followed by a 33% deflation creating a lasting damage on economic output. Meanwhile, the FED did not act by injecting liquidity, did not lower interest rates, and thus did not increase the money supply failing to act against what would become the Great Depression.

Milton Friedman preferred the so-called k-per cent rule. In this policy, the FED would increase the money supply by a fixed percentage annually, irrespective of the economic cycle. It is vital to stress, nonetheless, that Friedman considered the involvement of the state in monetary policy necessary. On the contrary, Rothbard argued that too loose a monetary policy in the 1920s was the primary reason for the recession. Further, he argued that the FED's effective monopoly over the creation of money is the primary cause of inflationary pressure. In Rothbard's view, therefore, the state effectively has the incentive to depreciate the value of the US dollar, make the repayment of the US debt easier and in effect make recessions more severe by creating an inflationary environment (Rothbard 1994). Further, Rothbard argues, that since 1914 'inflations have been more intense and depressions deeper'. While the FED seems to have tamed inflation following the chairmanship of Paul Volcker, depression after depression, especially since the Great Depression of the 1930s, have had increasingly more severe consequences on long-term economic output. Credit cycle theorists argue similarly that the low levels

of long-term interest rates caused the Great Recession as they incentivized 'irrational exuberance' and risk-taking.

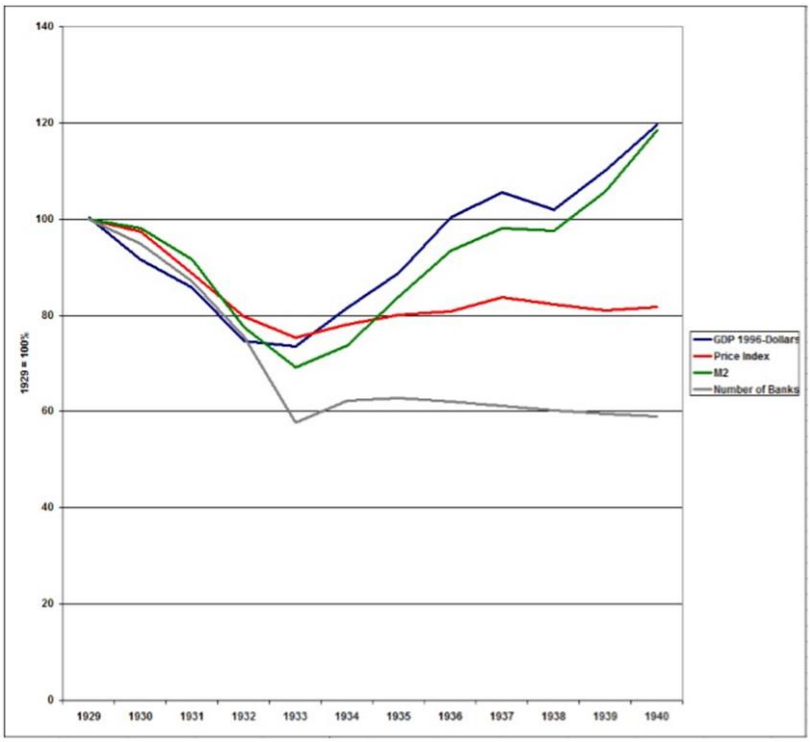


Table 3: GDP (1996-Dollars) from the United States Census Bureau - Historical Statistics, other data from San Jose State University. All data adjusted to 1929 = 100%.

Rothbard argues for the return of the gold standard, which is problematic. For instance, it does not allow for the expansion of money supply, when in risk of a deflationary environment. This puts a limit on economic growth. Moreover, the unpredictable production of gold increases short term price volatility.

Leaving a void instead of the current FED system would be highly risky as no evidence like Hong Kong that would apply to a developed economy exists. Thus, there is no data to show the effectivity of a model without centrally administered monetary policy. Even the HKM participates as the Hong Kong de facto central bank internationally and regulates the financial system. Moreover, to put the Federal Reserve's performance in context, over the 100 years of the FED's existence, there were 22 recessions in the United States with only one depression. On the other hand, the 100 years before the FED's existence saw 44 recessions and six depressions (Koba 2012). Thus, judged by the employment-maximization criterion of the FED, its existence is a significant improvement. Empirical evidence seems to suggest that independent and centralized monetary policy produces lower inflation with lower volatility in output (Blinder 2010). Paul Volker's policy of higher interest rates tamed the inflationary expectations endemic to the US economy, as after 1981, the US CPI never reached the 7% level or higher again (see below). Furthermore, when Ben Bernanke set the 25 January 2012 inflationary target of 2%, he effectively anchored inflationary expectations to between 0-4%.

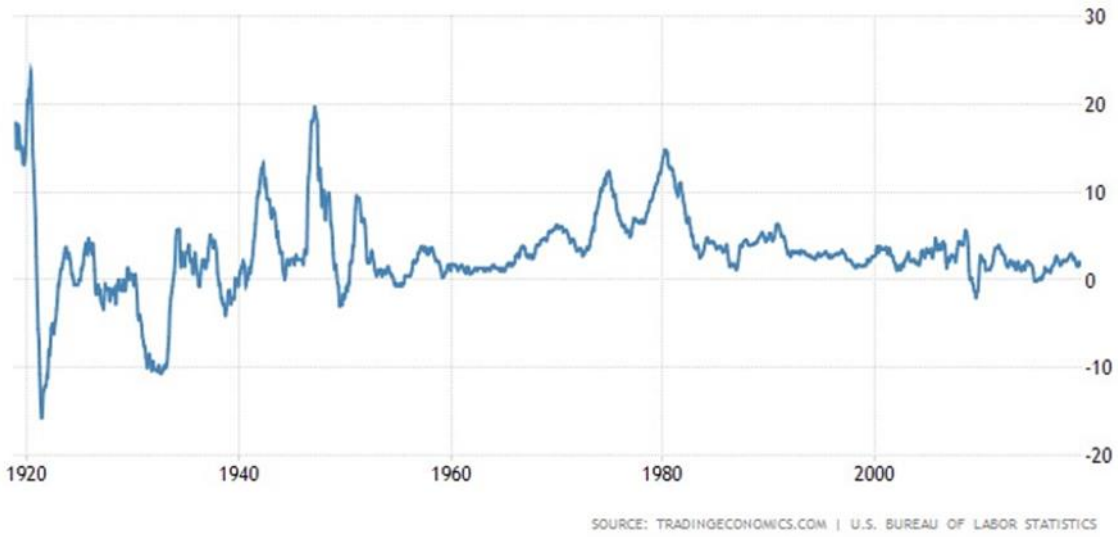


Table 4: United States historic CPI inflation rate, Bureau of Labour Statistics (US)

Importantly, the US is arguably the world's leading economy as measured by GDP, which totals $19.39 trillion. The world markets rely on the stability of the dollar since it plays the role of the world's reserve currency. Any uncertainty about the position of the dollar, the stability of the monetary policy management by the FED, and the lack of the FEDs direction in setting the interest rates for the US economy would have the potential to not only lower the competitiveness of the United States but even destabilize markets worldwide.

The most significant function which no-entity fulfils effectively when the free market replaces monetary policy is that of the lender of the last resort. Short liquidity and general depreciation of privately issued assets incentivize investors to shift from private commercial paper to government bonds. In such a scenario a central authority is needed to restore market psychology. (Aliber and Kindleberger 2005). Whilst, specific circumstances require congressional approval, the FED is uniquely positioned to quickly provide the necessary liquidity through loans or the arrangement of large-scale asset purchases. Only a central authority with monopoly control over the fiat system can fully restore credit markets confidence. Reversing recession via the FED is first, faster, and second, provides psychological force unfound in liquidity injections organized by private consortia.

Indeed, as stated by Walter Bagehot, the father of central banking, 'Substantial loans at very high rates are the best remedy for the worst malady of the money market when a foreign drain is added to a domestic drain' (Bagehot 1873). The FED fulfils its key function well, as it has shown numerous times. For instance, under Greenspan in the 19 October 1987 crash, over the 1997 Asian Financial Crisis, as well as in brokering the safe collapse of Long-Term Capital Management. The FED, and indeed central banks, are therefore necessary to safeguard the US and indeed the world's economy against liquidity freezes. In 2008 under Ben Bernanke, the FED became a direct lender to business. It spent over $4.5 trillion by the end of the QE1, QE2, QE3 and QE4 programmes, which massively increased the FEDs assets but helped prevent a crisis that would have been comparable in scale only to that of the Great Depression. It is indeed hard to imagine the levels of unemployment and the complete collapse of the financial system that were so close in the 2008 crisis and that could have occurred had it not been for the FED.

Bibliography

Akerlof, G. and Shiller, R. (2010). *Animal Spirits*. Princeton, p.59-86.

Aliber, R. and Kindleberger, C. (2005) *Manias, Panics and Crashes: a history of financial crises*. New Jersey

Bagehot, Walter (1873). *Lombard Street: A Description of the Money Market*. 2008. p. 32.

Bernanke, B. (2000) *Essays on the Great Depression*. Princeton, p. 7.

Blinder, A. (2010) 'How Central Should the Central Bank Be?' *CEPS Working Paper* No. 198

Durden, T. (2013) '11 Reasons Why the Federal Reserve Should Be Abolished', https://www.zerohedge.com/news/2013-05-07/11-reasons-why-federal-reserve-should-beabolished. *Consulted: 30/07/19*

Irwin, N. (2013) *The Alchemists: Three Central Bankers and a World on Fire*. New York

Koba, M. (2012) 'If the Federal Reserve is abolished, what then', https://www.cnbc.com/2012/02/08/if-the-federal-reserve-is-abolished-what-then.html

Lowenstein, R. 'Be Careful Wishing for the Fed's End', https://www.nytimes.com/2011/05/01/weekinreview/01fed.html?module=ArrowsNav&contentCollection=Week%20in%20Review&action=keypress&region=FixedLeft&pgtype=article *Consulted: 30/07/19*

Rothbard, M. N. (1994) *The Case Against the Fed*. Ludwig von Mises Institute, Auburn. pp. 139, 141.

White C. (2017)'Nobody Really Knows What the Fed Does, but They Think It's Bad Anyway', https://www.nbcnews.com/business/economy/nobody-really-knows-what-feddoes-they-think-it-s-n786091. *Consulted:30/07/19*

White H. (2012) 'Should We End the Fed?' https://www.youtube.com/watch?v=a_s6ofhyqWw *Consulted: 30/07/2019*

Zumbrun, J. (2010) 'Majority of Americans Say Fed Should Be Reined In or Abolished, Poll Shows', Bloomberg, 9/12/10. *Consulted: 30/07/19*

Graphs

1. Board of Governors of the Federal Reserve System (US), *All Federal Reserve Banks: Total Assets* [WALCL], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/WALCL. Consulted: 05/10/20

2. Board of Governors of the Federal Reserve System (US), *Effective Federal Funds Rate* [FEDFUNDS], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/FEDFUNDS. Consulted: 05/07/20

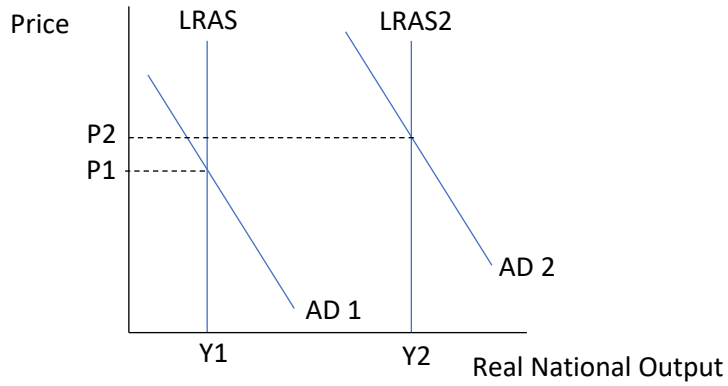
3. *GDP (1996-Dollars)* from United States Census Bureau - Historical Statistics (https://www.census.gov\/compendia/statab/hist_stats.html), other data from San Jose State University (http://www.sjsu.edu/faculty/watkins/depmon.htm). All data adjusted to 1929 = 100%. Consulted: 05/07/20

4. Bureau of Labour Statistics (US), *United States Historical CPI Inflation Rate*, retrieved from Trading Economics, https://tradingeconomics.com/united-states/inflation-cpi Consulted: 05/07/20

China, Africa, and globalization

Charlie Leithead

Africa has been China's fastest-rising export partner in recent years, with Chinese sales to African countries rising faster than they are to anywhere else. Indeed, research suggests that as many if not more than one million Chinese citizens have arrived on African soil since 2001,[1] and in June 2017 a McKinsey & Company report estimated that there are over 10,000 Chinese firms currently operation in Africa.[2] Many people believe that through globalization into African countries China is securing precious African natural resources to feed their expanding economy (they receive around 1.4 million barrels of crude oil from Africa per day)[3] and are exploiting workers despite creating new infrastructure and employment opportunities within those countries. Thus, it comes as no surprise that many people hold suspicions of Chinese motives, with some questioning as to whether China is colonizing Africa. However, there have been without a doubt many mutual benefits for both the small African countries and China, and in the words of Xi Jinping the current president of China 'For decades, China and Africa have treated each other with sincerity and



friendship',[4] and I believe the majority of Chinese investment has led to economic advancements in the respective countries which they have affected.

Perhaps the most obvious form of involvement in Africa has been through state-funded infrastructure projects of which the Chinese government has spoken about at length during their annual Forums on China Africa Cooperation, attended by 53 out 54 African countries, in which Xi Jinping pledged financing commitments $60 billion to African countries.[5] An example of how this money has been spent in the past are the railway systems in Kenya, Ethiopia, Angola, Djibouti, and Nigeria with the Mombasa-Nairobi

[1] French, H. *Why 1 million Chinese migrants are building a new empire in Africa.* https://qz.com/217597/how-a-million-chinese-migrants-are-building-a-new-empire-in-africa/ [Accessed: 09/08/2019].
[2] Mourdoukoutas, P. *What Is China Doing In Africa?* https://www.forbes.com/sites/panosmourdoukoutas/2018/08/04/china-is-treating-africa-the-same-way-european-colonists-did/#5adba0f4298b [Accessed: 09/08/2019].
[3] Albert, E. *China in Africa* https://www.cfr.org/backgrounder/china-africa.
[4] Jinping, X. *China and Rwanda: A Friendship Higher than Mountains.* The New Times Rwanda [Accessed: 10/08/2019].
[5] Sun, Y. *China's 2018 financial commitments to Africa: Adjustment and recalibration* [Accessed: 21/08/19].

Standard Gauge Railway in Kenya having been funded at the cost of around £3 billion.[6] Without a doubt these projects would have significantly reduced geographical and occupational immobility and hence could improve productivity levels and living standards. If workers were able to move around more easily and also be able to reach work that they would otherwise not be able to reach, then there would be more people becoming employed within these countries. Therefore, this would also stimulate increased growth, as more people would be earning more, and hence would have more disposable income to buy more goods and services. This can be demonstrated on a diagram as a movement of the long-run aggregate supply curve to the right due to the increased quantity of factors of production caused by an increase in African workers being able to work as a result of infrastructure projects, and also a shift in the aggregate demand curve to the right due to increased spending within the economy as people have higher disposable incomes as a result of becoming employed. Additionally, the Chinese state-funded companies working on large projects can end up employing a lot of African workers to help build these projects to help contribute to reducing unemployment that many African countries have. One report suggests that the launch of the Mombasa-Nairobi Standard Gauge Railway, a railway line connecting the city of Mombasa and Kenya's capital Nairobi, increased freight traffic between the two cities by 209%,[7] which would potentially bring in further money into the economy, as there would be increased exports out of Nairobi to Mombasa, and increased imports from Mombasa to Nairobi which would potentially increase living standards in the short run.

A research group at the College of William and Mary has estimated that the total value of China's completed projects to be $48.61 billion already,[8] showing the full extent of China's current investment in infrastructure in African countries, not only on railway systems but also on other projects such as various stadiums used in the African cup of nations, a practice which is known as 'Stadium Diplomacy'. They have been responsible for building around 33 stadiums in 26 African countries,[9] including a new one in Zambia which is set to have 45,000 seats and is currently undergoing construction, and they can benefit the countries economically speaking as it leaves them with new or improved tourism industries which would encourage employment in those sectors and if it were to attract tourists from abroad then they would be bringing in more money into their economies. However, there is one overriding issue with these infrastructure projects, namely that the Chinese often employ a lot of their own workers who come from China to work the construction jobs that could be fulfilled by African workers. This prevents the quite obvious benefit of increased African employment actually happening in the short run; therefore, these projects could be less beneficial then they might seem at first. As one journalist who saw the construction site of the new stadium in Zambia described the balance of African to Chinese workers, he only saw three African workers 'manning the second entranceway', yet saw many 'Chinese workers in hard hats walking around the circumference . . . and the exterior'.[10] This demonstrates the issue with the imbalance of Chinese workers employed versus African workers, and the lack of training provided to those workers. Training African workers would give them new skills, which would be beneficial for the economy and to the people as it would mean more workers would be becoming employed.

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[6] Tubei, G. https://www.businessinsider.co.za/here-are-150-million-rand-projects-in-africa-funded-by-china-2018-9 [Accessed: 19/08/19].

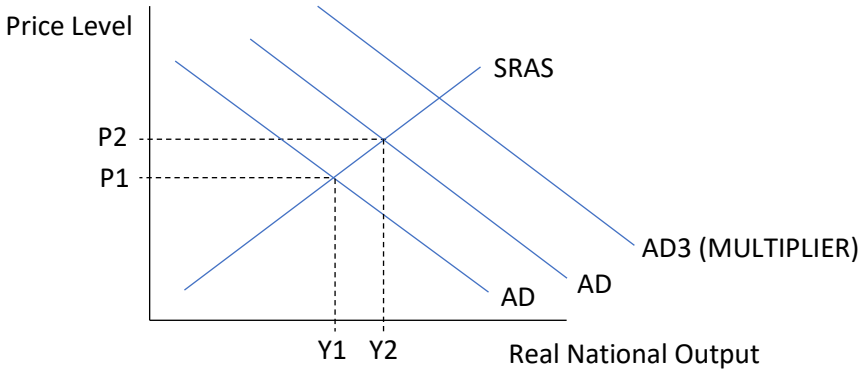
[7] Oirere, S. (2019) *KenyaStandard Gauge Railway launch drives freight growth* https://www.railjournal.com/freight/kenya-standard-gauge-railway-launch-drives-freight-increase/ [Accessed: 21/08/19].

[8] French, H. (2014) *China's Second Continent: How a million migrants are building a new empire in Africa.*

[9] https://en.wikipedia.org/wiki/Stadium_diplomacy#Africa [Accessed: 21/08/19]

[10] French, H. (2014) *China's Second Continent: How a million migrants are building a new empire in Africa.*

Currently, there are many Chinese immigrants in Africa who moved there without any assistance from the state, and solely to pursue their own entrepreneurial goals, with some estimates putting the figure around one million Chinese citizens having arrived in Africa since 2001.[11] It can be argued that since they are not involved with the state, and thus don't have a large amount money at their disposal, they are far more likely to employ more African workers and train them than they are to bring in Chinese workers from China, and have to pay them more than what they would earn in China. The act of employing increased amounts of African workers by Chinese entrepreneurs who own decently sized businesses has increased the disposable incomes of those workers, increasing consumption. This can be demonstrated through a diagram, in which there is shift of the aggregate demand curve outwards to show increased spending by the workers on goods



and services, as they become more wealthy due to moving from being unemployed to being employed, or in some cases from being employed to being better trained, and having more experience allowing them to apply for more well-paid jobs. This could have led to the multiplier effect, as when people spend money on goods and services in markets such as those in African countries, often this directly becomes someone else's income leading to them spending more money on goods and services. A good example of how this might happen is at marketplaces, where consumers will be giving their money to the vendors having bought a good. This vendor is then able to spend further money elsewhere, leading to the next vendor doing the same, and in effect this process is repeated. Therefore, this would be a good example of the multiplier effect. In this situation the initial increase in consumption is represented by the movement from P1, Y1 to P2, Y2, and then the multiplier is the further shift outwards from the aggregate demand curve to AD3. However, there can also be negatives to Chinese entrepreneurs moving to African countries to pursue their ambitions, for example it is unlikely the majority of those entrepreneurs have been able to scale up to the point where they are able to easily employ African workers, and for that to actually even make a difference in the first place it would have to be large-spread. Furthermore, working conditions for African workers working under Chinese entrepreneurs are often quite bad. One journalist noted when visiting a Chinese-owned copper-smelting factory in Zambia that 'Not one of the workers, men who spend hours at a time in this environment, wore a mask or any other specialized clothing' and the same journalist further noted upon seeing two Chinese workers being the only two workers in the entire factory who were responsible for building the new furnaces, he asked the Chinese entrepreneur who ran the factory why he did not choose to train two Zambian workers to do the same job at a lesser cost to him, to which the entrepreneur replied 'defensively' claiming that he treated his Zambian workers very well, whilst avoiding the question.[12] This demonstrates that there is still a discriminatory attitude by Chinese citizens who own medium-sized businesses in Africa with employing and

[11] French, H. (2014) *China's Second Continent: How a Million Migrants Are Building a New Empire in Africa*.
[12] French, H. (2014) *China's Second Continent: How a Million Migrants Are Building a New Empire in Africa*.

training African workers to do specialized jobs, which is ironic considering the fact that research shows that financial concerns are very strong amongst prospective migrants according to internet forums.[13] Finally, the pay they actually provide can be so low that whilst they may be employed they end up spending the bare minimum on necessity goods, and give the rest of the little they have left to their family members. This has minimized the amount of disposable income that the African workers could have, and thus the growth that would come from theoretical increases in consumption is unlikely to have amounted to anything. Salaries can often be very close to minimum wage and in 2013 in Zambia, such low salaries lead to protests in a carbon mine resulting in the murder of the Chinese employer of those workers.[14] This goes to show that whilst Chinese citizens can sometimes contribute to the economies of the smaller African countries, it does not always benefit African workers themselves to the point where there are any significant improvements in living standards.

Since the early 2000s many private Chinese companies have become involved in Africa, and a 2017 McKinsey report found that around 90% of Chinese firms in Africa are privately owned,[15] which is not to downplay Chinese state involvement in Africa, however that tends to come more in the form of the building of infrastructure and other large-scale projects. Generally, most African countries have potential for Chinese firms to assist the creation of markets for their goods and services, or to join in with what could be an already thriving market, otherwise they are going to these countries as they can be good places to set up factories for the production of their goods, or to make use of the abundant natural resources that can be found amongst many African countries, such as the estimated 200 million hectares of currently unused arable land which accounts for almost half of the world's total,[16] which should make it a desirable investment location for private companies across the world. Through bringing in new Chinese companies that sell new goods and services to African citizens, they may increase standards of living within Africa as African citizens will have access to better standards of things such as private healthcare provided by medical companies that have come from China in the future. Furthermore, they are currently able to enjoy services from Chinese companies that they would have been otherwise unable to get. Obviously, Chinese companies would create new opportunities for African citizens to work within them provided these companies are open to the idea of allowing skilled and qualified African workers to come and work for them. According to the United Nations Agenda 2063, African countries are set to become 'prosperous' where African people will be able to enjoy 'a high standard of living, and quality of life',[17] which suggests that there is even room for more Chinese high-end, financial service companies or other luxury brands to expand into African countries. Africa has already proven to be a good market for Chinese goods too, with sales of Chinese exports to Africa having doubled between 2009 and 2015 from $47 billion to $106 billion, increasing 5% faster than China's sales to anywhere else since 2010 at 14% year on year.[18] Chinese companies have helped contribute the necessary

[13] Sullivan, J and Cheng, J. (2018) 'Contextualizing Chinese Migration', *Journal of Asian and African Studies 53: 1173-1187.*

[14] Bruguière, P. *Chinafrica: African workers share experiences at Chinese factories* https://observers.france24.com/en/20120822-chinafrica-african-observers-share-experiences-working-chinese-companies-china-business-togo-cameroon-senegal [Accessed: 22/08/19].

[15] International Trade Centre (2018) *Guide to Chinese private investment in Africa* [Accessed: 22/08/19].

[16] The Economist https://www.economist.com/middle-east-and-africa/2018/04/28/africa-has-plenty-of-land-why-is-it-so-hard-to-make-a-living-from-it [Accessed: 22/08/19].

[17] The United Nations, *Agenda 2063* https://www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf [Accessed: 22/08/19].

[18] The Corner, *Private Chinese Companies Primed For Success In Africa* http://thecorner.eu/world-economy/private-chinese-companies-primed-for-success-in-africa/75096/ [Accessed 21/08/19].

money to help African countries drive their economic growth, and with China and Chinese companies playing such a large role in the country today it is no surprise that within the next 50 years, China will be in a favourable position with what will be a developed Africa. With better training for workers, the people are currently in far better positions and if this has led to increased access to technology for African people, then they may have enjoyed much better standards of living and potentially even increased productivity levels. Also, with increased competition in the markets with lots of Chinese companies getting involved, not only will prices be driven down in the future but with the more companies getting involved there may be more revenue for the state in corporation taxes. However, this is not without potential drawbacks, such as the fact that when smaller Chinese companies are involved, they may be less concerned about ruining their reputation potentially leading to them misusing and destroying natural resources within the countries, and there may not be that much employment of African workers, as private companies may bring over their own workers.

While there is the huge issue of Chinese companies and the state bringing over Chinese workers to do their projects and work in their companies, and of course the fact that in the long run, China may be the ultimate winner in terms of resources gained, I believe it has still been beneficial to Africa in various ways. I would argue that even if they have only used Chinese workers to build infrastructure, there is no issue with this as the infrastructure is there to stay, and not only creates more tourist industries but also benefits the people. Furthermore, both the citizens who have invested there and private companies do usually end up creating jobs for African people, which I believe outweighs the negatives that have come from the small minority of cases in which there has been misuse of African natural resources. I would argue that Chinese globalization into Africa has proven to be, and could prove to be in the future a prime example of globalization done well, but not perfectly, which mutually benefits both the economies of Africa and China.

All diagrams used in this essay are original.

Bibliography

Bruguière, P. 'Chinafrica: African workers share experiences at Chinese factories', https://observers.france24.com/en/20120822-chinafrica-african-observers-share-experiences-working-chinese-companies-china-business-togo-cameroon-senegal [Accessed: 22/08/19]

The Corner, *Private Chinese Companies Primed For Success In Africa* http://thecorner.eu/world-economy/private-chinese-companies-primed-for-success-in-africa/75096/ [Accessed 21/08/19]

The Economist https://www.economist.com/middle-east-and-africa/2018/04/28/africa-has-plenty-of-land-why-is-it-so-hard-to-make-a-living-from-it [Accessed: 22/08/19]

French, H. 'Why 1 million Chinese migrants are building a new empire in Africa', https://qz.com/217597/how-a-million-chinese-migrants-are-building-a-new-empire-in-africa/ [Accessed: 09/08/2019]

French, H. (2014) *China's Second Continent: How a million migrants are building a new empire in Africa*. London

International Trade Centre (2018) 'Guide to Chinese private investment in Africa', http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/Guide%20to%20Chinese%20private%20investment%20in%20Africa_final_Hi-res.pdf [Accessed: 22/08/19]

Jinping, X. *China and Rwanda: A Friendship Higher than Mountains*. The New Times Rwanda [Accessed: 10/08/2019]

Mourdoukoutas, P. 'What Is China Doing In Africa?' https://www.forbes.com/sites/panosmourdoukoutas/2018/08/04/china-is-treating-africa-the-same-way-european-colonists-did/#5adba0f4298b [Accessed: 09/08/2019]

Oirere, S. 'Kenya Standard Gauge Railway launch drives freight growth', https://www.railjournal.com/freight/kenya-standard-gauge-railway-launch-drives-freight-increase/ [Accessed: 21/08/19]

Stadium Diplomacy https://en.wikipedia.org/wiki/Stadium_diplomacy#Africa [Accessed: 21/08/19]

Sullivan, J and Cheng, J. (2018) 'Contextualizing Chinese Migration', *Journal of Asian and African Studies 53: 1173-1187*

Sun, Y. *China's 2018 financial commitments to Africa: Adjustment and recalibration* [Accessed: 21/08/19]

Tubei, G. https://www.businessinsider.co.za/here-are-150-million-rand-projects-in-africa-funded-by-china-2018-9 [Accessed: 19/08/19]

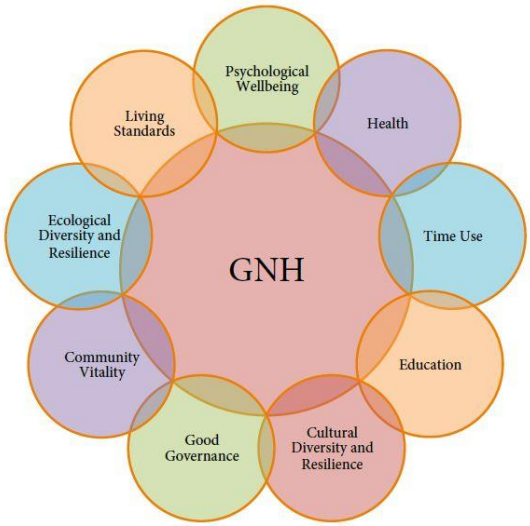
The United Nations, *Agenda 2063* https://www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf [Accessed: 22/08/19]

Value

Ryan Bhaskar

Value is a very interesting concept. It can be summarized as the importance, worth or usefulness of something. We can use money to measure the value of almost anything, e.g. a product in a shop, a country, or a person. When a customer walks into a shop and sees a product, they assess whether the product is worth more than the price. In very basic terms, if it is worth more than the price, than they buy it; but there are also other factors. This means that the perceived value must be greater than the price. This is called consumer value. There are also spiritual values. These are values that fulfil the purpose of human consciousness. Example of spiritual values are peace, love, truth and righteousness. This essay will focus on the differences between the materialistic and spiritual worlds.

Firstly, I will discuss about how value can be measured in money. I will use countries to show how something can be measured in spiritual values and economic value. For most objects, materialistic value can be easily measured by deciding its importance, worth and usefulness. However, it is not as easy to measure the materialistic value of a large area of land, a business or a person. The GDP (Gross Domestic Product) values a country's wealth. '[GDP] is the total monetary or market value for all finished goods or services produced within a country's border in a specific time period [usually a year]' (Investopedia). Using GDP, America is the highest-ranking country, followed by China. In last place, is Tuvalu, a small island nation. There are several flaws with the system. Firstly, it ignores how money is distributed within a country. Also, GDP measures money, rather than other important things such as clean air, health and equality. There are other systems, which focus on the wellbeing, happiness and spirituality of a nation. Arguably, that is of more value to us than money. This is where the materialistic world clashes with the spiritual world.



One of the alternatives to GDP is GNH (Gross National Happiness). In 1972, Bhutan declared that it would seek to grow its GNH rather than its GDP. It takes 9 variables into account and is less based on money. The 9 variables are displayed in the image to the left (taken from https://austria-bhutan.org/en/about-bhutan/gross-national-happiness-gnh/).

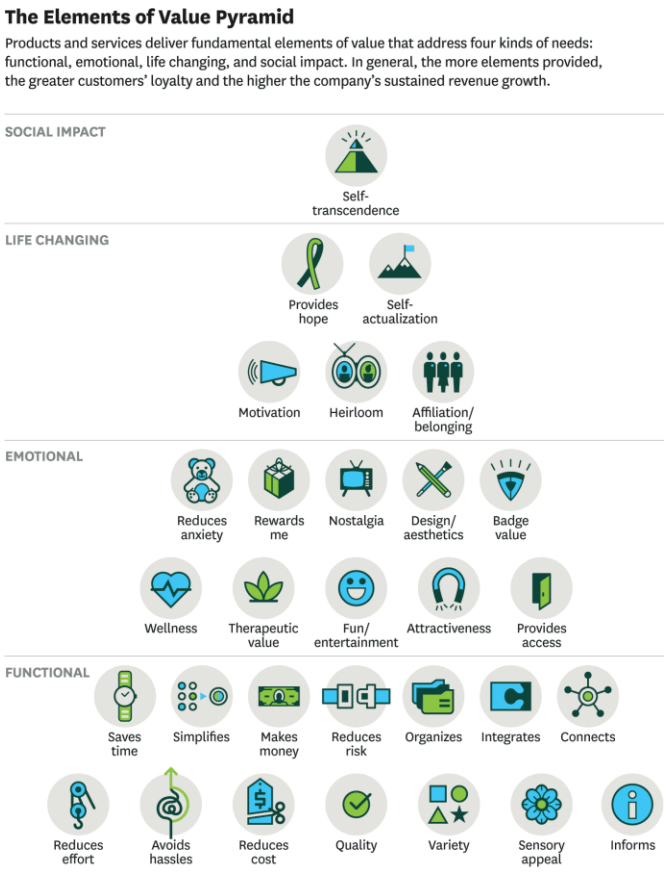
'Gross National Happiness is more important than Gross National Product'- King Jigme Singye Wangchuck of Bhutan.

The quote above was used as a response to a journalist concerning Bhutan's GNP (Gross National Product). GNH is guided by Buddhism, the country's religion. By saying that GNH is more important than GNP, the King said that the mental and physical wellbeing of his population is more important than having lots of money. I agree with this. However, without lots of money, how is it possible to have

good living standards, good education, etc.? This is where the barrier between the two world opens. To measure the factors in the image above, 8,000 random people are given an in-depth questionnaire and are compensated with a day's salary. The questions face criticism, because some of them are too religious or spiritual. Some of the questions are 'Do you meditate?' or 'How frequently do you pray?' I don't believe that one must meditate and pray to be happy.

By looking at GDP and GNH, we learn lots about the differences between the two worlds and how they are linked. I have also learnt that there are two ways of measuring value. We can judge the consumer value of all the goods that that we own, or we can judge our 'true' happiness and physical wellbeing.

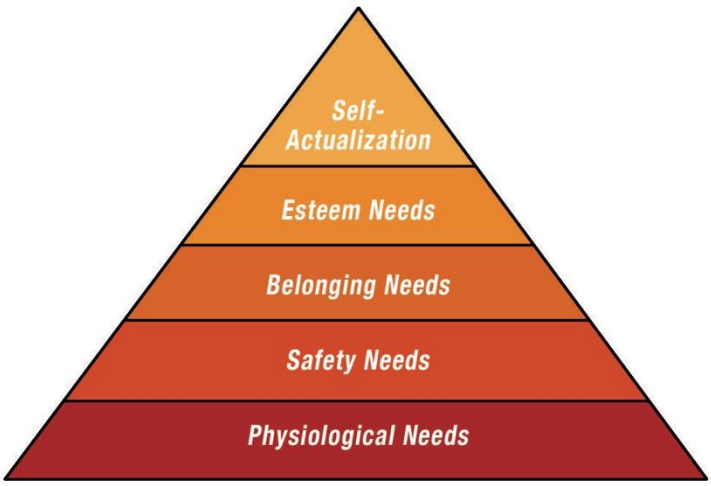
Next, I will look at what customers want in the products they buy. I will discuss how spiritual values are an essential part of consumer value.



The diagram on the left (taken from https://hbr.org/2016/09/the-elements-of-value) shows the 30 elements of consumer value. A business' aim is for their products to have as many of these elements as possible. These elements are what customers assess when choosing what to buy. There is one vital element which I think has been missed out in the pyramid is 'need'. Needs are very important, because before customers buy anything that will provide motivation or organization, etc., they will buy basic necessities, such as food and drinks. Whether you need something for survival or not, does affect whether you buy a product or not. However, people do still buy products which are not needed for survival. Whether you need a product or not for survival will significantly shape one's decision of whether to spend money on that product or to spend it on another product. Many of these 30 elements are linked to spiritual values. These elements are those in the social, life-changing, and emotional categories. When you judge the consumer value of a product, you also think about how it affects your moral wellbeing.

How do customers think about all of these elements? They think about what makes it good. For example, they think 'this bank is convenient'. The elements that they refer to are *saves time, avoids hassle, simplifies,* and *reduces effort*. Another good example is somebody who owns an expensive camera. Owning the camera would make them have pride in themselves and their ability to take pictures. The elements which matter in this example are *quality* and *self-actualization*.

The 30 Elements of Value model originated from Maslow's hierarchy of needs.



On the bottom, are the most important needs and on the top are less important needs. Physiological needs are basic necessities such as food and drink. Compared to them, the other needs are insignificant, because physiological needs are required for survival, while other so called 'needs' are extra. Safety needs are also very important, but not as important as physiological needs. Safety needs are security and protection from danger. This leads to a natural desire for an orderly world and certainty that nothing will go wrong. As you go higher in the pyramid, the desire increases. This is because for most people in western society, the lower needs are fulfilled, but the higher needs are only partially fulfilled. The higher needs are linked to your spiritual values. Naturally, we desire more for these needs, because we want to be happy, so we buy experiences that make us happy and fulfil those upper needs. Businesses take advantage of our desire for happiness and use it to sell us things which are not essential for our survival, but which we can enjoy. With happiness comes belonging, esteem and self-actualization. This is how businesses gain customer loyalty. Businesses that can fulfil higher needs are irreplaceable in the customer's mind, and therefore those businesses can influence the customer's mind more. Customer loyalty is about getting your customer to believe and tell the world that your brand had no equal.

Next, I will write about other interpretations of the word 'value'. We can say that a life is valuable if it has good ethics and knowledge. Ethics is about good vs bad, right vs wrong and just or unjust. Ethics is very difficult to measure, because something could be good or bad, depending at how you look at it. It can also be difficult to measure at what extent is something good or bad. Measuring value in money, on the other hand, is much easier to count. Knowledge is about what we know; and our knowledge is very limited for two reasons. Firstly, the physical universe could be an illusion. Perhaps, I'm just imagining the universe we live in, but at least I know that it exists in my mind. Secondly, even if the physical universe really does exist outside of my mind, we know almost nothing about it. We don't even know for certain if there is more than the observable universe, although that is very likely. We also don't know much about dark matter and dark energy. This means that, if we measure value by knowledge, our value would be infinitely small, and so cannot be measured. Also, scientific theories could be observed to be wrong, so we don't know if any scientific theories can be proven right and so we haven't made any progress with scientific knowledge. This means that if we measure value by knowledge, our value is 0, but it can't be, because '*cogito ergo sum*' (Descartes), meaning that our value must be greater than 0.

We can also talk about aesthetic value, which is based on the physical appearance of something rather than how practical that object is. This is difficult to measure, because there are multiple viewpoints. One person might think that an artwork is beautiful, while another may not see any beauty in the artwork. These other views of value can be used to measure relative value but cannot be measured absolutely.

In conclusion, I think that spiritual values are a very important part of consumer value. This is because people do not only look for necessities. In a product, customers also look for what makes them happy or what gives them self-esteem. However, there is also the happiness that can't be bought. This is what people call 'true happiness'. This means enjoying the experiences that you can buy with your friends and family. I think that the phrase 'money can't buy happiness' is not entirely true. You can use money to buy objects and experiences that can make you happy, but you can't buy family and friends to share your happiness with. Sharing happiness makes it stronger, not weaker. This shows the power of spiritual values and why there is more to value than materialistic value.

Sources

http://cultbranding.com/ceo/maslows-hierarchy-needs-crucial-for-your-business/,

https://hbr.org/2016/09/the-elements-of-value, https://atlassociety.org/commentary/commentary-blog/4124-spiritual-values,

https://ethical.net/politics/gdp-alternatives-7-ways-to-measure-countries-wealth/,

https://www.investopedia.com/terms/g/gdp.asp,

https://austria-bhutan.org/en/about-bhutan/gross-national-happiness-gnh/

Technology and battery metals: How the resurgence of electronic cars has affected the cobalt market

Wesley Fong

1. The Evolution of Electronic Vehicles and Lithium-ion Batteries

During the early development of automobiles in the late 19th - early 20th centuries, electronic cars were extremely popular, especially amongst affluent customers and cab drivers, largely due to their ease of use over steam and gasoline powered cars, and their large and luxurious carriages. However, by the 1920s electronic cars were practically abandoned for the much faster and effective automobiles, much more resembling of the modern car. Electronic vehicles (EVs) were largely forgotten until the start of the 2000s, when the danger of global warming and pollution became much more obvious. A brochure published by the U.S. Department of Energy in 2001 highlighted the issue of petroleum-based fuel-powered cars and suggested alternate fuel sources, including hybrid electric vehicles – then recently developed by Honda and Toyota – and the possibility of a resurgence of fully electric-powered vehicles. This helped to boost entrepreneurs and scientists to develop the first modern highway-capable electronic cars. In 2004, Tesla Motors began development on the first legal all-electric highway-capable car, using lithium-ion battery cells, a newly developed rechargeable battery that was vastly superior to its predecessor (NiH_2 batteries). This was sold to a small amount of buyers between 2008 and 2012. Tesla Motors continued to refine this new breed of electronic cars and have pushed for the first mainstream retail of these cars in 2016, leading other car companies to develop and produce all-electric cars. With environmental awareness more acute than ever, these all-electric cars have skyrocketed in popularity.

This transition from petroleum-based fuel powered cars to electric cars have largely been thanks to the aforementioned lithium-ion battery cells, which allowed electric cars to go faster and last much longer, reviving consumer interest in electric cars. With the rapidly rising demand for electronic cars, it is natural that demand for rechargeable batteries will also be driven up – in particular, demand for lithium-ion batteries.

2. Battery Metals and their Respective Markets

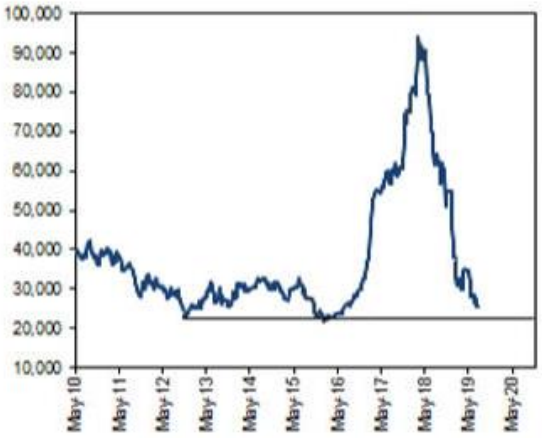
The battery metal market refers to the main input metal commodities in the production of batteries; lithium, nickel and cobalt. In the current development of lithium-ion batteries, lithium nickel manganese cobalt oxide (NMC) batteries are primarily used for rechargeable car batteries, meaning that these metal markets are the most affected by the booming electric car industry. However, the effects deriving from this increased demand from electric cars is both unclear and misleading when studying the lithium market owing to NMC battery production not being a large enough proportion of the lithium market. This is even more the case for nickel, as its sheer size and many uses dilutes the influence of electric cars on the market. As a result, it is most appropriate to study the effects of derived demand from rechargeable batteries on the cobalt market. As of 2016, 51% of cobalt is used for lithium-ion batteries, while being a relatively small market, not exceeding 95,000 metric tonnes (MT)

consumed. NMC batteries contain 10-20% cobalt, with each new electronic car using 5-10 kilograms of cobalt. This makes cobalt the most ideal market to study the effects of the rapidly growing EV industry.

3. Demand and Supply of Cobalt

Amongst other commodities, cobalt has experienced one of the most pronounced price volatility in recent years.

Average Cobalt Price per MT



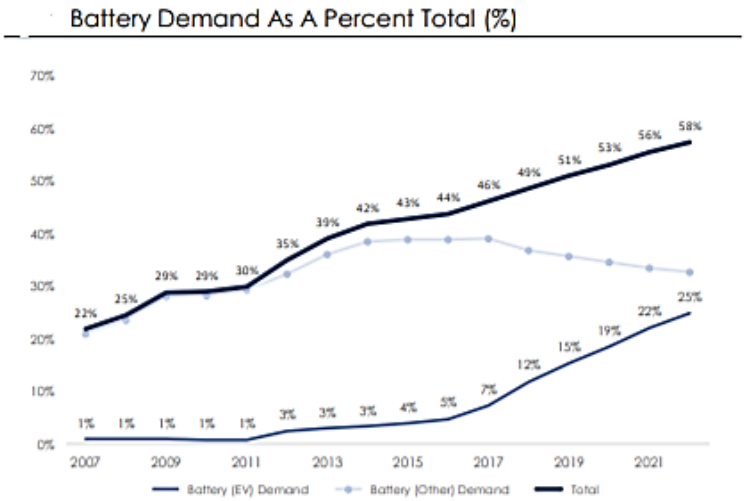
Sources: Bloomberg, Fitch Solutions

Cobalt prices before 2016 had been relatively calm despite growing interest in EVs, largely due to a lack of mainstream retailing of consumer-friendly EVs. After Tesla's release of the first mainstream electronic cars, prices have rocketed to $95,000 per MT due to the hype for the potential of the EV sector. In the 2nd quarter of 2018, however, cobalt prices plummeted down to 70% on a year-to-year basis (current spot price is at ~31,000 per MT), within a few months. To understand what exactly is behind this collapse, we first need to look at the movement of demand and supply for cobalt.

The supply of cobalt is particularly interesting in that despite cobalt being a critical raw material fundamental to industry, as classified by the USA, cobalt supply is still highly inelastic even though cobalt is not particularly rare, ranking 31st in global abundance. This is largely due to the fact that 98% of the production of cobalt is from the by-product of copper or nickel production. This helps to explain why the supply of cobalt has been rising since the 2000s despite low prices – copper production especially has been massively boosted since 2000. The large existing stockpiles of cobalt, however, did not stop people from capitalizing on high prices in 2017. Owing to 60% of cobalt being sourced from the Domestic Republic of the Congo (DRC), many Congolese saw this as an opportunity to profit and to leave the highly unstable DRC. This supply surge of cobalt has been fuelled by both miners looking to profit, as well as from the informal industry where private backyards were turned into artisanal mines. However, as it became apparent that growth rates of the EV sector were not going to be as high as expected, prices for cobalt started plummeting as miners rushed to sell off their existing stock of cobalt. This then led to a supply plateau as miners and the informal market saw the dipping prices and held off production of cobalt in exchange for opportunities for more profit elsewhere.

Unusually for a commodity, cobalt had strong demand growth every year since 2006, with an average annual growth rate between 2007 and 2017 at 7.6%. This was largely due to the slow transition towards using lithium-ion batteries and the boom of touchscreen phones which require higher energy density

and more powerful batteries. It is expected that growth will continue at 4.5% in the next 3 years, being purely driven by battery demand.



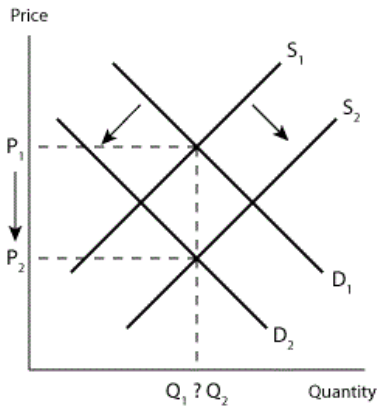
Source: Global Mining Research, CI, USGS, Antaike

Demand for cobalt from EV battery demand is currently taking up 15% of total cobalt demand, a sharp rise from 5% in 2016, before EVs started to be mainstream.

As a consequence of the high prices, however, EV producers have looked for technology to reduce the cobalt content in lithium-ion batteries. In May 2018, Tesla co-founder Elon Musk warned that 'We [Tesla] think we can get cobalt [in their lithium-ion batteries] to almost nothing'. This led to demand for cobalt dropping, as investors started being sceptical for the need of cobalt in the future.

The drop in price was also in no small part thanks to metal traders over-hyping EV growth rates, creating expectation in other investors and leading prices to rocket as some started to stockpile (especially in China), hence helping to increase their profits earned. This inevitably led to price drops as investors began to realize EV growth rates were not as high as forecasters were hyping them up to be: prices were bound to fall back to a more reasonable level.

In addition to this drop, by the law of supply and demand, we can then understand why prices plummeted in 2018;



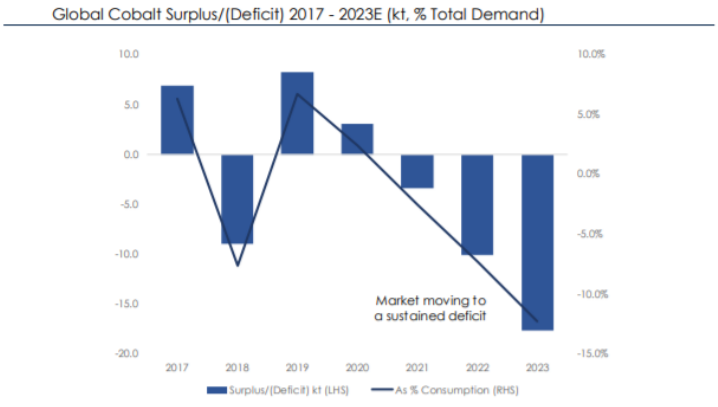
When both supply increases and demand decreases, there will be a sharp drop in the price of the good (cobalt)

4. Market Outlook on Cobalt

If we move a few years forward from the initial boom of the EV industry in 2016;,the advancements of this technology is much more familiar, allowing us to understand what direction the industry is heading. It is clear that most auto-manufacturers are looking to release (or have already released) new auto-models with in inclusion of an EV choice, partially due to governments pushing and incentivizing car makers with tax benefits and grants. Despite EVs being usually more expensive to purchase and maintain, consumers have increased their purchases, as over 2 million EVs were sold in 2018, up from just a few thousand in 2010. Bloomberg expects this figure (EVs sold) to rise to 10 million in 2025, 28 million in 2030 and 56 million by 2040, accounting for 57% of all passenger vehicle sales and over 30% of the global passenger vehicle fleet. The demand for cobalt is therefore expected to increase steadily in line with the demand for EVs. A report by UBS predicts the global market for EV batteries to grow tenfold by 2025.

On the other hand, as 60% of world supply comes from the DRC, poor transport networks, domestic politics disputes and changing fiscal policies mean that cobalt supply will always be uncertain. In August 2019, the mining giant, Glencore, announced that it will be temporarily closing the world's largest cobalt mine in DRC, accounting for 20% of all cobalt production, in an attempt to revive cobalt prices. This move is likely to result in the initial 11,000 MT surplus of cobalt in 2019 turning into a deficit, scaring EV producers to stock up on cobalt, which can result in prices being brought back up faster and higher than initially expected.

Considering the constant growth in cobalt demand along with restricted supply, the market is predicting that cobalt will go into a permanent deficit in 2021 and beyond if EV growth rates occur as most forecasters assume.



Source: Global Mining Research, CI, USGS

However, technological advancements have always run faster than we could predict. While battery producers are focusing on improving the capacity, durability and efficiency of lithium-ion batteries, scientists are now searching for alternate battery types, using silicon to achieve three times the performance of current graphite lithium-ion batteries. Other than silicon, scientists in Japan are working towards using sodium to replace lithium. Commercialization of these batteries is expected to begin within the next five to ten years. Apart from that, in pursuit of even more environmentally friendly alternatives to petroleum-based fuel, scientists are also working on the implementation of hydrogen fuel tanks into automobiles, which can reduce the reliance of batteries in the future auto-market.

In conclusion, technology is changing our daily lives, impacting heavily on world economic activities. Commodities markets, in particular base metal markets, which act as indicators for the world economy, are highly sensitive to changes in technology. These changes could result in a fundamental change in the demand of different kind of metals. The electrification of the world has already led to increase demands for copper, a primary component of wires. These changes are especially affecting for cobalt, with a relatively tiny market and being largely demand driven, prices are highly sensitive to technological changes.

Sources

Anon. (2019) *Abundance of elements in Earth's crust*. https://en.wikipedia.org/wiki/Abundance_of_elements_in_Earth%27s_crust [Consulted 08 2019]

Anon. (2019) *Commodity, Cobalt*. https://tradingeconomics.com/commodity/cobalt [Consulted 08 2019]

Anon. (2019) *Electric vehicle*. https://en.wikipedia.org/wiki/Electric_vehicle [Consulted 08 2019].

Attwood, J. & Ritchie, M. (2018) *Elon Musk Warns That Tesla's Cobalt Use Is Heading Toward Zero*. https://www.bloomberg.com/news/articles/2018-05-02/tesla-supercharging-its-model-3-means-less-cobalt-more-nickel [Consulted 08 2019]

Clowes, W. & Kennedy, W. (2019) *Glencore Tries to Limit Fallout From Congo Mine Halt*. https://www.bloomberg.com/news/articles/2019-08-07/glencore-tries-to-limit-fallout-from-shutting-congo-cobalt-mine [Consulted 08 2019]

EV Outlook Team (2019) *Electric Vehicle Outlook 2019*. https://about.bnef.com/electric-vehicle-outlook/ [Consulted 08 2019]

GEMC (2017) *Cobalt Demand*. https://www.globalenergymetals.com/cobalt/cobalt-demand/ [Consulted 08 2019]

Global Mining Research (2018) *GMR Cobalt*. s.l.: Global Mining Research.

Information and Outreach Program at NREL for the DOE Office of Energy Efficiency and Renewable Energy (2001) *Advanced Technology*. United States: U.S. Department of Energy.

KAWAMA (2018) *Can the world produce enough cobalt for electric vehicles?* https://www.economist.com/business/2018/12/01/can-the-world-produce-enough-cobalt-for-electric-vehicles [Consulted 08 2019]

Larsen, N. (2019) *WHY HAVE COBALT PRICES CRASHED*. https://internationalbanker.com/brokerage/why-have-cobalt-prices-crashed/ [Consulted 08 2019]

LME (2019) *LME Cobalt*. [Consulted 08 2019]

MINING.COM Editorial (2019) *Lithium and cobalt prices to remain under pressure as supply overtakes demand*. https://www.mining.com/lithium-and-cobalt-prices-to-remain-under-pressure-as-supply-overtakes-demand-report/ [Consulted 08 2019]

Pettit, C.-l. (n.d.) *Lithium-ion*. https://www.cobaltinstitute.org/lithium-ion-batteries.html [Consulted 08 2019]

Radford, C. et al. (2019) *BATTERY RAW MATERIALS MARKET REPORT 16/08: Cobalt sulfate discount widens as salts rally stalls; metal trades above $15/lb*. https://www.metalbulletin.com/Article/3889699/Search-results/BATTERY-RAW-MATERIALS-MARKET-REPORT-1608-Cobalt-sulfate-discount-widens-as-salts-rally-stalls-metal.html [Consulted 08 2019]

Rostás, R. (2018) *Electric vehicles to grow battery market tenfold by 2025, UBS says*. https://www.metalbulletin.com/Article/3846018/Search-results/Electric-vehicles-to-grow-battery-market-tenfold-by-2025-UBS-says.html [Consulted 08 2019]

Terashi, S. (2019) *Toyota's Challenge - Aiming to Popularize BEVs*. s.l., s.n., p. 45.

THE DATA TEAM (2019) *Electric vehicles are poised to unleash a cobalt boom*. *The Economist*, 22 March.

Wilkins, J. (2016) *The rise, fall and resurgence of the electric car: are new technologies set to increase sales?* http://www.engineersjournal.ie/2016/07/26/rise-fall-resurgence-electric-car/ [Consulted 08 2019]

Containerization and globalization

Yuming Guo

From a t-shirt made in Bangladesh to a car made in South Korea, from a Japan-made forklift to machinery imported from China, global trading is more and more common to everyone in the society: from firms to households, from the rich to the poor, no one can avoid being involved in the unprecedented level of integration of the global economy, or in other word, globalization.

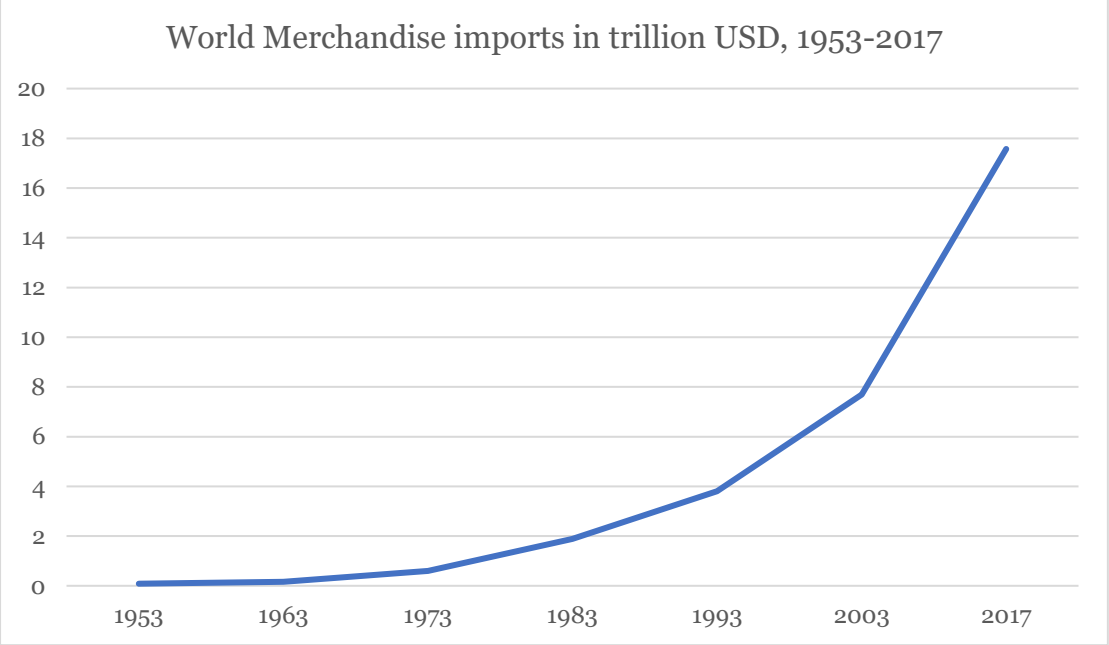


Figure 1: World Merchandise Imports, 1953-2017[1]

The entire process of globalization has been made possible thanks to plummeting costs of international shipping, which made international trades more and more cost-effective, which made the world economy closer and closer to the optimal economy according to the assumptions of the famous relative advantage theory, where there should be no transportation costs at all. And among all the factors that reduced shipping costs, containerization and automation may be ranked as the most important.

Today, a very large proportion of goods shipped worldwide are moved in containers, as figures showed that 90% of non-bulk cargo is already being shipped in a container back in 2009.[2] In this essay, I am going to focus on all the changes containers have brought, from the points of view of shippers, ship and train lines, workers and consumers.

[1] World Trade Organization. World trade statistical review 2018. https://www.wto.org/english/res_e/statis_e/wts2018_e/wts2018_e.pdf.

[2] Ebeling, C. E. (2009). 'Evolution of a Box'. Invention and Technology. 23 (4): 8–9.

Before containers were invented, most goods were transported as break-bulk cargo, a time-inefficient, cost-inefficient and unreliable way of cargo transportation. These disadvantages are caused by its transportation process, where the cargo had to be loaded and unloaded multiple times, and vessels will often be calling at many different call points before arriving at its final destination. Theft is also very commonly seen because all the cargo is stacked together on the deck. These are the problems containers aim to solve.

The origin of containerization could be found in 1830s northern England, where coal mining was the dominant industry. In England's first inter-city railway, the Liverpool and Manchester Railway, early containers could be found used to transfer coal between different means of transport. 'Simple rectangular timber boxes, four to a wagon, they were used to convey coal from the Lancashire collieries to Liverpool, where they were transferred to horse-drawn carts by crane.'[3]

Although containers were being used throughout the period, the first purpose-built container vessel wasn't built until 1955, when the 'Clifford J. Rodgers' owned by the White Pass and Yukon Corporation was finished in Montreal, Canada.[4] The ship was also written into the history of containers by being involved in the world's first intermodal service, using different means of transportation including ships, trucks and railroad cars. The advantage of container shipping is that these boxes don't have to be opened while being loaded and unloaded, which not only reduces port-time of the vessel significantly but also saves an enormous amount of labour, improving both time and cost-efficiency.[5]

In April 1956, American trucking entrepreneur Malcom McLean put 58 containers (which were still called 'trailer vans' at the time)[6] into a refitted WWII tanker ship called 'SS Ideal X' and sailed them from Newark, New Jersey to Houston, Texas.[7] It was a truly successful practice on reducing shipping costs, as the cost of loading loose cargo on a medium-size cargo ship was $5.83 per ton back in 1956, while the cost of loading the new Ideal-X was only 15.8 cents per ton.[8]

The success of McLean's Sea-Land Service (hereinafter called Sea-Land) attracted more and more competitors into the market and multiple incompatible standards of container appeared in the USA alone. For example, Sea-Land used 35-foot containers while Matson Navigation Company (hereinafter called Matson) used 24-foot containers. As standardization was one of the most essential purposes of containerization, a standard for the whole industry was needed. Between January 1968 and October 1970, the International Organization for Standardization (hereinafter called ISO) gradually sat standards for containers, including its size (ISO 668), identification marking (R-790), corner fitting (R-1161) and more, which sat 20- and 40-foot as main standard length for a container, [9] a huge step made

[3] Essery, R., Rowland. D. & Steel W. (1979). *British Goods Wagons from 1887 to the Present Day*. New York, p. 92.
[4] Hougen Group of Companies. *'White Pass the Container Pioneers'*. https://hougengroup.com/yukon-history/yukon-nuggets/white-pass-the-container-pioneers.
[5] Yukon museum guide. *'Cargo Container'*. https://yukonmuseums.ca/treasures/ytm/09.html.
[6] *New York Times. (April 27, 1956).* 'TANKERS TO CARRY 2-WAY PAY LOADS; Filled Trailer Vans to Form Cargoes for Vessel That Normally Carry Ballast'.
[7] Levinson, M. (2006). *The Box: How he Shipping Container Made the World Smaller and the World Economy Bigger*. Princeton, p. 68.
[8] *Levinson* ibid.: 68.
[9] European Conference of Minister of Transport. (1969) *Fifteenth Annual Report and Resolutions of the Council of Ministers*. OECD Publishing, p. 68.

by ship lines, as the standardization made inter-company transportation viable, which was the base of the later formed North Atlantic Shipping Conference. Those standards are still in use today.

However, containers only began to change the global economy as a whole since the mid-1970s, when the transportation industry was deregulated in the US. There is no doubt that this brought enormous benefit for consumers and shippers. 'Airfares are down sharply; trucking rates have fallen; the nation's railroads are offering new services.'[10] Heavily fallen transportation costs made moving labour-intensive production to countries with lower labour costs viable. In 1975, the time when transportation costs began to plummet, the mean hourly compensation costs for production workers in the Figure 2, World Merchandise Trade as a percentage of World GDP[11]

Figure 2: World Merchandise Trade as a percentage of World GDP[12]

manufacturing sector was $6.24 in the US, while the average earning in manufacturing of Japan at that time was only $2.95, and even lower in South Korea ($0.31) and Taiwan ($0.39).[13] This means that moving labour-intensive work abroad could easily save more money from wages than extra transportation costs, and that was what employers did.

From the chart above we can see that trade has had an increasing share of world GDP during the 1970s, which supported the view that lower transportation costs encouraged firms to move their production to countries with lower wages since it reduces their costs. Obviously, this is beneficial to producers, as lower costs are always a good thing; meanwhile, the competition among firms also made a part of the benefit of lower costs to the pockets of consumers, which made goods cheaper in developed countries. However, it wasn't everyone that enjoyed the benefits: As jobs are being transferred to relatively less

[10] Moore, T. G. (1982) 'Deregulation and Re-Regulation of Transportation', *Cato Institute Policy Analysis No. 12*.
[11] World Bank. *'Merchandize trade (% of GDP)'. https://data.worldbank.org/indicator/TG.VAL.TOTL.GD.ZS.*
[12] World Bank ibid.
[13] U. S. Bureau of Labor Statistics. (2010). 'Mean hourly compensation costs in selected countries, 1975 and 2007'. https://www.bls.gov/opub/ted/2010/ted_20100714.htm?view_full.

developed economies, developed economies tend to lose low-end jobs. While the unemployment rate in Japan stayed below 2.5%,[14] the unemployment of the USA has risen, as shown by the chart below:

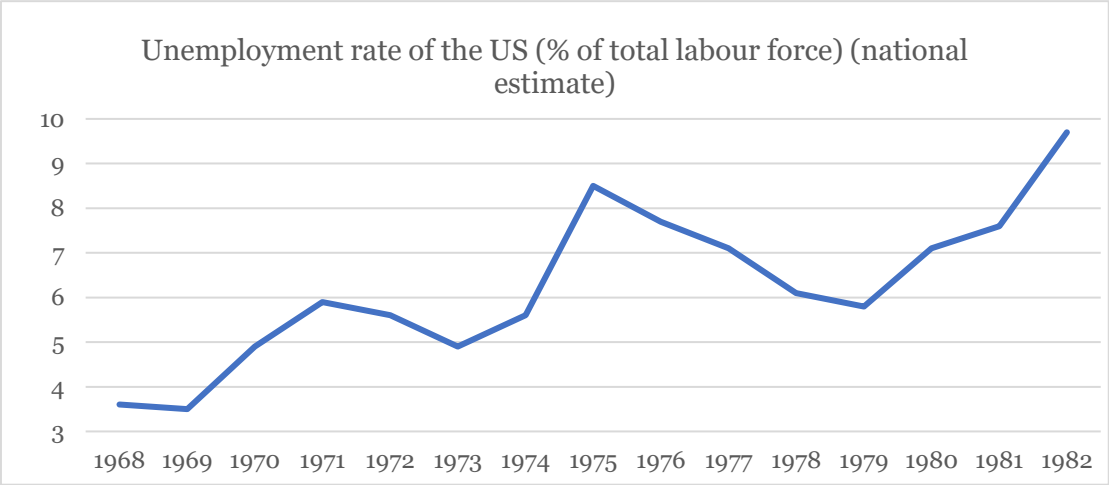


Figure 3: Unemployment rate in the USA (national estimate) as a percentage of total labour force[15]

Although it was mainly the 1973 oil crisis and the 1973-1975 recession that caused the rise of unemployment in 1975, we can see the possible effect of the cheaper transportation by comparing the unemployment in 1973 to the figure in 1979 (where unemployment were at the low point in two different economic cycles).

The changes in wages in Japan also showed the same pattern. Japan experienced a significant wage rise during the period (as shown by the chart below).

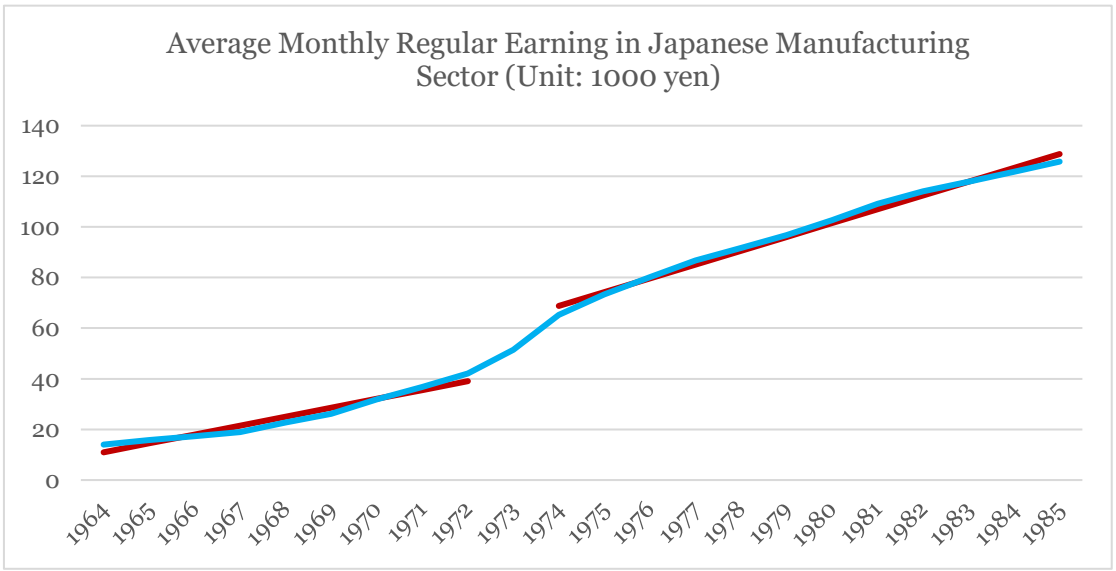


Figure 4: Average Monthly Regular Earning in the Japanese Manufacturing Sector[16]

[14] World Bank. *'Unemployment, total (% of total labor force) (national estimate)* https://data.worldbank.org/indicator/SL.UEM.TOTL.NE.ZS?locations=JP.

[15] World Bank ibid.

[16] Statistics Bureau of Japan. *'Age, Years of Service, Monthly Cash Earnings of Regular Employees and Number of Employees by Industry and Sex (Enterprises with 10 or more Regular Employees) (1958-2003). (Chart 19-37-a).* https://stat.go.jp/English/data/chouki/19.html.

In the chart above, we can identify two trendlines (marked red) with similar gradients, and the curve switched from the lower one to the higher one at around 1974, which was exactly the time period when deregulation of transportation industry worldwide began. In my opinion, the rise in wages was caused by a big increase in demand for labour, which was caused by increased foreign direct investment led by lower transportation costs.

China is another big winner of containerization. With a huge population (almost 1.3 billion as of 2000[17]), low wages (average annual earning of a Chinese urban citizen was only 6,907 CNY[18] ($834[19]) in 2001), high population density (of the eastern part of the country), adequate education level (59.7% of China's population were educated for at least 8 years,[20] which makes a person capable of most factory works), hardworking culture and only very basic worker protection (which made long working hours possible) and policies encouraging foreign investments (as the 'Reform to the Open' was highly prioritized), the huge country is destined to be successful in its new position.

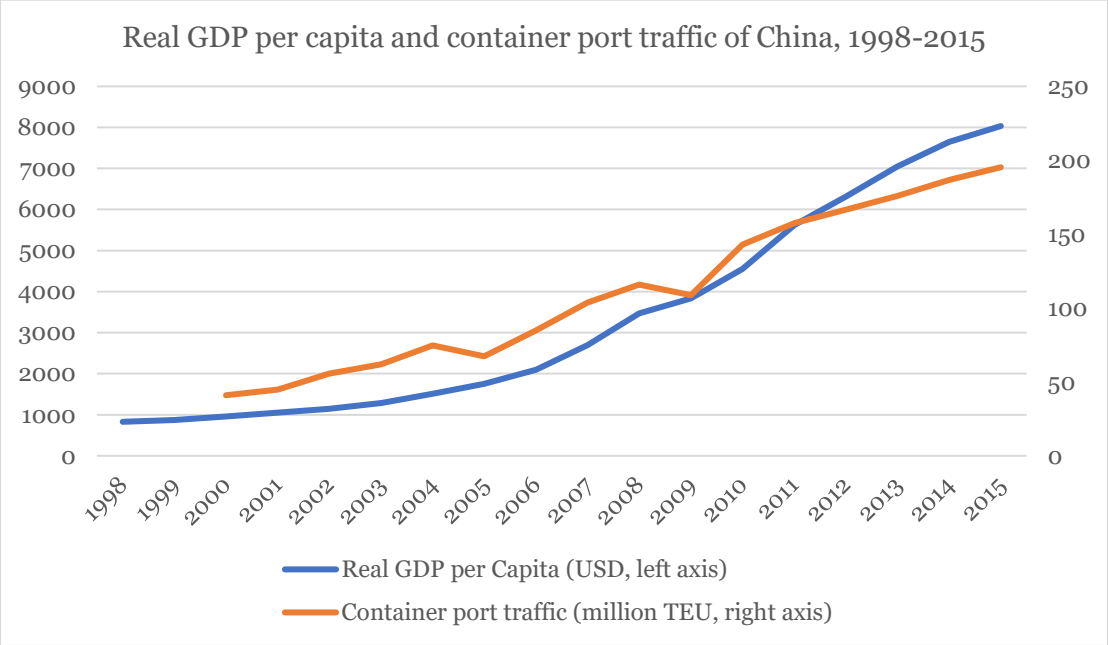


Figure 5: Real GDP per capita and container port traffic of China, 1998-2015[21]

[17] National Bureau of Statistics of China. *(2001). 'Communiqué on Major Figures of the 2000 Population Census'. http://www.stats.gov.cn/english/NewsEvents/200204/t20020423_25982.html.*

[18] National Bureau of Statistics of China. *(2002). 'China Statistical Yearbook-2001'.*

[19] National Bureau of Statistics of China. *(2016). 'China Statistical Yearbook-2015/Financial Intermediation/19-8 Reference Exchange Rate of Renminbi (Period Average)' http://stats.gov.cn/tjsj/ndsj/2015/indexeh.htm.*

[20] National Bureau of Statistics of China. *(2001). '第五次人口普查数据（2000年）表4-1 全国分年龄、性别、受教育程度的6岁及6岁以上人口 (English: Statistics of the Fifth National Population Census (2000) Table 4-1: Population aging 6 or over by age, sex and education level)'.*
http://www.stats.gov.cn/tjsj/ndsj/renkoupucha/2000pucha/html/t0401.htm.

[21] World Bank. *'GDP per capita (current US$) of China'.*
https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CN.
'Container port traffic (TEU: 20-foot equivalent units) of China'.
https://data.worldbank.org/indicator/IS.SHP.GOOD.TU?locations=CN.

From the chart above, the growth of China's GDP per capita almost followed the same trend as the country's container port traffic, and we can clearly notice the influence of world economy on China as well, like the 2008 financial crisis, which isn't seen that often before, when China was still a 'traditional' Communist country that rarely gets involved in the global market. The idea is that the low cost created by containerization made it possible for China to join the globalization process by doing labour-intensive manufacturing, which is although considered as low-end jobs in most of the Western world, are still good-paid jobs in developing countries.

China's integration of the global economy also pushed the country's urbanization and industrialization. According to the chart below, only about 37% of China's population lived in a city, but that has gone up to over 55% in 2015, which means over 200 million people moved from rural areas to cities due to higher wages. These higher wages also meant a lot. It is obvious that if someone has money, he/she has to spend it somewhere, and that was what Chinese people did. With a fast-growing economy, China's market has already become big enough to consume most of its products as people in China has become wealthier, which is why China's GDP per capita began to grow even faster than container traffic since 2011 in the curve above: China's market is growing at a higher rate than world economy as a whole.

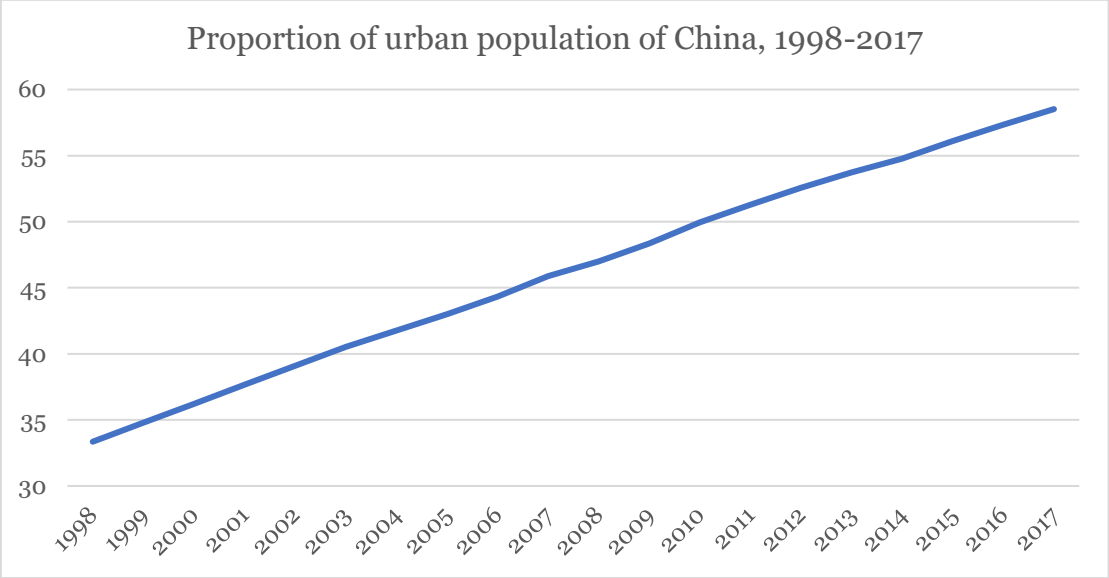


Figure 6: Proportion of urban population of China, 1998-2017[22]

However, as wages in eastern China have risen rapidly,[23] China's advantage in labour-intensive industries has become smaller and smaller. But this wasn't bad for the Chinese economy at all: Higher earnings and education level of China enables the country to start entering into industries with higher technology level, which is how companies like Huawei and DJI quickly took down a good proportion of

[22] National Statistics Bureau of China. *'China Statistical Yearbook-2017.'* http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm.

[23] *Average annual earning of China's urban workforce has risen to 82,461 CNY ($12,437) in 2018.*
Source: National Statistics Bureau of China. *'China Statistical Yearbook-2018'.*
http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm.
Exchange rate used: *Average closing price in 2018 (1 USD=6.63 CNY)*

their relative markets, and pushed the country into its transition from goods to services, which causes way less pollution and makes way more money, as the chart below shows.

Figure 7: Contribution of various sectors to GDP in China, 1999-2018[24]

And now, these labour-intensive industries, like clothing industry, are moving further to countries with even lower wages like Vietnam and Bangladesh, which are also fast-growing economies.[25] Container, the magic box, brought growth to the less developed countries and reduced production costs significantly, which was beneficial for consumers in rich countries as well.

Containerization has reduced the cost of international shipping dramatically and helped mid-income jobs to be distributed more equally across countries. The most significant effect of the process is the decrease in inequality between countries. In 2000, real GDP per capita in high-income countries ($25,593.4) were almost 75 times real GDP per capita in low-income countries ($341.44), but in 2018, this has reduced to 55 times ($40,763.1/$737.0), and this figure is still based on the fact that many of the low-income countries don't even have adequate infrastructure for globalization. If we look at the upper-middle-income group (where China, the fastest-growing economy is in), we can see that the difference reduced from 13 times ($25,593.4/$1967.3) to only about 5.1 times ($40,763.1/$7921.7).[26] As container ports and other infrastructure projects are being built in more and more countries, it is believed that there will be even less inequality between countries in the future.

[24] National Statistics Bureau of China. *'China Statistical Yearbook-2018'*. http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm.

[25] *In 2018, Real GDP per capita in Vietnam was 6.57 times as it were in 2000 and in Bangladesh it was 4.06 times.* Source: World Bank. *'GDP per capita (current US$) of Vietnam and Bangladesh'*. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=VN-BD.

[26] (For all figures in the paragraph) World Bank. *'GDP per capita (current US$) of High-Income, Upper-Middle-Income and Low-Income Countries.* https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2016&locations=XD-XT-XM&name_desc=false.

However, it is believed that inequality within a country has risen during the period, as the chart below has shown:

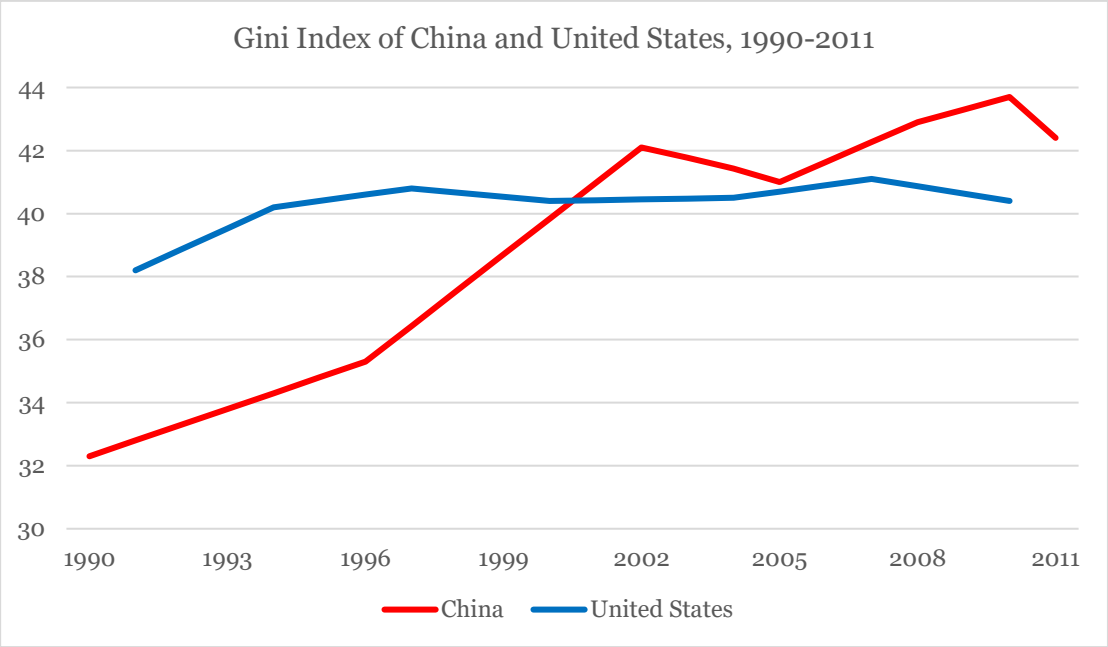


Figure 8: Gini Index of China and the United States, 1990-2011[27]

There were some upward changes in Gini index of both countries (although the change is more noticeable in China), which means that although inequality between countries has fallen, there is now more inequality among citizens of the same country.

To explain why this happened, I divide everyone in the world into four groups and explain how globalization affected their lives: The rich of rich countries (RR), the relatively poor of rich countries (PR), the middle class of developing countries (RP) and the poor of poor countries (PP). Examples of group RR may include CEO of an international company headquartered in Switzerland; group PR may include an average steelworker in northern England; group RP may include mid-level employees of Huawei or experienced factory workers in China; group PP may include a farmer living in rural Tanzania.

In the globalization process, group RR is always the one who gets the majority of the profit, so they will end up making money just as before; group PP isn't even involved in the process, as they don't have adequate infrastructure to be connected to the world. However, life of the other two groups has changed dramatically: According to the market mechanism, when there is a new substitute(cheaper labour in developing countries) for a good(low-skilled labour in developed countries), its demand will fall down, causing a decline in the amount supplied (less employment) and lower prices(decline in wages), while demand for labour in developing countries has risen, causing the opposite effect (higher employment and higher wages). This means that the globalization mixed the two groups together, changing the fact

[27] World Bank. *'GINI index (World Bank estimate) of China and United States'*. https://data.worldbank.org/indicator/SI.POV.GINI?locations=CN-US.
There are only data of China for 1990, 1996, 1999, 2002, 2005, 2008, 2010 and 2011; there are only data of United States for 1991, 1994, 1997, 2000, 2004, 2007 and 2010.

that the relatively poor in developed countries used to live a way better life than the average citizen in developing countries (which matched the famous chart describing globalization as an elephant).

There is no doubt that the achievement of containerization is huge. We can say that it made the biggest contribution in creating the condition for globalization, which, obvious has created a huge amount of wealth around the globe. Nowadays, almost everything is produced internationally. If you look around you will find globalization everywhere: your iPhone is being produced by factories in over 30 countries; your clothes may be produced in Bangladesh; the decorations in your living room may be made in China. . . The term 'globalization' isn't stuck in textbooks and academic research. Instead, it is a process that everyone can feel. The lives of millions of people are changing; products of a country you may not even have heard of are on the shelves of your nearby store; now you may even spend a holiday in the other side of the globe.

Every second there are vessels sailing on the sea. As long as these vessels are being loaded and unloaded with containers, the world economy will flourish.

The Winter War

Tom Oglund

On the ground the leaves lay. Gone from verdant green to a fragrant orange, or a pale yellow. Lost from the grasps of the tree, twirling in flight through the wind, a cool breeze. The leaves pile on top of each other, in the dirt. Some rot, and go a hideous black, for all type of matter and insects to feast themselves upon. While others cling on to life, blown through the dark October sky, through children's scrunching hands, or scraping feet. Through freezing ponds, or bustling streets. The trees feel desperate too, knowing what is coming. Like someone losing their hair, the leaves break off, one by one, the warmth and protection and energy gradually disappear. They are near naked in the Autumn.

The grass sway and sing in a line, directed by the wind, a song of sorrow, of fright, of prayer. The rain begins to patter down, seeping through the iced soil. From first sight this is a plentiful supply of water, but no. The factories are continuously pumping out filthy clouds, and the rain is poison. Like men on a battlefield, all nature sits there, and pray that the shells do not hit them, seeing smaller plants slowly shrivel up around them.

November. The time of day is unintelligible. There is no sunlight, nor moonlight. Just dreary clouds and dark skies. Nothing is cheerful, and nothing is warm. The spirit is cold. The birds do not come out to sing or tweet. The butterflies do not come out to dance or spread the growth of nature. The very atmosphere of the month is glum. The pond is frozen solid now, and boys and girls come from their schools and eagerly skate along it, as the ducks and swans watch jealously from their shelters. It does not seem fair, how the animals can rest throughout the whole of winter, while the nature must endure every step of the way, draining every ounce of courage and fight from them, the tension is high.

Small snowflakes begin to slowly fall down onto the ground, gently resting there. As the days go on, the snowflakes begin to tumble in more frequent amounts, feathered crystals which fall, landing upon the hardened floor. Nature begins to be concealed by the falling flakes and the start of December seems unmissable- bit by bit the ground is coated, and everything goes black.

December. The wind howls, swirling in the icy gale. Plants and bushes coated in glimmering snow twinkle in the reflection of the rapidly disappearing sun. The snow rests upon park benches as if they were cushions, covering the rich wood in a perfect white. The trees remain tall, as skeletons whose tissue lies beneath the snow. Bony fingers reach out as if to grasp the air, and whispers are heard in the wind. Nature is frozen still, no sunlight, water droplets frozen on their shivering stems, and constantly weighed down by the snow.

The only benefit of all this is the plentiful amount of water from underneath the ground, although almost icy cold. But even then, roots from trees struggle to burrow through the frigid ground, which has been hardened by winter. Winter truly seems to be an enemy of nature. All that can be done is to wait for everything to be over. Wait for the cold to stop.

Spring! What joy, the birds are tweeting, the leaves are growing into magnificent lush green. The yawns of animals awaking from their long slumber. The ducks float happily around the pond, and this time it

is the children who glare enviously and feed them bread. The butterflies dance, the flowers blossom, and it seems to be the end of the war. But it isn't. This war never ends. But forget about that now, it is Spring, and everyone is beaming happily. Until October rolls around again.

logos

Can artificial intelligence be intelligent?

Will Wood

Some offer essay-writing guidance using AI, while others pay human authors to make for you. In the article, we'll discuss essay work companies that apply AI technology. How will you get the most of these companies? In what ways will you change the articles using AI work tools? The section gives you important tips on how to make an essay using AI. Using the AI writing writer is simple. This method is easy, and there are not a lot of messages to go. One thing you to make note is that the AI author probably works a bit different than other software or instruments because of this AI planning. Normally, with AI writers you just want to give the name of the writing or other requirements, if there exist.

Now, you might have noticed that my introduction seems a little off. This is because it was written by an AI. So, the answer to my essay question is: 'Yes? Well, not necessarily.' The AI from *essaybot.com* that 'wrote' this simply took my title 'Can an AI write my Essay?' as a search term, found an answer from the internet and rephrased it so that its own plagiarism checker wouldn't recognize it. That paragraph isn't original, nor does it make any sense. So, is it correct to call it intelligent? This 'intelligence' does indeed seem artificial. However, the field of AI is far larger and more sophisticated than a free online essay tool. AI does exhibit some sort of acquisition of knowledge, application and even more importantly learning, but is this sufficient for intelligence?

AI itself is an umbrella term for a field with important sub-sets that have the overall goal of creating a machine that can function in an intelligent manner. Defining intelligence is difficult and has been attempted in many ways. On this subject psychologist Howard Gardner has said:

> *To my mind, a human intellectual competence must entail a set of skills of problem solving — enabling the individual to resolve genuine problems or difficulties that he or she encounters and, when appropriate, to create an effective product — and must also entail the potential for finding or creating problems — and thereby laying the groundwork for the acquisition of new knowledge.* (Gardner 1993)

What this and other definitions share are the traits of learning from, reacting to and solving problems. These AI sub-sets all represent those capabilities that such a machine would need to demonstrate intelligence (*Subsets of AI* n.d.). AI Learning is typically performed by forms of Machine Learning where a computer is 'trained' using algorithms to recognize certain

patterns with which it can then associate outputs based off its calibrated inputs (C 2018). This training knowledge can be stored and can be applied again, but only to a limited set of very similar unseen problems. Although this process incorporates learning and applying what it has learned, it lacks self-sufficiency as it must be exogenously trained by humans. However, a sub-branch of Machine Learning called Deep Learning allows for unsupervised training (Brownlee 2016). Deep Learning trains itself through layers of algorithms in an Artificial Neutral Network, calibrating itself to a large volume of data. This allows a degree of calibrated supervision of the learning process and the AI is continuously improving its internal state. On the one hand, Deep Learning sub-sets seem to constitute intelligence: there is an acquisition of new knowledge, an application of what has been learnt to its algorithms and a degree of autonomy.

However, Cambridge Professor Jon Crowford argues in his blog that deep machine learning is applied data science not AI and 'deep learning still isn't intelligent, though it sure is artificial' (Crowford 2018). Sophisticated calibrated neural nets that can identify emotions in crowds, or that power driverless cars, are useful tools, but neither one could perform the other's job. Ultimately, AI are just trained algorithms and they execute specific code dedicated to their specific task without knowing what the purpose of the algorithm they are performing, why they are executing it nor that they are executing code. In this way they lack understanding and are behaving intelligently but are not thinking intelligently, or thinking, or even being conscious. Any current AI, whether it counts ants or beats humans at Go, are all known as Weak AI. Weak AI perform a single task by simulating human cognition; they are highly efficient, specialized tools (Nicholson n.d.). The key distinction between behaving intelligently and thinking intelligently is consciousness. Before machines can think and become genuinely intelligent, they must have consciousness. Consciousness is required to think, reason and understand not just perform instructions. In short, Weak AI acts intelligently but is actually narrow in scope and until AI becomes conscious it will not exhibit genuine Intelligence.

But can consciousness be engineered? When Alan Turing approached the question 'can machines think?', he theorized a machine that consisted of an infinite strip of 1s and 0s with a reading head that can read or write a 1 or 0 to a single bit square which could be manipulated left or right (Mullins 2012). All computers and computer software can be described in this framework so whether you are running word on a desktop or minesweeper on a MacBook, you are fundamentally executing a number of algorithms on a so-called Turing Machine. Turing thought there might be a practical necessary test for detecting artificial intelligence (Bansal n.d.). Turing's Test involved two subjects, one human and the other a Turing Machine as well as a human observer. The observer can ask as many questions as it likes, and the subjects would answer via an anonymous text-based interface. When the test ended the observer would pick a subject it thought was human. The principle being that, if the machine could

perform better that a human, then we could believe it was intelligent. This test, although only thought as an approximation by Turing has a number of flaws in regard to defining Intelligence and consciousness. While passing a Turing Test maybe necessary for consciousness, it is not sufficient. For example, Deep Blue's defeat of Gary Kasparov at chess would pass a Turing Test, suggesting it is intelligent and therefore conscious when it is actually a very unconscious series of pattern finding algorithms. This is also another problem: any Turing Test is limited. A perfectly trained AI that could be perfectly created to fool the behaviour and language of a conscious person with a sophisticated enough algorithm and therefore passing the Turing Test without being neither conscious nor genuinely intelligent. Therefore, the Turing Test is not particularly useful but does show intelligence is not something that is easily tested practically but requires a theoretical approach.

Theoretically, if you had a conscious intelligent Turing machine, how could you tell it was conscious and intelligent? This theoretical device is referred to as strong AI and outlines that, with sufficiently complex algorithms executed on a Turing Machine of any hardware, consciousness can be achieved. However, this idea has been deconstructed by John Searle's famous Chinese Room argument (Searle 1980). In this scenario a person is inside the Chinese Room and passed Chinese messages through a slot. The person must return an answer written in Chinese but doesn't speak any Chinese themselves. They do however have a rule book that tells them how to calculate the correct answer for the given input. Seale argues that with a good enough book or algorithm, one can provide the correct answers without speaking or leaning any Chinese. In this way his answers will have the right syntax but no semantics. In the same way the symbols of Chinese may be unknown to the subject, the binary symbols 1s and 0s are unknown to a Turing machine. A Turing machine may well have an algorithm that can manipulate syntax, but it will never have an understanding of the semantics (Friedman 2002). Without this capability it won't be able to reason with language nor will it be able to form its own meta-language for creating thoughts. Consequentially, complex algorithms alone are unlikely to be sufficient for consciousness.

At least in the human context, consciousness must have developed in human brains through evolution over millions of years through random evolutionary mechanisms such as mutation. In this way a strong AI algorithm, however complex, could potentially evolve by simulating and inserting random mutations into itself and running them. A programmer cannot attempt to recreate random evolutional mechanisms on a strong AI algorithm, just by programming randomness. The problem lies with computers being able to create random numbers. Computers lack true randomness, although what they can generate might appear to be like random numbers, they are actually 'pseudorandom' numbers that will eventually repeat for a given seed (Hoffman 2019). You can't generate randomness with a set of deterministic instructions as they are opposite concepts. Genetic algorithms in AI can still be used but their evolutionary mechanisms won't be truly random and so their benefit in displaying conscious

intelligence is limited. A Turing Machine cannot replicate genuine evolutionary change without true randomness, but a machine can never access real random numbers to do so. In this way it is unlikely that a Strong AI algorithm will develop through mimicking evolution.
It is worth mentioning that the brain most likely uses complex but deterministic algorithms for unconscious operations such as controlling complex movement, language processing, breathing and blinking. Regardless of their complexity or their success these operations are still following an algorithm. Therefore at least part of our brain is, or used to be, applying a Turing Machine program on our biological hardware (Friedman 2002). The step from non-conscious Turing Machine to conscious brain could possibly have been because of these random evolutionary changes creating inconsistencies. This could have allowed us to develop some form of meta-concept; a way of looking 'outside' existing dead-ends and solving paradoxes. From meta-concepts we developed consciousness, and then from consciousness to thinking. Eventually our thinking became sophisticated and achieved intelligence.

In conclusion, as good as they might appear, Weak AI is unable to think or be conscious and therefore are not intelligent. Machine Learning can recreate learning but, no matter how advanced the techniques become, it will only improve an algorithm and the AI will always be following a set of instructions. Consciousness is key to intelligence and a Turing Machine looks unlikely to recreate it with algorithms alone. While the brain may be partly Turing Machine, this does not mean Turing Machines are brains. Human brains have evolved consciousness through random evolutionary mechanisms and as Turing Machines lack the ability to generate genuine random numbers, so they cannot recreate random evolution, necessary to develop consciousness. Therefore, I believe it is unlikely that a strong AI algorithm will ever become conscious nor will an AI become genuinely intelligent. Looking back at my opening introduction, I shall have to continue writing my own essays as it would seem an intelligent essay writing tool might never be. Although they can automate incredible tasks, I do hope this essay is not going to be marked by an AI algorithm.

Bibliography

All websites accessed on the 28th August 2019.

Bansal, S. (n.d.) *Turing Test in Artificial Intelligence*. Retrieved from geekforgeeks: https://www.geeksforgeeks.org/turing-test-artificial-intelligence/

Brownlee, J. (2016, August 16) *What is deep learning?* Retrieved from machinelearningmastery: https://machinelearningmastery.com/what-is-deep-learning/

C, P. (2018, November 19) *AI – artificial, yes, but is it really intelligent?* Retrieved from functionize: https://www.functionize.com/blog/ai-artificial-intelligence/

Crowford, J. (2018, March 8) *What isnt AI*. Retrieved from blogspot: http://fishcalledbush.blogspot.com/2018/03/what-isnt-ai.html

Friedman, A. (2002) The Fundamental Distinction Between Brains and Turing Machines. *Berkeley Scientific Journal*, 28-33.

Gardner, H. (1993) *Frames of mind : the theory of multiple intelligences.* New York

Hoffman, C. (2019, June 10) *How Computers Generate Random Numbers*. Retrieved from howtogeek: https://www.howtogeek.com/183051/htg-explains-how-computers-generate-random-numbers/

Mullins, R. (2012) *What is a Turing machine?* Retrieved from Cambridge Department of Computer Science and Technology: https://www.cl.cam.ac.uk/projects/raspberrypi/tutorials/turing-machine/one.html

Nicholson, C. (n.d.) *Strong AI, Weak AI & Super Intelligence*. Retrieved from skymind: https://skymind.ai/wiki/strong-ai-general-ai

Searle, J. (1980) Minds, Brains, and Programs. *Behavioral and Brain Sciences*, 417–457.

Subsets of AI. (n.d.). Retrieved from javatpoint: https://www.javatpoint.com/subsets-of-ai

Are we alive for a reason?

Oliver Hime

Many people have an innate yearning to find a reason for their existence. Whether through religion or meditation, they spend their lives in constant search for the 'meaning of life,' desperate to find a purpose in their lives. However, I am going to argue that this search is futile and irrational because the underlying essence of what it 'means,' to be alive contradicts the notion that life has a unified and all-encompassing answer to why it exists at all.

Or: if there was a meaning to life, life would have no meaning.

It follows that the unimaginable complexity of life means that there must be no reason behind its existence. This is because something so complex cannot have a reason behind its existence, otherwise its complexity would be rendered to nothing and it would be a simple thing. To have no meaning to be found is ultimately the mark of a highly complex thing. How can an infinitely complex thing be understood without no longer being infinitely complex? It can't. So, the infinite complexity of life means that it must have no reason behind its existence whatsoever.

However, just because life has no true meaning, doesn't mean that whatever reason you can find that tells you why you exist isn't worthwhile to hold dear. You can find 'meaning' or reason all around you. Whether you have a family or simply a garden to tend to, every single one of us can find a purpose if we search for it. This purpose, whatever it is, may not be anything more than something that your imagination sprouted one day, but, if it helps you to strive harder in your life, then is it any less valuable than the true and all-encompassing 'meaning of life' that many people claim is out there to be found?

If you are a person who needs a reason to live and a goal to tackle, then there is nothing better you can do than to look at the things that you already have. If you are lucky enough to have a family, what better purpose in your life could you ever wish for than to nurture those special people? Even if you live alone, and all you do every day is feed the birds, you should grab hold of those small wonders and focus your attention on making their lives as magical as possible.

So, we can all find a reason for our existence somewhere deep inside of us. Our purpose comes from within. Not from anyone else. You have to create your own meaning in your life, because your thoughts are the only thing that will ever gift you with something to strive for in life.

Each and every one of us has the ability to fashion a million reasons for our existence. If every reason were a puzzle piece, even if you had infinitely many reasons, you could never form the full puzzle, because there is no full puzzle to be formed. Life sprung into existence in a series of chemical reactions billions of years ago. After billions of years of evolution, we – homo sapiens – were born. Despite the uncountable advancements that were made over those billions of years, no reason for *why* life existed ever came into fruition because life was not created *for* a reason. Life came about purely by chance, so if we think this miraculous thing has 'meaning' behind it, we are being unbelievably naïve.

However, one often overlooked question is: 'do we actually want to find a reason for why we are alive?' If we found one, the spectacular elusive nature of life would vanish, and our existence would become a simple, dull experience where we knew exactly where we were going in life before we could even utter a string of words. To find a justified and unquestionable reason for why we exist would render life completely meaningless because so much of the magic of life is the tentative probing of the boundaries of what it means to be alive. When we experience new things, new alleyways that we never knew existed open up and we apprehensively take another turn in our life. But, if there was a clear meaning in life, life would just be one, straight, fogless path that every one of us would follow until our death. There would be no unknown turns, or any untold shocks lying in the murky shadows of another mysterious fork in the road. We would stroll through life guided by the puppet strings of certainty and confidence, knowing that our only path is the right one and is the perfect embodiment of a perfect life. Life would have no magic. Life would be a simple puzzle that everyone solved with the answers already snuggled in their brains. A life with an undeniable reason would cease to be a life.

That is what makes our quest for the meaning of life so valuable. It brings ever more questions and evermore uncertainty, making our lives more magical with ever more unknown alleyways and sudden forks in the road. The 'meaning of life,' if you have to find one, is to find uncertainty, which will sow the seeds for ever more uncertainty, and your life will be ever more rewarding because of it. Certainty makes life dull and a life not worth living; uncertainty makes life the captivating and alluring thing that we all dream our lives will be.

So, when you find a purpose in life, such as looking after your family, seize the knowledge that this reason for being alive is not the only one you will ever find, and the life before you is unpredictable and hazy and could bring a thousand different things. Only once you have acknowledged the fact that you cannot know anything in your life for certain, and the future could hold a thousand different things, will your life really be worth living. That is the only certain thing that life has ever slipped to us: life is going to be a crazy voyage of uncertainty. The purpose of life then, for every one of us, is to follow whatever path our life takes and to bask in the knowledge that your path could swerve at any moment.

Are we alive for a reason? In the realm of our thoughts, we are alive for whatever reason we can come up with. This reason may have no relevance to anything factual and will have no grounding in truth. However, this reason will bring the opposite thing that most people think it will – uncertainty. Every piece of knowledge you grasp, the more uncertain you become; the closer you get to the truth about the reason why we are alive: there isn't one, which is what makes life the meandering, magical voyage that it is.

The ethics of artificial intelligence

Gabriel Welham

Artificial intelligence is the field devoted to building artificial animals and people or at least artificial creatures that 'appear' to be people. Owing to the already abundantly clear moral problems with this practice, it is of considerable interest to many philosophers. This has clearly been shown by the numerous attempts by many philosophers to show that this goal is in fact unattainable. However, many of the core formalisms and techniques used in AI are still frequently used in modern day philosophy. For example, intentional logics suitable for the modelling of doxastic attitudes and deontic reasoning; inductive logic, probability theory, and probabilistic reasoning; practical reasoning and planning, and so on. Considering this, some philosophers conduct AI research and development *as* philosophy.

Officially artificial intelligence started in 1956. It was launched by DARPA, in Hanover New Hampshire. It was hosted by John McCarthy and Marvin Minsky. In this historic conference, McCarthy, imagining an extravagant collaborative effort, brought together top researchers from numerous fields for an open-ended discussion on artificial intelligence, the term which he coined at the very event. Sadly, the conference fell short of McCarthy's expectations; people came and went as they pleased, and there was failure to agree on standard methods for the field. Despite this, everyone wholeheartedly aligned with the sentiment that AI was achievable. The significance of this event cannot be underestimated, as it catalysed the next twenty years of AI research.

Despite the term 'artificial intelligence' being coined in 1956 at the conference, it was in operation before then. For example, in his 'mind' paper of 1950 Alan Turing asks the question: 'can a machine think?' Here Turing is talking about standard computing machines: machines capable of computing functions from the natural numbers. However, a more appropriate question should be: 'can a machine be linguistically indistinguishable from a human?' Specifically, he proposes a test, the 'Turing Test' (TT as it's now known). In the TT, a woman and a computer are sequestered in sealed rooms, and a human judge, in the dark as to which of the two rooms contains which contestant, asks questions by email (actually, by teletype, to use the original term) of the two. If, on the strength of returned answers, the judge can do no better than 50/50 when delivering a verdict as to which room houses which player, we say that the computer in question has passed the TT. Passing in this sense operationalizes linguistic indistinguishability.

Another important aspect to the philosophy that is related to AI is computer ethics. Computer ethics originated in the 1940s and still bears much relevance in today's society, as this field is all about the understanding of how one would act in situations involving computer technology (the 'one' here is a human being). However, computer ethics is not to be confused with robot ethics, where one is confronted with such prospects as robots being able to make autonomous and difficult decisions, including decisions that in some scenarios may not be morally permissible. If one could discover a way to engineer a robot with an aptitude for intellectual ethical reasoning and decision-making, one would also be engaging in philosophical artificial intelligence.

There is a plethora of approaches towards Moral AI (as it is known). Wallach and Allen, for instance, make an eloquent and forceful case that we should seriously consider granting machines moral decision-making power in their book, *Moral Machine*, teaching robots right from wrong. Their argument is that machines are deployed in situations in which they make decisions that have a moral impact. Hence, we should endow them with moral sensitivity to the moral dimensions of the situations in which the increasingly autonomous machines will inevitably find themselves. The machines they refer to may be anything from software, softbots to robots, and combinations of these. Through interconnected and open systems, situations might arise that are neither desirable nor foreseeable when the systems were designed. Whether we can build such systems is still an open question. If we were to engineer artificially moral systems, would they count as truly moral systems? Wallach and Allen conclude by noting that human and artificial morality will be different, but that there is no reason *a priori* to rule out the notion of artificial morality. Moreover, they argue that the very attempt to construct artificial morality will prove worthwhile for all involved.

The most general framework for building machines that can reason ethically consists in bestowing the machines with a moral code. This requires that the formal framework used for reasoning by the machine be sensitive enough to receive such codes. The field of Moral AI, for now, is not concerned with the source or provenance of such codes. The source could be humans, and the machine could receive the code directly (via explicit encoding) or indirectly (reading). Another possibility is that the code is inferred by the machine from a more basic set of laws. We assume that the robot has access to some such code, and we then try to engineer the robot to follow that code under all circumstances while making sure that the moral code and its representation do not lead to unintended consequences. Deontic logics are a class of formal logics that have been studied the most for this purpose. Abstractly, such logics are concerned mainly with what follows from a given moral code. Engineering then studies the match of a given deontic logic to a moral code (i.e., is the logic expressive enough?) which has to be balanced with the ease of automation. Bringsjord et al. (2006) provide a blueprint for using deontic logics to build systems that can perform actions in accordance with a moral code. The role deontic logics play in the framework offered by Bringsjord et al. can be best understood as striving towards Leibniz's dream of a universal moral calculus.

Deontic logic-based frameworks can also be used in a fashion that is analogous to moral self-reflection. In this mode, logic-based verification of the robot's internal modules can do before the robot ventures out into the real world. Govindarajulu and Brinsford present an approach, drawing from formal-program verification, in which a deontic logic-based system could be used to verify that a robot acts in a certain ethically sanctioned manner under certain conditions. Since formal-verification approaches can be used to assert statements about an infinite number of situations and conditions, such approaches might be preferred to have the robot roam around in an ethically-charged test environment and make a finite set of decisions that are then judged for their ethical correctness.

Personally, I find the view of American philosopher Daniel Dennett to be the most interesting and relevant to the ongoing debate about AI. He claims that philosophy and AI are not just separate things that have certain parts bound to one and other, but that AI is philosophy. Dennett says exactly this: 'I want to claim that AI is better viewed as sharing with traditional epistemology the status of being a

most general, most abstract asking of the top-down question: how is knowledge possible?' Elsewhere he says his view is that AI should be viewed 'as a most abstract inquiry into the possibility of intelligence or knowledge'. In essence, Dennett claims that AI is an effort to explain intelligence. Not, however, by studying brain activity in the hope of identifying certain aspects to which cognition can be reduced. Rather, he claims that, by implementing abstract algorithms that capture cognition, we are developing and furthering our own understanding of the human mind. Without doubt his views have been criticized. For example, one could counter his claim by saying that AI, by virtue of not being human, restricts itself to mechanistic solutions, and hence its domain is not the Kantian domain of all possible modes of intelligence, but just all possible mechanistically realizable modes of intelligence. However, despite the critique from multiple different philosophers, Dennett refuses to let his view be tossed aside. In 1971 he stated: 'But . . . the mechanism requirement of AI is not an additional constraint of any moment, for if psychology is possible at all, and if Church's thesis is true, the constraint of mechanism is no more severe than the constraint against begging the question in psychology, and who would wish to evade that?' This is perhaps not the most convincing argument.

However, without a shadow of a doubt, the best argument in the philosophy of AI is John Searle's 'Chinese room argument' (CRA). This thought experiment was designed to overthrow 'strong' AI. The CRA is based on a thought-experiment in which Searle himself stars. He is inside a room; outside the room are native Chinese speakers who don't know that Searle is inside it. Searle-in-the-box, like Searle-in-real-life, doesn't know any Chinese, but is fluent in English. The Chinese speakers send cards into the room through a slot; on these cards are written questions in Chinese. The box, courtesy of Searle's secret work therein, returns cards to the native Chinese speakers as output. Searle's output is produced by consulting a rulebook: this book is a lookup table that tells him what Chinese to produce based on what is sent in. To Searle, the Chinese is all just a bunch of (to use Searle's language) squiggle-squoggles. But he can still, because of the rule-book, give the right answers, but without any understanding.

The Chinese Room Argument is incidentally also a refutation of the Turing Test and other forms of logical behaviourism. I, in the Chinese Room, behave exactly as if I understood Chinese, but I do not. One can see this point by contrasting the Chinese case with the case of a man answering questions in English. Suppose I, in the same room, am also given questions in English and I pass out answers to the questions in English just as I pass out answers to the questions in Chinese. From the point of view of the outside observer, my behaviour in answering the questions in Chinese is just as good as my behaviour in answering questions in English. I pass the Turing Test for both. But from my point of view, there is a huge difference. What exactly is the difference? The difference can be stated in common sense terms. In the case of English, I understand both the questions and the answers. In the case of Chinese, I understand neither. In Chinese I am just a computer. This shows that the Turing Test, or any other purely behavioural test, is insufficient to distinguish genuine cognition from behaviour which successfully imitates or simulates cognition.

In conclusion, over the years the ethics of artificial intelligence has been enthusiastically discussed and debated. With the up-and-coming increase in 'smart' technology, we could be seeing a large amount of modern day philosophy being based around the ethics and principles of artificial intelligence.

Websites

https://searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence
http://www2.psych.utoronto.ca/users/reingold/courses/ai/cache/searle.html
https://en.wikipedia.org/wiki/Selmer_Bringsjord
https://en.wikipedia.org/wiki/Ethics_of_artificial_intelligence
http://moralmachine.mit.edu/
https://medium.com/@drpolonski/can-we-teach-morality-to-machines-three-perspectives-on-ethics-for-artificial-intelligence-64fe479e25d3
https://futureoflife.org/2016/07/06/evolution-of-ai/
https://en.wikipedia.org/wiki/Philosophy_of_artificial_intelligence
https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/
https://www.accenture.com/gb-en/company-responsible-ai-robotics
http://aiethicslab.com/

Books

Kurzweil, R. (2014) *How to Create a Mind: the Secret of Human Thought Revealed*. London

Does time pass?

Samuel Lambert

If you asked someone what time was like, their response would probably be a shrug followed by various vague allusions to a 'movement' or passage of time. To most people, the concept of time is based on the assumption that it moves or passes. It is intuitive to feel as if time moves or flows past us or that we move through time, and this same argument has been used by many a philosopher in favour of the passage of time. 'There is hardly an experience that seems more persistently, or immediately given to us than the relentless flow of time,' argues George Schlesinger for the seemingly obvious fact that time must flow.[1] However, one of the prevalent theories on the metaphysics of time, *B theory*, proclaims that time is analogous to space, and that none of the 'dynamic' features of time are real. What this means is that the apparent features of time can be analogous to space: there is no flow of space nor objective '*here*' of space and it is the same for time. This seems to pose a problem for our intuitions about time, namely that it flows (or passes), which is supported by the other prevalent theory(s) of time, *A theory*. Thus, we must distinguish between these two theories and discuss their potential merits, and pitfalls, to discover whether time really does pass.

Firstly, *A theory* denotes an *A series* of time, which means that events are ordered future, present and past, with present being an objective, universal present while past and future are always relative properties of that specific present. These events on the *A series* 'timeline' are known as A properties and every event has the property of future, past or present to a different degree, for example the year 2016 has the property – at the time of writing – of being 3 years in the past. The most essential characteristic of the *A series* for our discussion is that A properties (events) undergo continual transformation from future, to present to past. For example, the event of you reading this essay will be in the future, is in the present and was in the past. This characteristic of the *A theory* is what denotes the existence of a flow of time, as events change their relative position to the present. For most people, the *A series* description of time is what feels the most natural. We can image a 'timeline' of events with the future ahead of us and the past behind us while we are at a single point in the present.

On the other hand, the *B theory* rejects the flow of time. In a *B series* the relative position of events remains constant, the only distinction used is 'earlier than' or 'later than' to describe when events happen. Rather than there being 'A properties' to describe events, events are only ever relational and never change their relative positions in time, for example an *A series* would describe events as: 'an event is now present, which was future and will be past', while the relations in the *B series* are permanent: 'If M is ever earlier than N, it is always earlier.'[2] On this view, the passing of time is denied, as relations within the *B series* never change; they remain constant. However, for the passage of time to exist there must be change, as without change there is no time. This is what McTaggart argued was a reason to

[1] Schlesinger 1991: 427-441.

[2] McTaggart 1908: 457-474.

reject *B theory*, as it denied the passage of time, and therefore change, which McTaggart saw as essential for time: 'it would, I suppose be universally admitted that time involves change.'[3]

In order to argue for the passage of time, we must argue for *A theory* as *B theory* rejects that the passage of time is real or is experienced. While McTaggart argued for the *A theory* on the basis that the passage of time is essential, he also went on to reject both *A theory* and *B theory* to conclude that time is unreal. Most A theorists would also argue that the passage of time is essential but would deny that time is unreal. Therefore, to prove the passage of time they must both provide an answer to McTaggart's paradox and more importantly provide arguments for the truth of *A theory*.

Perhaps the most intuitive argument for the *A theory* comes not from any exquisite metaphysical debate, but through our most basic empirical evidence, experience. We have conscious experience; most people seem eerily to feel as if they are 'moving' through time. There seems to a phenomenal characteristic of experience which indicates that there is a difference between what I was in the past and that I am moving from my past into the future, following my present. Another example is that of memories. We have memories of past events (as an *A theorist*, A properties), and an awareness of the degrees to which they are past; or put metaphorically, they are at differing distances along a 'timeline'. This indicates that we must be moving through time, as these events change their degrees of distance from the present. And, as the B series only accounts for permanent relations of 'earlier' or 'later', the phenomenon of varying degrees of 'pastness' seem to be a purely *A theory* phenomenon.

An alternative view in the defence of *A theory* is that a belief in the objective 'special' present and the passage of time (therefore *A theory*) is common sense and is too obvious to throw away at the first hint of scepticism. (this is the line of argument followed by Dean Zimmermann, among other reasons).[4] While we cannot unequivocally prove the truth of *A theory*, it is more reasonable to believe in the *A theory* – given our intuitions – than to throw away our intuitions in favour of *B theory*, which contains nothing that most people would relate to their experience or intuition about time. Therefore, a belief in *A theory* and the passage of time is more reasonable than *B theory*. Yet whilst it can be said that an *A theory* of time seems best to interpret our phenomenal experience of time as passing, in reality the *A theory* has few strong arguments in its favour. While the claim that a 'common sense' view can often be correct, in the face of the evidence against the *A theory* which shall be laid out below, it seems we may have to abandon our beloved passage of time.

The most famous assault on the *A theory* of time is that given by McTaggart himself, when he concluded that time itself is unreal. For McTaggart (and many B theorists) the *A series* is itself contradictory. If we imagine an event, *I*, and three positions in time in relation to *I*, will happen (*x)*, is happening (*c*) and has happened (*v)*. If we describe *I* from each point in time, we would say that *I* is future, is present and is past (future at *x*, present at *c* and past at *v)*. The contradiction is that no one event can be described as having

[3] McTaggart 1908: 457-474.

[4] Zimmermann, 2007: 211-225.

more than one position in time (future, present or past), yet it seems that it would be true to describe event *I* has having all three characteristics at the same time, meaning that *A theory* must be incorrect.

This argument, while famous, can be rejected by A theorists. First, it isn't true that event *I* is past, present and future at the same time, rather that *I* will be past, is present and was future. Now McTaggart argues that the use of tense to describe time properties (e.g. will be past) simply applies another *A series* to the existent *A series*, meaning these new descriptions are also contradictory with one another. However, the real response by A theorists is that McTaggart mistakenly assumes that 'a proposition that is true at one time is true at all other times',[5] (a view known as eternalism and held by most B theorists). Importantly, A theorists reject this view and instead argue for *temporalism*, 'according to which propositions change their truth values'.[6] Therefore, it is only at the specific times at which the claims are made that those claims are true. As time passes, the nature of reality changes, and only the claims made at that specific point in time are true. Therefore, there are no contradictions between claims about an event made from different points in time. For A theorists, Mc Taggart's paradox does not pose a real threat to their beliefs, as McTaggart is simply begging the question for the correctness of externalism over temporalism.

However, another assault is still to come for believers in the passage of time, aimed this time at how the passage of time itself can be understood. If A theorists claim that time passes (as they do), then time must pass at a rate. However, if posed the question 'how quickly does time pass?', most modern A theorists would answer that time passes at a rate of one second per second. This claim in itself seems contradictory. While it is true that we can measure time relative to other times – for example, a clock could be accurate to 1ms per year –, meaningful rates must be measured in ratios of different quantities. However, what are the two different quantities of seconds which can be measured against one another? By answering that there are two different quantities of seconds, one must concede to an infinite regress of time series, as seconds are compared to seconds to seconds etc. Just as the passage of time is poorly understood, so is its measurement and just because an answer cannot be provided at the present time, doesn't mean that there is no answer at all.

Rather than comprehensively dismantling the *A theory*, these attacks by B theorists have themselves been disproven. As in the scholarly debates over the topic, this essay has reached a stalemate between the *A* and *B theory*. *A theory* has popular support in that it accounts for characteristics of time which seem intuitive to most people, specifically the passage of time. On the other hand, assaults by B theorists have pointed out errors in the *A theory* which at first glance seem damaging, but in reality depend on which side you stand; A or B, for example B theorists would denounce temporalism in favour of eternalism meaning that A theory has failed after all. In the same light, the original question over whether time passes has also entered a stalemate. As this view can only be followed by A theorists, the veracity of the claim 'time does pass' lies equally on the arguments for A theory as the theory itself does. This essay hasn't aimed to provide a comprehensive answer to whether time passes, merely to outlie a

[5] Prosser S. (2018) *Experiencing Time*. Oxford Prosser, 2018: 15.
[6] Ibid.

small number of popular arguments for and against the proposition. It will be up to the reader, and future philosophy, to provide an appropriate answer to whether we can tell the time.

Bibliography

Markosian, N & Zalta, E. *Time*. https://plato.stanford.edu/archives/fall2016/entries/time/. *Consulted: 18/6/18*

McTaggart, J. (1908) 'The unreality of Time', *Mind*, 68: 457-474

Prosser, S. (2018) *Experiencing Time*. Oxford

Schlesinger G. (1991) 'E Pur Si Muove', *The Philosophical Quarterly* 165: 427-441

Zimmermann, D. (2007) 'The privileged present: defending an 'a-theory of time,' *Contemporary Debates in Metaphysics:* 211-225

Are criticisms of utilitarianism convincing?

Aiken Furlong

My essay is in two sections. First, I redefine utility then utilitarianism, and propose we shift our conception of morality. Secondly, I evaluate the criticism that utilitarianism is not palatable.

I begin by re-defining utility in order to assist tackling the 'is-ought' fallacy and the confusion that is morality. In doing so I try to pick out the parts of morality that may be the cause of the confusion. From here, I find the best solution is to form several new terms based on varying levels of altruism, in the hope that we can shift the endemic social understanding of 'should', 'ought', 'rightness' etc. away from 'good' and towards these new terms which have more clarity. Armed with a clear definition of morality, I then address the mistakes that people commonly make when forming criticisms of utilitarianism. I cover: the 'more or maximum' fallacy; the fallacy of resource allocation; the utility monster; pain's necessity for pleasure; justice; impartiality; usefulness and intentions; and the issue of moral luck. In addressing moral luck, I also investigate how my new utilitarianism could provide a response against determinism. I hope I manage to provide wholly conclusive rebuttals which show how the new utilitarianism is immune to the classical criticisms.

I then demonstrate how the new utilitarianism can address the plight of the position of animals in morality with an interpretation of utilitarianism inspired from Peter Singer. In addressing the subject of animals, we can also find a natural utilitarian solution to the issues of abortion and euthanasia. One concerning problem that arises from these developments is the idea of utility through illusion. However, one can question if this is really an issue at all. Finally, I address a criticism which may be leveled against my utilitarianism (and indeed all act-centered moral theories). This concerns false individualization and the taxonomy of actions.

SECTION ONE: A NEW MORALITY

Re-Defining Utility

Bentham assumed that happiness is what people desire as 'Nature has placed mankind under the governance of two sovereign masters, pain and pleasure,'[1] but we now accept that there are many things humans desire that are not means to the end of happiness. So, we should define utility as happiness, but also as the desire for community and socializing, the desire for knowledge,[2] and the desire for experiences. Note that knowledge may often not bring happiness but from an evolutionary perspective it remains a human desire.[3] The desire for experiences is similar to the desire for

[1] Bentham 1948: 1.

[2] This is backed up by evidence that (some) knowledge (like pleasure) is rewarded by the chemical dopamine in our brains; see González-Burgos, Feria-Velasco 2008.

[3] The curiosity (desire for knowledge) is why we watch *youtube* videos of teenagers mailing themselves to China, as much as they're also entertaining.

knowledge; we're curious to see what the adrenaline of a rollercoaster feels like or what standing on the top of a mountain feels like. So those actions which maximize the fulfilment of rational desires which are ends in themselves (for the greatest number of people) can be described as 'good'.

It is imperative to ignore irrational desires, desires which undermine one's long term desires. This is an important distinction between this form of utilitarianism and preference utilitarianism. One can distinguish between a rational and an irrational desire by observing that rational desires are constant desires over time and irrational ones are heated/momentary desires which will often clash with other desires (namely the rational, long-term, desires – or end-desires).

Can we really discriminate between different desires? I believe we can. The desire for a cigarette, which undermines the long-term desire to be happy by not falling ill or dying, is an example of a momentary desire. However, if someone were to desire to be 'here for a good time not a long time' then smoking would not undermine their long-term desire (so would not be irrational).[4]

'Utility' can be defined as 'rational end-desires'. In addition to relating to ideas outside of itself (e.g. the desire for pleasure), 'utility' is also circular, because, in part, 'utility' is 'the desire for more utility'. So 'utility' is 'what is desirable' and we do desire utility. This is where we draw the idea of 'maximizing' utility from: maximizing itself is an inherent characteristic of utility.

Schopenhauer may have disagreed with this, instead arguing that we should strive to have fewer desires. But nobody desires to overcome and shun one's undefeatable desires. It is impossible to shun one's end desires because in doing so that becomes your new end desire which you are trying to maximize. On top of this that desire would just be a desire for peace, which is a means to happiness.[5]

Utility is desire on a personal level: it is what you and I desire singularly. Do I desire things for other people? I may desire not to see them suffering but partially because seeing them so makes me feel awful. I may desire justice for everyone but largely because seeing otherwise makes me feel bad. This means that utility can incorporate altruism. However, for the sake of creating a clear, naturalistic interpretation of utility, I will define utility as personal desire as opposed to society's desire. When I talk about utility in this essay, I am referring either to individual utility, or the collection of individuals' utilities when referring to objective decision-making. When I refer to 'society', it is as 'a collection of the utilities of the many individuals'.

Higher and lower pleasures

'It is better to be a human being dissatisfied than a pig satisfied; better to be Socrates dissatisfied than a fool satisfied.'[6] From the modified definition of utility, we are now in a position to dismiss Mill's concept of utilitarianism in regard to different forms of pleasure. Mill was expressing a distinctively personal view when he suggested that there are specific pleasures of different values, given that desire is a matter of personal taste.

[4] Irrational desires could also be desires which do not undermine your personal long-term desires: They could be manufactured by propaganda playing on the manipulatable emotions of 'prejudice, superstition, anti-social vices such as envy or arrogance . . .', as Crisp puts it.

[5] I believe shunning one's desires is most likely an irrational desire.

[6] Mill 1863: 13.

Interestingly, we can note that Mill's higher pleasures are often those which encompass several human desires. Mill seeks to claim these as pleasurable to a higher degree. Studying nature, for example, is a higher pleasure according to Mill. By encompassing all end-desires (as is logical since this stems from Bentham's original argument), we give value to desires or objectives such as knowledge with our improved definition of utility. Studying nature encompasses two end-desires: desires for pleasure and knowledge. Thus, some actions have utility stacked in their favour as they fulfill two end-desires at once. But there are no such things as higher or lower pleasures! As the utility equation has changed slightly, we will now give greater weight to actions which fulfill two end-desires simultaneously.

> Example 1: You enjoy playing on a games console alone equally to playing football with friends. Since football encompasses fulfilling your primal desire for community as well as pleasure, you choose that over gaming.
>
> Example 2: You enjoy playing on a games console alone far more than playing football with friends. In this case you may choose to play on the console, because unlike objectively defined higher and lower pleasures, in the real world there are no absolute better actions.

If a man were more swine-like in his desires, then he would choose pleasure more often than knowledge. We have no reason (if we include animals in utilitarianism) to force actual pigs to stop enjoying themselves in the mud and painstakingly learn basic mathematics instead. We shouldn't force any unenjoyable intellectual pursuits on a pig-like human just as we wouldn't on an actual pig.[7] (Unless of course the person doesn't know what they desire, and you – in a position of authority and empathy – do.)

Good, ought and re-defining utilitarianism

In this section of the essay I will consider the problem with 'ought'. I will detach utilitarianism from the word 'good'. This will address Hume's 'is-ought fallacy'. Then I will create several new terms which will serve to be a more appropriate and useful morality because they have clarity.

Old utilitarianism attempted to define the word 'good'. But the problem with defining 'good' is that it carries the consideration of 'rightness' and 'correctness' which implies we ought to do it. 'Ought' indicates 'correctness' and 'duty'. So 'good', 'right', 'correct', 'ought to', and 'duty' describe synonymous concepts or objectives. 'Duty' is a painful issue to be linked with 'good' as there is no reason for duty, the word 'duty' is used as a reason in and of itself to make people do things there is no reason to do.[8]

The concepts of 'good', 'right', 'correct', 'ought to' and 'duty' are either matters of opinion or circular to each other. '*Why ought we do what is right and correct? We ought to do what is right because what is right is*

[7] This is an argument from analogy, but, in this particular circumstance, it is not a flawed argument since the two subjects I compare are 'a pig' and 'a pig-like human'. I compare two subjects which I wish you to imagine as the same. A 'pig-like human' is, by definition, almost identical in mentality/behaviour to a pig. The reason we force humans to learn is not because of the species, but because we think that person merely doesn't realize what he desires. I hold the opinion that it would be kind for us to help everybody reach their potential.

[8] There is no such thing as duty: When someone says you have a moral obligation to your mother and your country, I ask 'Why?' There is no possible response, except a circular one. Thus, it is a certain conclusion that duty is nothing more than personal preference and feelings which vary from person to person, culture to culture.

what we ought to do.' This is circular! 'Ought' and 'right' cannot be connected without justification. If we do allow them to be connected then we can allow ourselves to throw the word 'utility' in the mix as another synonym, also without justification. If 'correctness'/'rightness' are linked to 'good' then it implies that depending on the situation, there is a better course of action and a worse course of action. Why 'ought' we do the 'better' action over the worse one? Because it's 'good'? Why 'ought' we do anything for that matter?

One can consider two types of 'ought': 'ought' as a means to an end desire, or 'ought' as contrary to what you desire. '*You ought to brush your teeth if you want healthy gums*.' This is 'ought' because of something you desire. Versus: '*You ought to go to war and defend your country*.' This is not something you desire, this is the commanding 'ought', it is the 'ought' which states the opinion of a higher authority, commonly 'god' but any authority will suffice. The commanding 'ought' (which goes against your desires) is more commonly associated with 'good'. If we question authority, the authority inevitably fails to provide a reason since it is just expressing the authority's own opinion.

Beyond 'good' describing functional success, 'right' and 'correct' describing something empirically testable, and 'duty' & 'ought' describing a sneakily presented opinion, there is no connection. They all seem to have a second equivocal meaning, that is, of each other. So, I am going to abandon the word 'good', as it already seems to have been defined in a terribly ambiguous and circular manner with a jumble of other words which together serve no better purpose than to validate one's own opinions.

The is-ought fallacy

A central semantic problem of naturalistic utilitarianism was originally recognized by David Hume when he proposed the 'is-ought fallacy'[9] and then later expanded by G. E. Moore in 1903 with the 'naturalistic fallacy' and the 'fallacy of equivocation'.[10] Both Hume and Moore claimed that moral 'rights' and 'wrongs' were undefinable. They might seem undefinable when 'duty', 'ought', 'correctness' and all sorts of words are mixed up. But by not connecting 'utility' to 'good' nor 'duty' nor 'authoritative ought' we can escape these fallacies. Instead I present utilitarianism as a descriptive statement that we do desire to maximize our utility. Bentham and Mill may have claimed we 'should' do this or we 'ought' to do this ('ought' in the authoritative sense), but I am only claiming we want to do this.

Morality is a mess

Take building a bridge, it might seem that we ought to do it because the bridge is useful, but it hardly seems like a moral action. Unless, say, it was to help a convoy of trucks deliver food to starving children. But why is that any more moral than building a bridge to speed up journey times and reduce congestion? Both produce utility, just one more than the other. This just shows how what we value

[9] Hume 1740: 469.

[10] The 'is-ought fallacy' states that utilitarianism takes a descriptive statement (is) about the world (i.e. humans desire pleasure) and makes a naturalistic statement from it (ought) (i.e. humans should maximize pleasure). Hume points out that one cannot derive an 'ought' from an 'is'. The 'naturalistic fallacy' is very similar, it's a criticism of the claim that if something is natural (empirically real) it's therefore 'good'. The fallacy of equivocation states that desire has two meanings: 'what is desired' and 'what should be desired' and utilitarianism mixes the two. See Moore 1903: 54.

morally versus what we 'ought' to do are sort of connected but not always. J. L. Mackie famously claimed: '*There are no objective values*.'[11]

Nietzsche explains how morality is a mess. Some people see the utility of an action as demonstrating its morality whilst others see this as evidence of its immorality (i.e. Kant's argument that actions are more moral if you are not doing it to bring happiness but because you want to do the right thing, hence a utility-bringing action will likely have selfish motivations).[12] Nietzsche also points out in *Beyond Good and Evil* how intuition is not a reliable base for moral judgements.[13] We all think giving milk to a child is good, because our intuition says so. But there is no morality in this action merely because we feel there is! We might feel we should give moral weight to this or that, but intuition should not be used as an argument for or against something.

Nietzsche even had an interesting theory of why morality is such a mess, well summarized by Michael Tanner:[14]

> *Morality as it is still practised derives from the Hebraic-Christian tradition, in the largest measure, which means that its origins are to be found in the dictates of the God of a small Middle Eastern tribe, and that its contents remain very much what they were. That immediately transcendentalizes them in two ways. First, their deliverance is a matter of unquestionable commands, for which the punishment for violation was at one time instant divine retribution. Second, since the content was evidently designed for the continuance of the tribe, whose living conditions were vastly different in many ways from ours, it has had to be made more abstract and disconnected from the conditions in which we live. A result has been that morality has in part become unintelligible, and in part has to be coerced into relevance by making us into the kind of beings to whom it would sensibly apply, even though in many respects we know that that is false.*

I like this quotation because it theorizes not only why morality is a mess, but also proposes that Christian morality originated from a need to survive – the 'need to survive' feels suspiciously similar to fulfilling my version of utility. However, it's better to think of Christian morality as a trait of the tribe, which gave the tribe a survival advantage over other tribes, and that now this trait (of following Christian doctrine) is no longer helpful to your survival, its 'morality' is dying back. Morality is therefore an evolution.

If the circularity of morality's many associations, and Nietzsche's criticisms weren't enough evidence, the Roman Catholic G. E. M. Anscombe wrote:[15]

> *...the concepts of obligation, and duty – moral obligation and moral duty that is to say – and of what is morally right and wrong, and of the moral sense of 'ought', ought to be jettisoned if this is psychologically possible; because they are survivals, or derivatives from survival, from an earlier conception of ethics which no longer generally survives, and are only harmful without it.*

[11] Mackie 1977.
[12] Kant 1797: 10.
[13] Nietzsche 1990: 12.
[14] Tanner 2000: 37.
[15] Anscombe 1968.

Such a statement is very significant coming from a Christian scholar.

So, if 'ought' is what makes you survive, and the end desires make you survive, then indeed utility is synonymous with (non-authoritative) ought. But if you consider the 'authoritative ought', then it becomes a meaningless expression of opinion. If authoritative 'ought' is separate from personal opinion, it could be an expression of social contract theory, but then it is still meaningless, as this would be expressing how things are which is not in line with morality. It would, however, enable the possibility that we could alter the social contract – converting 'good' to my new terms and shifting 'authoritative/opinion ought' to be in line with 'non-authoritative ought' which is already in line with utility.

A new morality

I propose to continue my development of utilitarianism by reference to a new word I'm inventing: g88d. The definition of 'g88d' is as follows: *an adjective which describes actions, intentions, or people that 'maximize utility for the maximum number of people.'* For example, saving ten people instead of one person[16] is a g88d action. This is an analytic definition. People may start to make claims such as *'We should/ought to do g88d,'* but really this would just be an expression of their preference for satisfying the desires of as many people as possible (i.e. they should really be saying *'We want/desire to fulfil the desires of as many people as possible.'*)

Next we actively choose to define 'g88d' as that which maximizes utility for the greatest number. We do not do this for any other reason than for the sake of doing it. If we had defined 'good' as that which you ought to do, then we can get no further in any definition and the word 'good' is useless to us. There's no part of 'g88d' which implies we ought to do it, but I'm sure every rational being who sees utility would desire to maximize it. This is because we, as humans, desire more of what we desire. So, it is rational that – as a descriptive statement – we want to maximize utility. It is impossible to claim rationally that you do not want to maximize utility because, by definition, utility is what you desire as an end.

What about the *'for the maximum number of people'* part of g88d's definition? After all, aren't we selfish creatures? I have met people who only desire to maximize their own utility. Whilst I may desire to maximize as many people's utility as possible, to say that being altruistic is better than being selfish without valid reason is false.[17] Just because your intuition suggests altruism is better does not mean everyone's does, so intuition is not reason for altruism being 'better'. I have no argument to claim one is worse or better than the other as any such argument would be circular. I propose we can make another word: 'g66d'. 'G66d' means 'that which maximizes utility only for itself.' So, without providing justification we can simply choose to define g88d in that way, and g66d in another way; it's only the utility part of g88d-utilitarianism which is descriptive.[18]

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[16] In a trolley problem situation. Ideally, the utilitarian action is to save all eleven people.

[17] There is no empirical or logical justification which does not require preconceived ideas of 'good' and 'bad' or does not rely on emotion-backed opinion.

[18] Humans do evolutionarily desire to be altruistic. But not in an egalitarian way: We care more about people who are closer to us genetically. So first we prioritize ourselves, then family, and then people who look like us. We could make a third word: g44d which means maximizing utility for everyone with a coefficient of how similar they are to us.

So, the word 'g88d' (modified utilitarianism) is immune to the semantic issues proposed by Moore and Hume. The criticisms they propose are more of 'good''s colloquial connection to the flawed concepts of duty and ought. The concepts, in my opinion, are too entrenched in our psyche to now claim that they aren't connected to 'good'. But by starting again with 'g88d' we can try and replace 'good''s everyday use with 'g88d'.

In detaching 'g88d' from authoritative ought, can I claim, in an essay about concepts and ethics, that 'g88d' is a moral term?

Shifting from 'good' to 'g88d'

We need to distance utilitarianism, as a concept, away from a morality in terms of 'oughts' and 'propers'. Over time I hope people will start to have the same positive intuition about the word 'good' for 'g88d'. And so a statement of opinion could be '*It's good to do g88d*'. Where good is expressing those feelings of 'properness', 'obligation', 'ought' etc. This is what distinguishes utilitarianism from mere behavioral psychology – the expectation that the descriptive statement 'g88d' about end-desires can be talked about in such a way as if it were a moral statement: *it's g88d to help the elderly* etc.

I am trying to suggest that there are two ideas/sets-of-terms that exist side by side: 'good and bad' and 'g88d and b8d'. 'Good and bad' are messy words which are a jumble of people's opinions. People also commonly have the opinion that 'morality' is synonymous with 'good' and 'bad'. Then there is 'g88d' and 'b8d', these terms refer to a clear-cut concept of 'those actions which maximizes utility for the maximum number of people,' and 'those which do not.' By proceeding to explain (through evaluating the criticisms) how the term 'g88d' (as defined above) is a more beautiful definition of morality than 'good', we can shift how we define morality. Morality can be rid of 'duty', 'shoulds and oughts of authority'. Morality will be a study of an action's or person's effectiveness at maximizing utility, either in a g44d, g66d or g88d manner. The only 'ought' we will consider is the 'practicality ought' for fulfilling personal desire.

Psychologically, by providing clarity, this competitive account of morality (detached from archaic concepts such as duty) should come to replace 'good' when we try to make decisions. Due to the clarity and the closer alignment with rational descriptive decision making (how a person not blinded by emotion acts), the utilitarian decision-making process is the only sensible choice.[19]

I am definitely *not* saying '*because we act according to 'g88d' we should act according with g88d,*' instead I'm proposing that 'g88d' is a more useful, clear and desirable way to act than 'good', it also happens that when we are rational we do act according to 'g66d/g44d/g88d', if only subconsciously.[20] As well as using 'g88d' as a tool to decide how we want to live and act, it can be useful for describing actions or

[19] Unless you would prefer to be guided by emotion and intuition (in which case choose good). Even if you do choose that you will still act in a way in line with 'g88d', unless you have been indoctrinated with concepts of false duty to false authority.

[20] In response to Hobbes and Locke, Rousseau points out whilst humans naturally aim for self-preservation, they are also marked by pity: we desire for other humans not to suffer. It's up to the biologists and psychologists to decide which word (g66d/g44d/g88d) is most descriptive, but the most descriptive may not be the same as the most useful.

lives. Seeing as most people (I assume) want to act morally, it seems reasonable that morality should have a small element of naturalistic overlap.[21]

I am essentially purging morality of the parts which are no longer useful, descriptive or desirable. I believe it would be too difficult to ask an individual to comprehend 'good' without 'should'. So, creating the new words, and having these new words replace 'good' in our day-to-day language may be a craftier plan. My new terms even have the advantage of being more specific when describing an intention or action that has taken place. Why would anyone say an action was 'good' when that carries so much ambiguity?

The objection to using 'g88d' because 'g88d' actions are undesirable is, by the very nature of the word and properties of utility, impossible. I will proceed to explain how the examples which seek to paint 'g88d' as undesirable have key flaws. Outlining the faults in these criticisms will mean that my version of utilitarianism will prove to be representative of intuition and rational moral desires. There may be cases where your irrational moral desires are contrary to my utilitarianism, but, in being rational, your moral desires will, by definition, be utilitarian.

SECTION TWO: MISUNDERSTANDINGS

It seems that criticisms of utilitarianism are simply the result of misunderstanding and people being uninformed. This misunderstanding is not a problem of where we derive utilitarianism from, rather that 'maximizing utility for the greatest number of people' could lead to actions which are undesired.

Of the many claims I encounter here are a few:

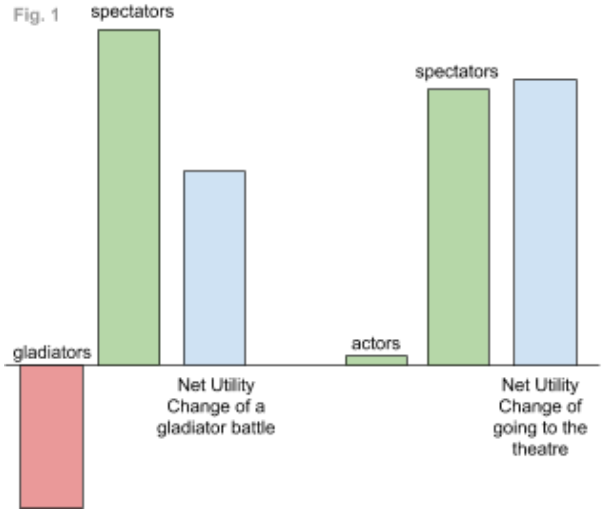
> *Utilitarianism would justify gladiators.*
>
> *Utilitarianism would justify the execution of the homeless and of those society could not support.*
>
> *Utilitarianism would kill depressed people.*
>
> *Killing someone for their organs to save many people is the utilitarian thing to do.*
>
> *People should give all their money away to feed poor African children.*

These statements are all misunderstandings, most of which result from a false dichotomy. When misunderstood, utilitarianism appears to lead to unpalatable consequences.

[21] Morality and naturalism are disconnected: morality sways with opinion and I hope that showing you why it's rational to act in a utilitarian way, your (and society's) opinion will shift morality onto utilitarianism (which is a partially naturalistic concept.) Naturalism can never be a cause or reason for morality. But moral opinion can be naturalistic.

'More' or 'The Maximum'

1. *Gladiators and tyranny of the masses*



First, 'maximizing utility for the maximum number of people' would not justify gladiators (or tyranny of the masses[22] over a minority slave population - as the generalized criticism goes). The claim is that if two gladiators' suffering and death brought more pleasure to the hundreds/thousands of people watching than the pain (and death) the gladiators underwent then it would be a g88d action. This is wrong because the action of the gladiators' fight (whilst it may bring a net gain of pleasure) is certainly not maximizing pleasure (fig. 1).

When evaluating whether an action is g88d you must observe all the possible actions. There are thousands of actions which bring a net gain of pleasure, but only the action which *maximizes* utility is *g88d*. There are many things one can do for entertainment and ones in which someone dies will have a large amount of negative utility to make up for. If it's possible for everyone to gain the same pleasure somewhere else without the negative utility from the death, then it stands to reason that the entertainment without the death creates more utility than the entertainment with the death.

2. *Football Jones*

A modern example is the Jones football example:[23]

> Jones the electrician is in charge of maintaining the live TV coverage of the World Cup Final. Six billion people are watching; six billion people are gaining small amounts of utility. Jones notices a fault. Luckily, he can fix the circuit by using himself as a conductor which will kill him.

The options seem to be:

Either: Jones dies (utility loss) but the game continues (utility gain).

Or: Jones doesn't die (no utility loss) but the game is not seen by the six billion views (utility loss).

This is similar to the gladiators example, except that it's a spur-of-the-moment decision and there does not appear to be any alternative. But utilitarianism, as I have defined it, would suggest building a TV streaming mechanism which does not require a lifetime's utility sacrifice in order to work. It seems obvious that the reason the Football Jones example has never happened in real life is that in the entire history of streaming sports matches to millions of viewers, precautions are taken to ensure that the TV

[22] Mill 1859: 8.
[23] Scanlon 1982:103.

coverage works; and if it fails that it can be fixed with less utility sacrifice than a whole life.[24] Precautions would blatantly be taken if the utility of a human life was at stake. For example, hospitals have backup generators for when the power fails because there is a great amount of utility at stake.

3. *Football Jim*

But we can re-imagine Jones' situation as similar to 'Jim and the Indians':[25]

> Dr No tells Jim he will cut off the electricity to the World Cup stadium, ruining the World Cup for 6 billion people unless Jim shoots himself.

There are no alternatives. We may now believe that due to the sheer number of people gaining small utility that Jim will die if the utilitarian approach is taken. Let's say watching a football match is double as pleasurable as the average pleasure you experience in life and Dr No challenges Jim at half time: taking the audience, there are 228,159 years' worth of utility, say, to be gained from the match and maybe 50 years' worth for Jim. There is more utility to be gained from Jim's death. But is it the maximum amount of utility that can be gained from this situation?

We can imagine an alternative way out for Jim. Jim could not die and the viewers may be momentarily disappointed but can still get the same happiness from the match by watching it half an hour later once Dr No has been apprehended and the game resumes. The viewer's momentary disappointment would be cancelled out by their happiness upon hearing of Jim's rescue and safe return to his family. Arguably, this would be the only utilitarian action to take.

4. *Depression and euthanasia*

Does utilitarianism justify the euthanasia of depressed people, people society couldn't support, indeed anyone who brings down the utility of the population? Because their organs could be used for transplants increasing others' happiness? This idea is also not something utilitarianism would justify.

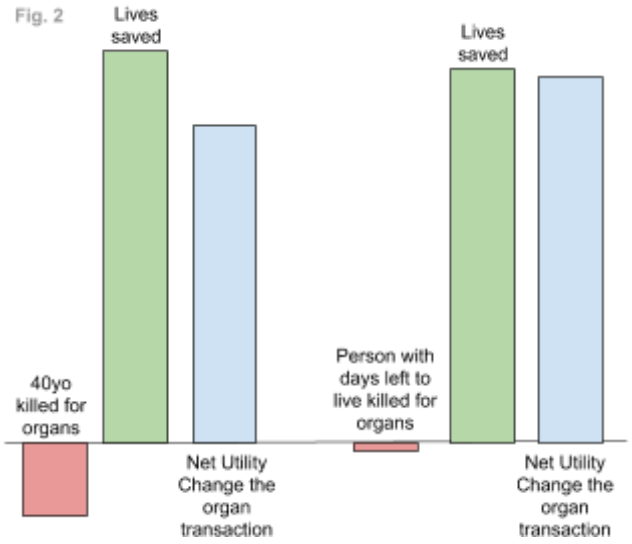
It may be that a large group of people are happy[26] and another group of people are not happy, or in pain, or suffering due to poverty. However, by killing the people currently undergoing negative utility we limit the possible happiness to those who're already happy. But this is not the maximum amount of utility. More happiness could be created if we take all those who are suffering and make them happy instead of killing them, pull them out of poverty, or take them to see a therapist if they're depressed.

When people assume that utilitarianism would permit/favour some action which we find repugnant, it's usually because they are making the same mistake of forgetting that, despite the action increasing happiness to some extent, it is not maximizing happiness: you must consider all the possible actions you can take. It may be that if someone cannot have their life improved because of a medically torturous condition, maximizing happiness through killing them is the only way. But most of the time there are better alternatives.

[24] This is a perfect real-life example of maximizing utility!

[25] Williams 1994: 339.

[26] When weighing up options we must consider all utility's desires, but for the sake of simplicity when responding to the criticism (which centers around pleasure/happiness) I will use happiness, pleasure and utility interchangeably.



The case of organs is interesting but utilitarianism would never justify the killing of a person for their organs to save, say, a dozen other people. Yes, this definitely increases utility but again it is not maximizing utility. Killing a 40-year-old with lots of utility left to gain is different (utility-wise) from killing a much older person or someone terminally ill with days left to live, or indeed just taking organs from a dead person[27] (fig. 2). We find the left situation on the diagram repugnant but the right situation is intuitively much better. This is why it's so important that people understand the 'maximum' part of utilitarianism because otherwise it is easy to feel repulsed.[28]

5. *Car crash*

Even the classic example of saving one life or another is flawed. The example places you in a car crash. You are given a choice between saving your mother, a shopkeeper, or a doctor who is on the verge of finding a cure for cancer.

First, the utilitarian thing to do is to try to save both of them, put them both in the recovery position and call an ambulance. But, even if we exclude this option so you can only save one, you know the g88d thing to do is save the doctor. If you do not do the g88d action, if you are led by your emotions and save your mother (acting g44d/g66d), then, yes, you will have done a b8d action but just because most people act b8d and under emotion in a car-crash situation doesn't discredit utilitarianism. G88d and b8d do not depend on what people actually do when acting under the influence of intense emotion.

6. *Mobsters violating rights*

The 'maximum & more' issue applies to criticisms of other forms of utilitarianism too. Nozick mentions (in objection) a utilitarianism of rights where we aim to reduce the number of rights violated. He proposes that:

> *A mob rampaging through a part of town killing and burning will violate the rights of those living there. Therefore, someone might try justifying punishing another he knows to be innocent of a crime that enraged a mob, on the grounds that punishing this innocent person would help*

[27] The organs of someone younger are healthier and so may extend the utility of the receiver of the organs more than if they receive the organs of an almost-dead person. But the greatest utility would still favour the latter.
[28] I'd even go to say the right-most situation in Fig.2 is not the maximum, the maximum utility would be taking organs from a recently deceased person - which happens to be what we already do.

> *avoid a greater violation of rights by others, and so would lead to a minimum weighted score for rights violations in society*.'[29]

Nozick is wrong. In this hypothetical example a rational person who heard that a mob is on its way would *not 'try justifying punishing another he knows to be innocent'* (ibid.) No rational person comes to the conclusion that to maximize utility we must stop the mob by punishing an innocent person! A real-life example could be the Brixton Riots in which we didn't stop the rioting by punishing the policeman who shot Mark Duggan dead.

In Nozick's thought experiment, the way we should 'minimize' rights violations (not have 'fewer' rights violations) is to stop all rights violations, by deploying police. But let us say, for the sake of argument, there aren't enough police to stop the mob. Another better decision (than the one Nozick suggests) which would violate fewer rights would be to pretend to punish the innocent person to appease the mob and secretly evacuate the innocent person to a nice hotel to compensate for their trouble.

Nozick makes the mistake of confusing 'fewer' rights violations with The Minimum. It's sneaky of him to create a hypothetical world where you limit the options of the decision-maker to ones which are all b8d. If you offer only b8d options, it becomes easy to discredit a moral theory. When constructing a moral dilemma, the highest utility option of the ones offered is very unappealing. If we consider the actual utilitarian decision when all choices are available, it's far more appealing. [30] Stopping a mob with the police is not morally repugnant, whereas, with Nozick's two given options, both are morally repugnant.

In the TV drama *Spooks*, the protagonists are repeatedly placed in situations where the options both seem dire (e.g. the diplomat is shot or the embassy explodes) yet they repeatedly manage to take the utilitarian action, managing to come up with a cunning plan to save both the diplomat and the embassy. If you ask a child what they would do in the 'Jim and the Indians' thought experiment, the most common response is to shoot the soldier so that no one has to die. In real life an adult would try to convince the soldier to change his mind or negotiate a way out of the situation. This is an inherently human quality[31] which cannot be discarded. Time and again humans pursue the actual utilitarian solution to dilemmas to which it initially appears no such option exists.[32]

Nozick also continues his flawed example by claiming *'Utilitarianism doesn't, it is said, properly take rights and their non-violations into account.'*[33] But, if we observe how justice contributes to utility through stability and if we take my modified definition of utility, I reject this idea. Justice is something we desire; contrary to the desire for pleasure when we desire justice, we are desiring pain for another person, for

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[29] Nozick 1974: 27.

[30] Just like in real life. The more options are restricted the more the hypothetical situation becomes further detached from reality.

[31] Research on task concentration shows the hormone noradrenaline (signaled to be produced by the anterior cingulate cortex) causes us to think of what else we could be doing. When doing an action, the concentration of noradrenaline slowly increases until we experience distraction. Since it is always present in our brains we are always, to some degree, questioning ourselves with what other actions we could possibly be doing. I believe the feeling of *aporia* (experienced to some level with every decision and action) is the brain considering the many possibilities of the situation.

[32] However, argument aside, the idea of rights in the utilitarian sense I find quite ridiculous. Desiring rights is a means to the end of happiness, and rights as a construct is liquid and unsubstantial.

[33] Nozick 1974: 28.

them to feel suffering similar to that which they caused. It can then be said that justice, since it's not a means to another end desire (like pleasure), is an end-desire in and of itself. So, we can certainly take justice into account. If we did not, we could easily envisage society collapsing and hence bringing about vast amounts of pain and negative utility. So, we can argue for a just utilitarianism, both from the need for having a just society because stability is important for please, and also because in my modified utility we can see the desire for justice as an end-desire.

If a victim did not feel compelled to pursue justice, we may not see it as necessary to inflict negative utility as there is no positive utility gained, i.e. a shopkeeper forgiving a troubled youth for stealing. However, we may in other cases seek justice regardless of the victims wishes, for the sake of maintaining stability through consistency, and future prevention, i.e. punishing a domestic abuser even if the abused does not desire them to be punished, because otherwise other abusers may feel they can get away with it.

7.*Time ad infinitum*

The 'more or maximum' fallacy is the key misunderstanding, one which has led to tyrants misusing utilitarianism to justify brutal acts. The idea that utilitarianism has no time limit seems to suggest that one could cause immense suffering for one generation so that all subsequent generations may live in glorious prosperity.

For example, from a Nazi point of view: conquering the world, despite the sacrifice of a generation of young men, will be worth it as in the future Germany would benefit seemingly forever. This is not utilitarian. Utilitarianism does not encourage sacrifice! It encourages people to find a method, a solution, to improving people's lives via the maximum utility. Having a giant discount of utility (i.e. sacrificing millions of lives) will clearly place this method of 'improving' the world through warfare and domination as a non-utilitarian option. If the Nazis had wanted to improve German citizens' lives, the utilitarian solution would have been to find a non-violent path to prosperity and happiness.

Utilitarianism is criticized because dictators hide their intentions behind it. Stalin's real intention was probably self-preservation, a lust for power and wealth and other personal gains. He then uses various, ill-thought-out interpretations of utilitarianism to hide his personal motives behind the well-intentioned-sounding phrase '*I'm doing the most good for the most people.*' Unfortunately, utilitarianism lends itself to be used as such camouflage for the personal intentions of dictators. And 'the people' are often foolish enough to believe the words of the dictator when clothed in utilitarianism.

This more and maximum fallacy highlights a mistake which has led to the incorrect belief in tyranny of the masses and that sacrifice is not only permitted but encouraged. Through defining utilitarianism as *only* the *maximum* utility, we do not have these issues.

Resource allocation

Next is a phrase often heard: '*Surely I should give away all my money to charity as it could do more good for others than me. If everyone did this it would be a disaster.*'

The key point is that it would indeed be a disaster and lead to societal collapse if everyone did this and societal collapse would lead to more pain (less utility) for everyone. So, surely it's obvious that utilitarianism would not suggest you do this because, whilst it may appear you are helping increased

utility, you are inadvertently contributing to the degradation of a stable system and the stability of the system is what brings more utility.[34]

But utilitarianism would suggest that up to the point, where giving away your money is not significantly reducing your own utility, if the money is better served elsewhere it should not be spent on items that will only marginally increase your own utility but be spent on something which could significantly increase another person's utility. The diminishing marginal utility of wealth states that it is important to find a balance of maintaining a stable system and creating as much utility with the money (/scarce resources) that we have through carefully calculated distribution.

A disabled man may require lots of resources for a small amount of utility gain compared to a healthy person but the state would not be encouraged by utilitarianism to give the healthy man *all* the resources (money) because maximizing utility is best done through providing a balance and finding ways to increase the disabled person's utility more efficiently. It would encourage the careful provision of resources to ensure everyone (or as many people as possible) avoid suffering: some may need more than others to achieve this. Sadly, in countries which don't have enough resources, it is often those who require more resources for the same utility who miss out. In the circumstance of not being able to provide for everyone, those who are the greatest burden are often left out - this is what utilitarianism would suggest. It may seem unfair as disability is mostly random. However, distributing resources when they are scarce to save the most lives is more g88d than saving fewer lives.

In the UK the state allocates money for healthcare to patients. The UK is wealthy enough to be able to ensure that everyone is treated and no one suffers - up to a point. Therefore, beyond £30,000 per year[35] the government decides a patient's treatment is too expensive and not worth the cost. Beyond £30,000 the cost of treating a patient would start to dip into money used to treat other patients. Beyond that amount there is a utility opportunity cost. When the Chinese healthcare system faced a shortage of resources (namely ventilators) in the 2020 virus pandemic, the appropriate utilitarian actions were taken. First, more ventilators were built. In the meantime, they allocated the ventilators to those patients who would gain the most value from them. This was worked out by a series of factors such as potential utility left to gain and probability of survival. [36]

The utility monster

Nozick theorized a person to which marginal utility loss didn't apply.[37] He used the example of a monster who gains more pleasure from the available resource than anyone else. To maximize utility we would therefore give all our resources to the monster at the cost of everyone else. That is, we should give all the ice creams to the monster because he appreciates every single ice cream far more than anyone else.

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[34] Similarly, your time is a resource. Utilitarianism would not suggest you quit your job to collect money for Oxfam on a full-time basis. On the grounds that suggesting such an idea too widely would lead to collapse. It could be argued that too many people start charities these days and that they end up doubling up on the same cause. Utilitarianism would suggest less people take paid work in charity because this would increase the efficiency of donations.

[35] Cook 2014.

[36] This can be derived from mainly age, but also if someone is extremely disabled they may have less to live for.

[37] Nozick 1974: 41.

All such theoretical devices are best ignored as mere intellectual fantasy exercises. If I were to build a moral theory for a world in which the utility monster did exist, it would look very different from utilitarianism. But this is not my purpose here. The utilitarianism I have constructed is for use in a world where 'marginal loss of utility' is a naturalistic fact of life. It is human nature that pleasure decreases with quantity; it's basic opportunity cost economics.[38]

Pain's necessity for pleasure

A criticism which is due to patent misunderstanding is the idea that to be happy we need some pain and challenge in life, and that somehow the necessity for pain in life discredits utilitarianism.

Firstly, there is no actual evidence to prove that happiness relies on pain. Let us say a new study into the psychology of happiness suggests people gain more utility when they overcome a challenge to get it. The actions suggested by utilitarianism would factor this in![39] If you were to plug yourself into 'Nozick's pleasure machine'[40] then the machine would factor in just enough challenge, adversity, and pain to remind/enable you to appreciate the pleasure, as this would be necessary to maximizing the utility. [41]

Some critics are fearful that in an ideal world, utilitarianism could become so successful (eradicating all pain) that our lives would become boring and meaningless. This would not happen because utilitarianism would suggest giving people a life purpose (a challenge to overcome), as this would be an end desire. To an extent people do desire work; so, utilitarianism would suggest having the perfect amount of it. But life as it is, often has unnecessary amounts of pain and far too much challenge: this has the effect of decreasing pleasure/happiness ∴ utility.

The issues with Nozick's pleasure machine can be dismissed as it would include challenges. If people desire challenge and social interaction, then the machine would maximize pleasure whilst including the exact right amount of challenge and social interaction. Nozick claims that people would not plug in, but I would argue that if you remind people that they can still speak to their families and friends in the machine, I think they would. I certainly would.

Sex in a dream is just as good as real life, if not better because you can't be disappointed. As someone who has extremely vivid dreams, I love the night-time adventures. It appears that plugging into a pleasure machine has an image problem; if it's in people's rational interests to fulfill their desires and if possible through the pleasure machine, why not do so? Doesn't the fact that people spend money inside video games prove that we don't place emphasis on the real. Is play-acting proof that humans love fantasy and dreams? Are video games our feeble attempts to fulfill them? We hate waking up from

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[38] The more resources we already have, the less impact more resources have. (See 'Resource Allocation' earlier.)

[39] This is a reference to the economic attempt to build a model of society which would maximize utility, or merely a decision-making model given a set of options. Some models quantify with 'utils'; others don't quantify at all, instead using comparisons (indifference theory). Indifference theory is a possible solution for those who protest that happiness cannot be quantified.

[40] Nozick 1974: 42-5.

[41] The pain argument is most often used by religions as an attempt to explain away evil in the world. Those who claim this often have easier lives and fewer challenges than those who experience unnecessarily large amounts of suffering. Such people tend to believe in 'The Train Wreck Equilibrium Theory' which states that all people experience the same amount of suffering, just in different forms at different times. As poetic as this is, it's no more than a lazy self-indulgence. Try telling a poverty-stricken child of Sudan that you will both undergo the same amount of pain in your lifetimes.

a good dream to be faced with work on a grey October morning. From a sceptical standpoint, why emphasize what is real if you can't know that 'it' is actually real? Why should we assume that what is real is better?

If you were to adamantly claim that what you desired more than anything is to live authentically in the real world, then this would be an end-desire. If this was your end desire, then contrary to Nozick's claim, utilitarianism would not suggest you plug into Nozick's machine.

Justice

A criticism proposed by H. J. McCloskey was that utilitarianism would allow for unjust situations:

> *If framing an innocent man for a crime that would reduce the further riots and pain that looking for the real guilty person would incur, utilitarian theory would suggest that this would be the optimal choice as although an innocent man will suffer, for a greater number of people less pain will be caused, incurring in a calculation of more pleasure overall.* [42]

When responding to issues of justice, J. J. C. Smart offers a convincing response:

> *To say that you ought not to do an action A because it would have bad results if everyone (or many people) did action A may be merely to point out that while the action A would otherwise be the optimific one, nevertheless when you take into account that doing A will probably cause other people to do A too, you can see that A is not, on a broad view, really optimific. If this causal influence could be avoided (as may happen in the case of a secret desert island promise) then we would disregard the universalization principle.*[43]

The case proposed by McCloskey is different since his example asks: what if the opposite of [seeking justice to prevent others doing the action] were true? But the real issue with the case McCloskey presents is that it's an impossible one. McCloskey has not been specific in his example and instead offered a broad proposition because he is simply unable to be specific. Try to imagine a possible example in which framing someone in the name of stability is the option which will maximize utility? Surely it is always more g88d to punish the guilty party to deter future negative utility?

It's good[44] to test ethical theories in extreme and theoretical situations, but what McCloskey proposes is not a situation. Hence, we are unable to analyse the different possible actions and their utility.[45]

'The obligation to obey a rule does not, in the opinion of ordinary men, rest on the beneficial consequences of obeying it in a particular case.'[46] Surely a rule is an inefficient rule if the consequences of following it are

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[42] McCloskey 1957.

[43] Smart 1956: 345.

[44] I say 'good' as an expression of my personal opinion. But 'g88d' would also fit in the sentence. In maximizing utility we need optimum ethical theories, so we need to test them in extreme situations. Thus testing ethical theories in extreme situations is a means to utilitarianism so 'g88d'.

[45] Note that McCloskey's criticism was of restricted utilitarianism which is not really utilitarianism. Smart defines two types of utilitarianism as '…an extreme utilitarian would apply the universalization principle in the causal form, while a restricted utilitarian would apply it in the hypothetical form.' Meaning that a restricted utilitarian would disagree with the idea that, if a crime was committed on a desert island where not punishing the criminal could not inspire further crime, we do not need to punish them for the sake of it because there is no reason to do so. Still the criticism still holds of 'extreme utilitarianism' (standard utilitarianism).

[46] Nowell-Smith 1954.

not g88d? Smart's argument that 'ordinary men' are confused here because 'rule obeying' is a method to stability (in turn a means to all our pleasure and utility) is very compelling. Punishment for breaking such rules is necessary in non-desert island situations.

One might also consider justice as a market for utility. Markets are famous for being brilliant satisfiers of desire, allocating scarce resources in an efficient way to maximize utility.[47] Mill says: '*[A] person is understood to deserve good if he does right, evil if he does wrong.*'[48] Let us forget 'deserve' and instead see this idea of 'reward and punishment' as a market mechanism: a means to maximizing utility. In rewarding and punishing, delivering justice could be an efficient method to utility maximization. Mill famously argued that respecting rights was the best means to maximizing utility. I cannot be certain, but I think it highly likely he is correct given how well regulated markets have worked.

The only way to encourage people to seek utility increase and not decrease would be to uphold absolute execution of justice to ensure people knew there were no exceptions or loopholes they could exploit - as exploitation would decrease the utility from this method.[49] In order to maximize utility by this method, citizens must be free within the limits of law just as markets are free within the limits of regulation. If (P1) this method of maximizing utility is the most efficient and (P2) the only utilitarian action is the maximizing action, i.e. the most efficient action with minimal utility loss, then (C1) the freedom and the justice would be utilitarian.

But equally, if the justice market is not the best way to maximize utility, I can still claim (with a high degree of probability) that some degree of justice is necessary in the name of order and satisfying the desires of our utility. Even with any amount of justice, there requires freedom. So freedom is still necessary to utilitarianism.[50] Freedom could also be seen as an end-desire. Most people prefer to make a mistake as a result of their own decision rather than do a beneficial action which was dictated by an authority and so not the result of free will. But the desire for independence varies person to person. We can also desire not to have freedom, for example my desire to be fit may be unachievable if I am always irrationally (emotionally) led to stay in bed instead of working out; so I may ask someone to restrict my liberty when I am not rationally minded and force me to go.[51] In this sense we can resind our liberty with consent.

A response to Mill when he proposed rights as a means to utilitarianism was that this was respecting rights for the wrong reason. This is a weak response because it relies on the circularity of assuming what is right and wrong before defining right and wrong. This argument also rests on intuition, which I give little credit to since morality as a form of opinion is useless to us. Anyone who claims something is wrong in itself is expressing a circular opinion (as earlier explained.) If you were making this

[47] This is an oversimplification, but roughly speaking, regardless of your opinion on markets, we can view them as a means to an end of maximizing some thing, which may not exactly align with utility but to some extent is very similar.

[48] Mill 1863: 44.

[49] Justice often refers to punishment of wrongdoing rather than reward of g88d actions, this may be due to impracticalities, but we could (at least in Britain) consider MBEs and Knighthoods as a form of rewarding justice.

[50] Not full freedom - freedom within limits. Freedom that may still be curtailed by the parental state in the name of your own interest or merely in the name of society's interest.

[51] Blackmail websites to help people go to the gym really do exist.

argument as an ethical contract theorist, you would be hypocritical as in ethical contract theory, rights[52] are just a necessary means for enforcing social and individual contracts. It's indifferent whether we desire justice as a means to happiness or as an end desire in itself (or both); justice is still an integral part of utilitarianism.

Impartiality

Whilst I think utilitarianism's impartiality and objectivity is a strength, some people see this as a disadvantage.[53] People place a moral emphasis (moral in the sense that they are expressing their intuitive opinion) on family. Family is something we are naturally conditioned to prioritize over others ('familial duty'). Familial duty is more scientifically known as 'kin selection'. Genes want to reproduce (logically so). This is why parents care about their children more than those of others; their children carry their genes and so to continue the gene reproduction, the children must be successful and reproduce themselves.

Natural selection favours genes that increase the reproductive success of their carriers. We often think of 'carries' as referring to ourselves carrying our own genes. But people are aware that their siblings are also carriers of almost the same genes as themselves. So in a wide world the best way to spread our genes is to not only be successful ourselves, but also to have our siblings [and those with similar genes to us] be successful. This refers to 'g44d'. Kin selection can also foster sacrificial behaviour: parents, in order to see their genes succeed, prioritize the survival of their children over their own survival.[54]

G66d versus g44d versus g88d

One cannot argue 'g88d' is any better than 'g66d' or 'g44d'. I prefer actions which are 'g88d', but 'g44d' is arguably more descriptive of how people actually act. It may even be a built-in part of utility to desire happiness and survival upon those closer to you. On a personal level 'g44d' is probably most useful. But when I consider utilitarianism as attempting to model a system for everyone - 'g88d' is most useful.[55]

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[52] The term 'rights' is extremely ambiguous. Anybody can, on whim, claim anything to be a right. Rights clash all the time and the extent to which we have rights is heavily debated. I will take a 'means to utility' view of rights. So, we will reject the idea there is a right to not have the state to interfere in your life. For example, I find it deplorable someone can claim they have the right not to wear a seatbelt. On the other hand, most countries do not consider there to be a right to food and shelter, but under our 'rights as a means to utility' we might consider there to be a right to have access to (or be provided) food and shelter. Those who argue against this as a right do so on the grounds it would cause the collapse of housing markets and bring about more negative utility. They argue a few homeless may be necessary to incentivize people to work, this returns to the idea that utilitarianism would have to factor in pain's necessity to pleasure. Of course, the best option would be to provide shelter but not so nice that there was no incentive to work, this I believe is the utilitarian option and what we have in most developed countries.

[53] Ashford 2000.

[54] This paragraph also partially explains cronyism. Cronyism is mainly a *quid pro quo* exchange, but we may irrationally promote strangers who we feel are similar to us because that feeling of similarity is a possible sharing of genes.

[55] The self-transcendental disposition (altruism) and self-accumulation disposition (the personal accumulation of wealth and status and non-generosity) are both seen as innate parts of being human yet are inherently contradictory. Studies have shown that their prominences can be shaped by upbringing and exposure to different media. Meaning how g66d, g44d or g88d you are is shapeable.

Nepotism is a symptom of 'g44d'. But nepotism and the familial preferences of 'g44d' undermine an attempt to maximize utility on a population wide level. So, acting 'g44d' clashes with a population's desire to act 'g88d'. Therefore, we are forced to cast aside the preferences of some people over others; thinking about morality on a population wide level demands objectivity.

When it comes to decisions, we get different answers depending on who is making the choice. If the decision maker is human, the person will likely decide according to 'g44d', but if the decision maker is a machine or an algorithm it will be impartial and act according to 'g88d'. For example:

In a trolley problem[56] where someone favours saving someone they know over three strangers, they are making a g44d decision but also a b8d decision. Realistically, in the near future when (inevitably) a driverless car is forced to make a decision between who it runs over, it would decide to save the larger number of people - this would be the g88d decision. But to the person in the driverless car which runs over their family member they would view the decision as b4d[57].

When a person makes a g44d/g66d and b8d action:

We may be sympathetic to the parent in the trolley problem who saves their child instead of three doctors, because we feel their rational power was overridden by emotion, they effectively had less choice.[58]

But in situations which are not life or death, where emotions aren't so strong, we may be less sympathetic and more judgmental of g44d and b8d decisions. For example, when someone is nepotistic and gives the job to a family member, a worse candidate.

In other cases we may be neither sympathetic nor critical. For example, a person posts a picture on social media which frames their life nicer than it actually is, because the likes make them happy (a g66d decision). But this is happiness at the cost of others' jealousy (negative utility) so it is a b8d decision.

Usefulness and good intentions

Some people criticize utilitarianism for not being 'useful' because, they claim, one can't predict the future and the equation which quantifies your desires and happiness does not work. However, adverbs/adjectives are not meant to be useful. If you want a moral theory which is useful, it's best to turn to religion: a morality derived from authority is easy to follow. Utilitarianism as morality is merely meant as a concept and how you use it is up to you.

Utility is not *meant* for making decisions but due to its nature you (in theory) *will* desire to make utilitarian decisions. I recommend you try to do g88d actions. Utilitarianism *is* useful for judging actions and evaluating them in a thought process which asks: '*Was(/is) that action the one which brought about (or could have) the most amount of utility?*' As with all adverbs, one cannot provide judgement on the action until it is over. For example just as one would say '*Jones cycled to the museum fast,*' one could say '*It was g88d of Jones to share the chocolate.*' Only once we have observed the results of the action can

[56] A trolley problem refers to a trolley running down some tracks. You, the driver, can steer the trolley left or right at the fork in the tracks. Dr No has tied people to the tracks so that depending on where you steer the trolley a different person (/people) will die.

[57] 'B6d'/'b4d'/'b8d' being decisions which are not 'g66d'/'g44d'/'g88d'.

[58] If a parent is able to act b4d and g88d (saving the doctor over their child), we may be mightily impressed by their ability to overcome their emotions.

we comment on it. If Jones shared chocolate with Smith, who was (unbeknownst to Jones) allergic to chocolate, then we would say: 'It was b8d of Jones to share the chocolate.' We can also add '*Jones had g88d/g44d intentions but there were b8d/b4d results.*'

Henry Sidgwick thought that the general population shouldn't know that utilitarianism was what underlined their moral decision-making. He also believed that they have a simplistic understanding of utilitarianism and misuse it.[59]

Smart has a convincing argument which explains why it's g88d to praise[60] g88d intentions with b8d consequences.

> *For an extreme utilitarian, moral rules are rules of thumb. In practice the extreme utilitarian will mostly guide his conduct by appealing to the rules ('do not lie', 'do not break promises', etc.) of common-sense morality. This is not because there is anything sacrosanct in the rules themselves but because he can argue that probably he will most often act in an extreme utilitarian way if he does not think as a utilitarian. For one thing, actions have frequently to be done in a hurry. Imagine a man seeing a person drowning. He jumps in and rescues him. There is no time to reason the matter out, but always this will be the course of action which an extreme utilitarian would recommend if he did reason the matter out. If, however, the man drowning had been drowning in a river near Berchtesgaden in 1938, and if he had had the well-known black forelock and moustache of Adolf Hitler, an extreme utilitarian would, if he had time, work out the probability of the man's being the villainous dictator, and if the probability were high enough he would, on extreme utilitarian grounds, leave him to drown. The rescuer, however, has not time. He trusts to his instincts and dives in and rescues the man. And this trusting to instincts and to moral rules can be justified on extreme utilitarian grounds. Furthermore, an extreme utilitarian who knew that the drowning man was Hitler would nevertheless praise the rescuer, not condemn him. For by praising the man he is strengthening a courageous and benevolent disposition of mind, and in general this disposition has great positive utility. (Next time, perhaps, it will be Winston Churchill that the man saves!) We must never forget that an extreme utilitarian may praise actions which he knows to be wrong. Saving Hitler was wrong, but it was a member of a class of actions which are generally right, and the motive to do actions of this class is in general an optimific one. In considering questions of praise and blame it is not the expediency of the praised or blamed action that is at issue, but the expediency of the praise. It can be expedient to praise an inexpedient action and inexpedient to praise an expedient one.*
>
> *Lack of time is not the only reason why an extreme utilitarian may, on extreme utilitarian principles, trust to rules of common-sense morality. He knows that in particular cases where his own interests are involved his calculations are likely to be biased in his own favour. Suppose that he is unhappily married and is deciding whether to get divorced. He will in all probability greatly exaggerate his own unhappiness (and possibly his wife's) and greatly underestimate the harm done to his children by the break-up of the family. He will probably also underestimate the likely harm done by the weakening of the general faith in marriage vows. So probably he will come to the correct extreme utilitarian conclusion if he does not in this instance think as an extreme utilitarian but trusts to common sense morality. [...] The extreme utilitarian, then, regards moral*

[59] Schultz and Zalta 2020.

[60] Praise in a sense or further encourage rather than declare '*That was right*'.

> *rules as rules of thumb and as sociological facts that have to be taken into account when deciding what to do, just as facts of any other sort have to be taken into account. But in themselves they do not justify any action.* [61]

Smart views utilitarianism as a personal decision-making tool. I am aware the only decisions you may be able make, when trying to, are 'g44d' (unless you have incredible will power to overcome your human bias). So, in cases of 'g88d', which is the form of utilitarianism Smart is referring to, unless a computed decision, we can only use 'g88d' as the adjective to describe past decisions. For example: in the case of a divorce, we might say: '*That was a b8d decision but also a g66d decision disguised to the self as g88d.*'

Animals

Animals provide a dilemma for utilitarianism. We're not quite sure where they fit into morality and utilitarianism is unhelpful at providing judgement on actions involving them. Utility is in reference to human desires and happiness and so if we were to use 'g88d' to guide our actions we would disregard animal welfare. G88d rarely clashes with what we intuitively find repugnant except when it permits brutality towards animals?

I propose that we should continue to develop my modernized utilitarianism to include animals, something first proposed by Peter Singer.[62] We will value their desires with a coefficient of their relative intelligence (because desires are intrinsically linked to cognitive ability). This would mean giving greater weight to the happiness of dolphins, chimpanzees and dogs than to hamsters or sheep. If we decide to act according to utilitarian principles it would suggest for humans to contribute resources to the animal's happiness and welfare up to the point where it does not become significantly detrimental to our human utility.

This is simple enough for most animals. We free dolphins, monkeys and most animals into the wild then ensure a decent level of habitat protection. We do not need to sacrifice everything to give them a life of luxury where food is brought to them and they're given massages, this would be pointless as it would cost our own utility more than they would appreciate the benefit. The element of appreciation is a key part of happiness and it's the reason we have the intelligence coefficient. In humans we already use this concept of appreciation: if a resource can impact more utility elsewhere, then the state would give a little more of the resource to where it was most appreciated.

Farm animals

What about domestic animals and farm animals? Arguably it stands to reason that we should free them because killing them for food is definitely not maximizing utility? I would argue otherwise. I would say the options are between no utility at all and some utility, but that the option of them living nice old lives is not one of them. While wild animals exist naturally and live out their lives unhindered if they are not interfered with by humans, the 24 billion chickens on earth today are not here naturally. Without human induced breeding and feeding they would not otherwise exist.

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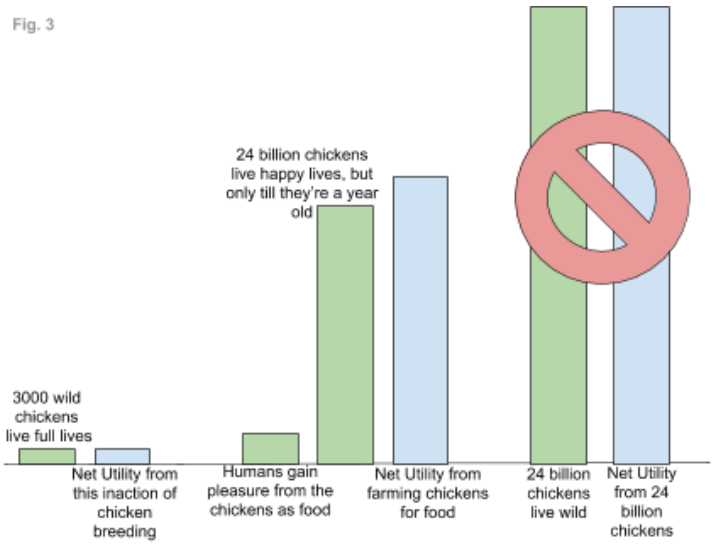
[61] Smart 1956: 346.

[62] Singer 1979: ch.3.

So, we are left with the situation in Fig. 3. The first option is how many wild chickens would exist naturally without human involvement. The second is more utilitarian because there is greater net utility but the third (which seems to be the option with most utility) is not really an option. Without reason to exist (as food) there would never be 24 billion chickens in this world, only 3000. So, the utilitarian thing to do is to farm animals but as humanely as possible so they gain as much utility from their lives as possible. Note: with cows there are other factors to consider, such as their impact on the climate and environment (negative utility), but it is important to find a balance.[63]



Utility monster-aninal

One way we might now consider creating as much utility as possible is to take an animal which is quite intelligent (so appreciative) and easily pleased, then breed as many as possible. We would then have the human population in servitude to the happiness creatures (utility monsters). Since it's easier to fulfill utility, and because humans are in a god-like position, we create a world which serves them and maximizes their utility.

I'm talking about dogs. Why don't we use dogs to maximize global utility? Golden retrievers have evolved to be friendly and happy. Breeding lots of chickens is pointless except to fulfill our own happiness through food because chickens cannot (cognitively) appreciate their life as much as a dog who has much higher utility potential.

A response to the proposition of dogs as utility monsters is that for those not as cognitively advanced as humans (i.e. dogs and other animals), the animals are happy when they think they're living their best life. A dog cannot desire what it doesn't know about: dogs aren't creative. If you never show a dog what an automatic ball throwing machine is, or show it what an electric blanket is, it will never in the first place desire either of those because it was not aware of the possibility of them. Dogs are equally happy if just the things they desire are maximized. We can limit their desires to socializing and sticks; once your dog meets another dog with a squeaky ball it will now invariably desire this. To be utilitarian you must let your dog socialize and play and now give the dog its own squeaky ball.

My argument here is that you do not have to give animals all the luxuries in the world, even if they are similar to a utility monster. Because they are less cognitively aware, animals will settle for what they have if they're given reasonably good lives. We could increase the number of dogs in the world to increase utility. But not at the expense of humans. What would be the effect of building a dog park?

[63] When I say 'balance' in this essay I'm referring to the optimific equilibrium point when we compare the many factors affecting utility that situations present us with.

They might all be happy, but all we've essentially done is build a habitat and released animals into it. We might as well just plant some trees and let wild animals come.

Awareness of death

In addition to intelligence, we could distinguish why it may be g88d to kill some animals and not humans because of the difference in conscious awareness of death. All animals run from recognizable danger; they flee instinctively and because they desire not to feel pain. But few animals are able to conceive of a world without themselves, to consider their own death, and flee danger because they desire to exist.

So when we kill a horse we are not crushing any dreams, when we kill a baby we have not crushed any dreams, even painlessly killing a toddler would not destroy the utility of desiring meaning because no such desire has developed in a horse, baby or toddler (yet).

Animals appear to live in the moment, without considering that their future is finite and how they desire to spend their time. There's a fundamental switch when a toddler realizes the world isn't happening to them, revolving around them, and the actuality of reality continues to be understood into the teenage years, even all throughout life. Peter Singer claimed it was okay to kill a baby up to around three months as this is when he considered consciousness to develop.[64] But I think it's what that consciousness stands for: the shift in desire, knowing we will die creates an urgency and necessity to fulfill our desires. Instead of a child wanting milk just as animals desire milk or grass, we shift to wanting to become a fireman or an astronaut.

This creates a shift in utility: killing a human who expects to live 80 more years is cutting their desires short; whereas killing a human whose concept of life desires does not yet exist does not create as much negative utility. Obviously, I have not considered the negative effects of killing a baby on the parents and the damage to societal cohesion. Painlessly killing a newborn baby is b8d because of the negative utility it causes the parents, and not 'bad' because of the potential utility of the baby because it's not aware of life. It is a descriptive fact that beyond our close family, we do (rationally) value the lives of strangers differently; based on learning their age, dreams, and potential for creating utility for others based on their career. As the reader you may fear that valuing life has scary connotations, but credit card and insurance companies, even the government, calculates this all the time. [65]

Instinctively we feel murder is worse when the victim had more to live for or more to give. How bad ending a person's life is would depend on the potential utility you take away from them, as well as the pain their death would cause to others. Here's an average person's potential for utility over life. (Fig.4).[66]

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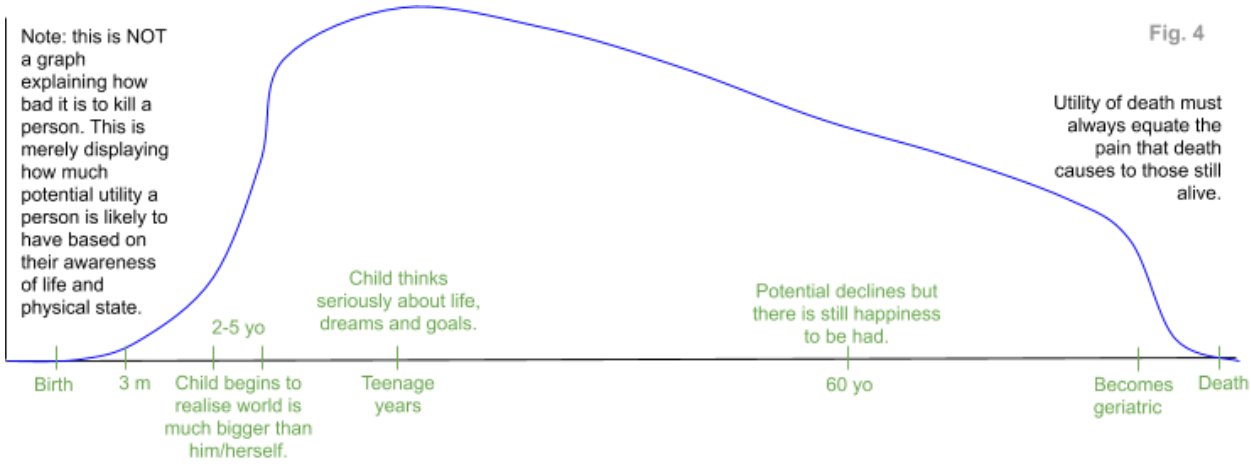
[64] Singer 2020.

[65] The official name for the value of your life if you live in the UK is 'The Value of a Prevented Fatality (VPF)'. As of 2016 the UK Department for Transport values the prevention of a fatality on Britain's roads at £1.8million; see Thomas and Waddington 2016.

[66] It could vary greatly from this graph. For example: veteran charity hero Sir Thomas Moore ('Captain Tom') produced vast amounts of utility when he was 100 years old, as did the Japanese woodblock printer Katsushika Hokusai. It could even be said that painter Vincent van Gogh's utility was only redeemed a century after his death.



Abortion and euthanasia

Given a situation where someone has no potential utility (potential to desire anything), and a situation where their death would not cause negative utility to others, it would be morally permissible to end their life. I am referring to abortion and euthanasia.

In any case of abortion, the mother's pain by keeping the child will be greater than if she rids her body of it. The foetus/baby, 'alive' or not, is unaware of potential utility to be had from life so cannot care if its life is ended. In euthanasia, the person is likely to be disabled beyond hope and in pain, their potential for positive utility in the rest of their life is considered by them to be naught. They may have family who would be saddened to see them go, but equally they would also be saddened if the relative continues in their troubled existence.[67]

Utility through illusion

The analysis that we could maximize utility for animals through illusion could be expanded to include humans as well (since we are not un-trickable). It can help explain why people living in LEDCs[68] are not as unhappy as we might expect: they are less aware of what they have not got. People living in MEDCs are less happy than we might expect because there is more 'stuff' for them to desire, and so more products which they want but cannot have because, whilst they're rich, they still cannot afford most of their desires.

It does sound dystopian to say that all we have to do is convince the general population into thinking that they're living their best life. In fact, it's a common campaign claim among political parties going for their second term that life is as good as it gets. Is it really that repugnant to be deceived into happiness? You and I are both aware there is a leisure class with better lives than our own, but I doubt we would want to not know of their existence. To deprive us of this would be to subdue our other desire for knowledge. But for the cognitively impaired and animals it's okay to deprive them of knowledge of better lives because they do not desire knowledge as an end-desire the way humans do. So,

[67] This would not permit a suicidal person to try to seek euthanasia as whilst they may feel their life has no potential for happiness and utility, an observer would say it had.

[68] LEDCs - Less Economically Developed Countries (poorer countries), MEDCs - More Economically Developed Countries (richer countries).

utilitarianism would permit illusion to be used *only* on organisms which do not desire knowledge as an end-desire.

I believe what is permissible largely relies on the available resources. For example, until a baby tastes a strawberry it is indifferent. If we had enough strawberries for that baby's lifetime, we would let the baby try the strawberry and eat them throughout its life. If strawberries were a rarity, it may be better the baby never knows of the existence of this rare flavor, else it would desire what it cannot have. Once the baby tries that flavour, the desire will exist and we should now endeavour to maximize the fulfilment of this desire.

Moral luck

Often two people with equal intentions who do the same action will end up suffering different consequences. In the case of moral luck ,the misunderstanding is that due to the differing consequences, utilitarianism would have them punished or rewarded differently. For example, two men are driving under the influence of alcohol. Owing to 'luck', one kills a man and the other does not.

Thomas Nagel and Bernard Williams both pointed out in papers entitled 'Moral Luck' that people are inclined to pass moral judgement on the consequence but paradoxically do not think people should be judged for things out of their control. While the driver could have prevented the death there was also a strong element of luck impacting the outcome.

Punishments

Another example: Jones punches a man who falls over; Jones is punished for assault. Smith punches a man who falls over and dies; Smith is punished for manslaughter. It would seem similar actions can yield different punishments owing to luck.

I concede utilitarianism is open to plenty of debate over what will create the maximum utility. I do not believe utilitarianism would punish Smith and Jones differently. I think utilitarianism would more likely suggest a drink-driving style punishment. To reduce negative utility a blanket punishment system is in place to incentivize people not to do the action which has a relatively small probability of incredibly high negative utility. Or it may be that some regard for disincentivizing the action and some (lesser) regard for the consequence is taken into account. I don't see the issue with 'moral luck' because utilitarianism would issue justice in whichever way was most efficient and moral luck is irrelevant to that.

Drink driving is not, in itself, b4/6/8d. One can imagine driving a sports car around a desert while tipsy might be fun. When there is a risk of large amounts of negative utility (i.e. driving tipsy through the streets of London), punishment must be considered. Punishments do not always equate to the moral value of the action but are often necessary to prevent actions which have probabilities of leading to certain negative utility. Someone who is responsible for an immoral action is not necessarily an immoral person: they may try their best to spread g88d but unluckily end up causing pain.

Determinism

When Nagel proposes different forms of luck (constitutive, circumstantial, causal, resultant),[69] he's simply outlining different facets of determinism. Or referring to varying degrees of determinism where in most cases our choices have less effect on the outcome than we might hope. This I can address by reiterating the distinction between 'g88d' intentions versus 'g88d' outcomes. Accountability and judgement are valid of intentions and the degree to which the decision-maker considered the probability of their intention actually affecting the consequence. It would also be affected by the degree to which determinism is true.

When talking about determinism I think we should first assume that it is true, and then ask whether there is a possibility where it could not be. When we consider the factors that led to even trivial decisions, the answer always lies in a mixture of our past memories, upbringings and external factors (external factors themselves influenced by the logical cause and effect of physics). But for the decision-making process in our minds to be rational and logical,[70] there must be one singular end goal which we are trying to maximize. If we take my premise of utility as being comprised of multiple end-desires, all usefully formed through evolution (happiness, knowledge, experiences etc.) then there is no one desire to aim for.

Artificial intelligence can be taught to think up methods of reaching an objective (desire) but it cannot rationally find a way to consider multiple end objectives/desires.[71] It cannot 'choose' between them; it must be told how much to weigh each separate objective; it must be told which to prefer and by how much to prefer one objective over another. Humans must make our own considerations (choices) of how to equate each factor in our own 'utility calculus'.[72] When given choices, we must decide how to weigh each end-desire. This doesn't discount molecular level determinism, but if we think that our stream of consciousness operates rationally in pursuit of an objective, much like a computer, this would not be possible if we have multiple end-desires. If it's true that there is more than one end desire, it would seem necessary that we do indeed make at least some choices.

In addition, if we were to isolate from our senses in a neutral room, we are able to logically trace our thoughts backwards (this is why we are inclined to believe in determinism) but we are unable to trace our thoughts forward any faster than real time. Despite knowing that there will be no major external input of sense data, I cannot forward my understanding or predict where my thoughts will go. This leads me again to think that there must be some randomness, some element of choice in partnership with determinism.

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[69] Nagel 1979.

[70] 'logical'/'rational' as in: 'Influenced by *x* amount of emotion, *y* amount of past experience, and *z* external factors, and all the factors subconsciously (but rationally) weighed up to form a conclusive action.'

[71] If you were to program the AI an overarching objective which balanced the multiple sub-objectives beneath it, then it could balance them. But to rationally balance multiple objectives without an overarching objective is not possible, unless it were done randomly.

[72] A replacement of the Hedonic Calculus.

Conclusion

I have evaluated some of the criticisms of utilitarianism and accepted Moore and Hume's proposition that 'good' is indefinable because of its circular nature and the confusion of words that we associate with it, primarily the words 'ought' and 'duty'. I first redefined utility as those desires which are ends in themselves and do not undermine your most prominent desires. I noted that since utility is what one desires, and circularly utility is also desirable, one naturally desires to maximize utility. I defined three interpretations of maximizing utility: for yourself (g66d), for everyone equally (g88d), and for everyone relative to how genetically similar you think they are to yourself (g44d). I did this because there was no reason to choose 'g88d' over 'g44d' or 'g66d' to be utilitarianism so they are all just different forms. I have also established through analysis how to allow utilitarianism to include animals by weighting people and species by cognitive ability. The impacts of this on making abortion and euthanasia morally permissible. As well as looking at how utility can be maximized by illusion for those unaware of potential desires. I have also cleared up some misunderstandings where people mistake 'more' for 'maximum', as well as reminding ourselves utilitarianism is a concept for describing actions and not necessarily to be used as a guiding principle. Should you desire to maximize utility you could use utilitarianism to guide the construction of societal models and laws or just for your day-to-day actions. Finally, I looked at how moral luck can be addressed by distinguishing between moral intentions and consequences; as well as considering that, whilst actions may have a strong deterministic sway, there must still be some element of choice. Through alterations and addressing the criticisms I believe utilitarianism is a concept that can become socially accepted as morality.

All ethical theories are means to utilitarianism. Because we have defined utility as human end-desires the creators of ethical theories can't help but be utilitarian. Even Kantian ethics can be constructed as simply a bad attempt at rule utilitarianism. Kantian ethics descends into rule utilitarianism because when building absolute rules you can build that rule to be more and more specific, defining the action of lying to your mother as different to lying to a thief. Rule utilitarianism becomes as situationally specific as it possibly can until it is virtually act utilitarianism. In rule utilitarianism courts may even allow exceptions where people are permitted to break said rules, or parliament may simply add infinite clauses to allow for a specific rule to almost every situation. Aristotle's virtues are just human traits tending to bring about utility and his 'golden mean' concept is simply stating you should do whichever action is most likely to bring about the maximum utility.

Bibliography

Anscombe, G. E. M. (1968) 'Modern Moral Philosophy', in *Ethics*, eds. by Judith Jarvis Thomson & Gerald Dworkin, New York

Ashford, E. (2000) 'Utilitarianism, Integrity, and Partiality', *The Journal of Philosophy* 97.8: 421-39

Bentham, J. (1948) *An introduction to the principles of morals and legislation*. New York

Cook, C. 29/08/2014. *How much is a year of life worth?* BBC Newsnight online article 'bbc.co.uk/news/health-28983924'

Mackie, J. (1977) *Ethics: Inventing Right and Wrong*. London

González-Burgos I. &m Feria-Velasco A. (2008) 'Serotonin/dopamine interaction in memory formation', *Progress in Brain Research* 172: 603-23

Hume, D. 1740. *A Treatise of Human Nature (III)*. Oxford

Kant, I. 1797.*Groundwork for the Metaphysics of Morals*. Translated by H. B. Nisbet. Cambridge, 1991.

McCloskey, H. John. 1957. 'An Examination of Restricted Utilitarianism', *The Philosophical Review* 66.4: 466-85

Mill, J. S. (1859) *On Liberty*. London
(1863) *Utilitarianism*. London

Moore, G E. (1903) *Principia Ethica*. Cambridge

Nagel, T. (1979) *Moral Luck*. New York

Nietzsche, F. 1990. *Beyond Good and Evil: Prelude to Philosophy of the Future*. London

Nowell-Smith, P. (1954) *Ethics*. London

Nozick, R. (1974) *Anarchy, State, and Utopia*. New York

Scanlon, T. (1982) *Contractualism and Utilitarianism, Utilitarianism and Beyond*. Cambridge

Schultz, B. 2020. 'Sidgwick', *The Stanford Encyclopedia of Philosophy*, plato.stanford.edu/entries/sidgwick/.

Singer, P. (1979) *Practical Ethics*. Cambridge
(2020) Personal Website, Frequently Asked Questions: 'petersinger.info/faq/'

Smart, J. (1956) 'Extreme and Restricted Utilitarianism', *The Philosophical Quarterly* 6.25: 344-54

Tanner, M. (2000) *Nietzsche: A Very Short Introduction*. Oxford

Thomas, P. & Waddington, I. (2017) 'What is the value of life? A review of the value of a prevented fatality used by regulators and others in the UK', *Nuclear Future* 13.1: 32-39

Williams, B. (1994) 'Jim and the Indians', in *Ethics*, ed. Peter Singer, Oxford

The influence of philosophy on science

Sameer Khalil

Philosophy has always had, and continues to have, a significant influence on science, although the two subjects are regarded by many as two completely different modes of thinking. While science focuses on what can be observed, tested, and repeated, philosophy explores issues, including the nature of reality and the limits of our understanding, using rational thinking. Both fields utilize different methods to make conclusions such as empirically based hypothesis testing contrasted with logic-based analysis, which seems to be a clear difference. Hence, many believe the two disciplines do not benefit from the teachings of the other. The debate's earliest forms took place in Athens, where Isocrates criticized Plato's philosophical attitude of approaching education, 'arguing that philosophers do not consider practical evidence, and hence do not contribute to scientific speculations about the physical environment'.[1] However, the two are complementary. Philosophers have helped scientists in various ways, from providing the logical basis of scientific methodology to observing flaws in scientific trends.

The fundamentals of scientific methodology strive from philosophical thought, and scientists use methods developed by philosophers, such as classification and logical deduction, to prove hypotheses. Philosophy aids scientific experimentation owing to its tradition of classifying objects depending on the different types of properties they display. More recently, in the field of stem cell research, the philosophical analysis of 'stemness', the property that defines a stem cell, has consequently led to the use of stem cells in cancer-based therapies.[2] Depending on the type of tissue, stemness can be a categorical property, a dispositional property, a relational property, or a systemic property, and what separates these classifying factors are what influences the cells to differentiate, either being intrinsically or extrinsically controlled, or by the environment. This analysis can highlight several problems or factors that will affect the physical object, useful for science as it can now deduce how to control all, or a combination of, these factors and investigate different cancer therapies, based on stemness. Secondly, philosophy tackles issues that science does not, and poses fundamental questions that science tries to prove.

Suppose one looks at an object without any presuppositions or prior knowledge of what that object is, it is hard to interpret what this object is. Philosophy looks at what is not observable and questions this, not based on any environmental, case-specific factors that science relies on. To take a basic example, everything we know about the planets, the distance from the moon to the sun, and the motion of the planets around the sun, are all theoretical problems, based on ideas involving the force holding the planets in orbit or the role of infinity in the universe, all problems philosophy came up with through questioning the possibilities of relationships between cosmological objects. Lastly, philosophy incorporates a logical method of deduction into scientific methodology. If we add certain premises, or 'postulates', and say P is equal to Q, and Q is also equal to R, S and T, we can logically deduct that P is

[1] Rovelli 2018.

[2] Laplane et al. 2019.

also equal to R, S and T.[3] If one knows that species best adapted to their environment are more likely to survive and pass on their traits to the next generation, scientists can deduce that, if the temperature of an ecosystem rises, the organisms better adapted to warmer climates will outlive the others. Thus, being the backbone of scientific deduction, and creating problems which science can investigate in the physical world, Philosophy contributes significantly to scientific methodology.

Despite this, philosophers have proposed various arguments that conflict with scientific discovery, yet even this has somewhat aided science, by constantly sparking change and a novel way of investigating problems. The induction principle suggests that, if one knows a sample of a population displays a feature, it can be assumed that everything in the whole population displays this feature.[4] Karl Popper, in his 1934 book *The Logic of Scientific Discovery,* uses this principle to argue that all science remains hypothetical.[5] His reasoning was that, if a property of an object is believed to be true, and we demonstrate that property with another sample of the population, it cannot be proven that this feature holds true for all objects in the population. For example, if a chicken notices a farmer bringing food for it every morning for hundreds of days in a row, it is not safe to assume that the next day the farmer will not do something different. Popper takes this further to say that scientific observations can only falsify scientific hypotheses. Through this principle of falsification, if something does not abide to the laws of the theory, that theory is falsified.[6] This has confused scientific procedures, as the knowledge of previous theories means nothing when making up a new one, as everything can be falsified. Anomalies to the general trend can ruin a whole scientific theory. Another philosopher, Thomas Kuhn, denied this idea of falsification, and instead argued that science moves between different paradigms, which are large bodies of scientific theory. These paradigms can have inconsistencies but can be constantly refined. Paradigm 'shifts' occur when evidence leads to a majority rejection of a previous paradigm.[7] In 1811 Johann Friedrich Meckel proposed the idea that from birth, humans develop features as they grow up, corresponding to other animal types. For example, human embryos have slits in their necks which look like gills. Owing to this fact, many believed Meckel's theory. It was only later, when enough understanding about DNA and Darwin's Theory of Evolution arose, that this was proved false, as we now know fish and humans share some of the same DNA from a common ancestor.[8] When using logical thinking to determine whether a theory is true or not based on other evidence, science can move forward, as displayed in this certain scenario. Thus, it turns out that, even though philosophy has challenged scientific methodology, it exposes the gaps within scientific theory, and this insight allows scientists to challenge prior theories, and come up with newer, more valid ones.

Furthermore, philosophy has had a wider impact on science practically, and continues to aid science education. In the twentieth century, major advancements in physics relied on philosophy. Werner Heisenberg used the notion that knowledge arises from what is physically observable, and by eliminating the Measure Problem of unobservable Multiverses,[9] he produced his revolutionary paper

[3] Passmore 1948-1949.
[4] *The Problem of Induction* 2018.
[5] Popper 1934.
[6] Ibid.
[7] Kuhn 2018.
[8] Vickers 2019.
[9] Wolchover and Byrne 2015.

on quantum theory.[10] Philosophical discussions have contributed greatly to the ethics within medicine and to what extent doctors have the choice to decide the fate of a terminally ill patient. The mind-body problem, proposed by Descartes in the seventeenth century, is a problem whereby humans are judged by their physical body every day, but the mind also exists as a separate being trapped within this body.[11] Our inner mind is not represented outwardly by the physical appearance of our body. Francis Crick managed to link this philosophical thinking with science, and thus, many discoveries about neural connectivity and understanding of how we can see, taste, and smell arose. Crick also suggests how science can explain feelings and emotions, with a system of neurones and chemical messages in the blood.[12] Thus, the knowledge about the connection between the mind and the body has improved. Teaching students the philosophy of Ssience can be beneficial in their scientific study, as understanding the flaws and the wider ideas behind the topic can give the students a fresh way of looking at certain subject. If a teacher taught parallels to theories, such as Lamarck's falsely proven theory that physical changes due to environment during an organism's life can be passed on to its offspring, students would be better prepared to discuss different explanations to a topic, and hence, be more knowledgeable scientists.[13] This is considered in theoretical pluralism, where 'maximum science growth is achieved by working with a number of different and conflicting theories'.[14] Therefore, philosophy benefits science practically in the real world, and explains concepts to enhance students' understanding. I

In conclusion, philosophical matters lie at the heart of science, and have contributed greatly to the field and its impact on society. Philosophy occasionally challenges scientific methodology, and by no means has this always led to positive developments, but ultimately can lead to changing a theory for the better. The Three Worlds Model, proposed by Mouton, categorized knowledge production into three different 'realms', with each realm differing from the other by epistemic interest and form of knowledge.[15] Even though science and philosophy are split into two different realms, Mouton claims the latter takes the reflective nature of the former and critically analyses 'the sociology of science, the history of science and methodologies of scientific enquiry . . . the ultimate improvement of science itself'.[16] Indeed, these subjects are individually their own area of knowledge and a scientist can be a good scientist by making conclusions solely based from their own speciality but claims that science does not owe where it is now to philosophy are untrue, a bond which has been for the most part, overlooked.

[10] Rovelli 2018.
[11] The School of Life: *The Mind Body Problem*
[12] Horgan 2018.
[13] *Early Concepts of Evolution: Jean Baptiste Lamarck*
[14] Martin 1974.
[15] Ryan 2019.
[16] Ibid.

Bibliography

Boas, G. (1951) 'The influence of philosophy on the sciences', *Proceedings of the American Philosophical Society 95.5:1 – 9*

De Haro, S. (2019) *Science and Philosophy: A Love–Hate Relationship*. Available at: https://link.springer.com/article/10.1007/s10699-019-09619-2#Sec4 Consulted: *02/06/2020*

Early Concepts of Evolution: Jean Baptiste Lamarck. https://evolution.berkeley.edu/evolibrary/article/history_09 Consulted: *02/06/2020*

Horgan, J. (2018) *Why the Mind–Body Problem Can't Have a Single, Objective Solution.* Available at: https://blogs.scientificamerican.com/cross-check/why-the-mind-body-problem-cant-have-a-single-objective-solution/ Consulted: *02/06/2020*

Kitcher, P. (2019) *Philosophy of Science.* Available at : https://www.britannica.com/topic/philosophy-of-science#ref271804 Consulted: *02/06/2020*

Laplane, L. et al. (2019) *Why Science needs Philosophy.* Available at : https://www.pnas.org/content/116/10/3948#ref-17 Consulted: *27/05/2020*

Martin, M. (1974) 'The Relevance of Philosophy of Science for Science Education', *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1974: 1-8

Passmore, J. (1948-1949) 'Philosophy and Scientific Method', *Proceedings of the Aristotelian Society* 49: 1-16

Philosophy of science. (2020) *Wikipedia.* Available at https://en.wikipedia.org/wiki/Philosophy_of_science. Consulted: *27/05/2020*

Pigliucci, M. (2009) *On the difference between science and philosophy*. Available at: https://www.psychologytoday.com/gb/blog/rationally-speaking/200911/the-difference-between-science-and-philosophy. Consulted: *02/06/2020*

Popper, K. (1934) *The Logic of Scientific Discovery*. Germany: Julius Springer.

Rovelli, C. (2018) *Physics Needs Philosophy / Philosophy Needs Physics*. Available at: https://blogs.scientificamerican.com/observations/physics-needs-philosophy-philosophy-needs-physics/ Consulted: *02/06/2020*

Ryan, N. (2019) *Detailed Introduction to the Philosophy of Science*. Available at: https://medium.com/the-understanding-project/a-detailed-introduction-to-the-philosophy-of-science-f2dce6e0e5b9. Consulted: *27/05/2020*

School of Life: *The Mind-Body Problem* https://www.youtube.com/watch?v=q8uM9_tbfCI. Consulted: *28/05/2020*

Smith, S. (2017) *Why philosophy is so important in science education*. Available at: https://qz.com/1132948/why-philosophy-is-so-important-in-science-education/. Consulted: *02/06/2020*

Spirkin, A. and Daglish, R. (translator) (1984) *Dialectical Materialism*. London

The Problem of Induction. (2018) https://stanford.library.sydney.edu.au/archives/sum2016/entries/induction-problem/#Bib. Consulted: *02/06/2020*

Thomas Kuhn. (2018) https://plato.stanford.edu/entries/thomas-kuhn/ Consulted: *02/06/2020*

Vickers, P. (2019) *4 convincing scientific theories that fooled scientists for decades*. Available at: https://www.siliconrepublic.com/innovation/scientific-theories-proven-wrong. Consulted: *28/05/2020*

Wolchover, N. and Byrne, P. (2015) *In a Multiverse, What Are the Odds*? Available at: https://www.quantamagazine.org/the-multiverses-measure-problem-20141103/ Consulted: *02/06/2020*

Will AI replace humans?

Joshua Soyke-Pinon

Artificial Intelligence (AI) is the pursuit for the best agent programme on a given architecture – an agent being something that can perceive its environment through sensors and consequently act upon that environment through actuators.[1] Note that there is no constraint on the AI having to be weak (the assertion that machines act as if they were intelligent, by simulating thought) or strong (that machines that do so are actually thinking).[2] In terms of the title, the idea of replacement is that in which AI replaces humans as the dominant form of intelligence on earth, either through extermination of the human race or replacing human's societal role, rendering them useless. This need not be a physical upheaval of the human race through robots but a cyber-takeover. I have left the title quite open to allow for a multitude of factors and ideas to support and conflict with one another. The format of the question is also that of a yes/no but I will be supporting arguments on both sides. I have also not included a time-frame but am more interested in AI over the next decade rather than some arbitrary time until the end of the universe. To summarize, I will be looking at the ethics, predictions, precautions and development surrounding artificial intelligence and its ability to replace humanity.

In some ways part of the question is already answered: the world's most powerful supercomputer – IBM Summit, USA – has a memory of 2,801,664 GB and can perform calculations at a rate of 148.6 petaflops ($10^{17.2}$ operations per second).[3] In contrast the brain is estimated to have a memory ranging from 1-2,500,000 GB and able to perform 10^{17} operations per second.[4] (Ironically, the power requirement for Summit is 10,000kW compared to around 20W for the human brain indicating the brain is still much more efficient!) Therefore, modern supercomputers, capable of running AI programs, are already outperforming human brains in this metric. However, the catch lies in recreating the brain's level of intelligence using a computer of this magnitude. Until this is understood, the continued increase in processor power as indicated by Moore's law does not directly threaten humanity.

One of the more prominent fears is not current levels of AI replacing humans, but the possibility of more advanced forms called AGI or artificial general intelligence. Most existing AI systems can be classified as 'narrow AI' in that they are trained to complete a specific task to a high level of accuracy and consistency but are unable to venture out of their comfort zone. The upcoming materialization of 'general' AI would be able to perform multiple tasks adapting in real-time to environments and be of a much better use to society – on a par with humans. Looking at the modern categories of AI: machine learning, natural language processing, expert systems, vision, speech, planning and robotics,[5] AGI would be able to enhance all these fields resulting in job losses and an increased reliance on AI for a wide range of tasks. Taking this further we can map out a potential path for humanity: AI reaches some

[1] Russel and Norvig 2010: 34.
[2] Russel and Norvig 2010: 102/
[3] Strohmaier and others 2019.
[4] Russeland Norvig 2010: 12.
[5] Kumar 2018.

theoretical limit of being able to perform any human tasks - present or future -> humans become redundant and resort to leisure activities -> humans lose sense of self-worth without a job or meaning to life -> parts of humanity become insane and the population dwindles with possibly some self-inflicted extinction event. Although this is quite far-fetched and has only been touched upon in dystopian Sci-Fi movies, there are already existing indicators that we are giving up a larger proportion of control to AI.

Another approach to the question is to look at the rate and feasibility of AI development and where this will lead us. We can then extrapolate the state of AI in the future and if it breaks the intelligence threshold. The first work recognized as AI was done by Warren McCulloch and Walter Pitts in 1943, and since then AI has grown at a rapid rate owing to an increase in funding, interest and results. Nevertheless, there have been setbacks such as the 'AI winter' in which many companies stagnated as they failed to deliver on extravagant promises.[6] Looking at present-day AI the current market for cognitive and artificial intelligence is $24 billion in revenue.[7] This shows that there is a demand for research into AI and that companies believe it is economically viable. If this trend continues it is likely that more automated and AI-driven systems will be developed (as there is no need to pay employees), resulting in the same consequence as outlined in the previous paragraph.

It might also be useful to consider the potential of exponential advancement within the AI industry. It is quite probable that growth in AI won't be linear and we already have examples of this: Google recently announced its AutoML project which is designed to create other AI more effectively than humans.[8] Along with this, increases in efficiency in engineering AI and computers will only shorten production time and bring us closer to artificial superintelligence (a god-like level of intelligence surpassing that of humans).

The ability of AI to replace humans also relies on the ability of humans to write programs in which AI can self-learn over time (either through machine learning or other means) creating a feed-back loop in which the primary goal is blurred and instead the AI becomes intent on destroying humanity. This may be the case with reinforcement learning in which maximizing reward or some other parameter is the end goal. As is often hypothesized a poorly built algorithm could evolve into deciding that removing humans is the optimal way to maximize X. Once the AI has reached this stage it may be unable to retrace its steps and so this is a feasible claim for human replacement.

On the other hand, there is room for optimism: many computer scientists and visionaries see the potential of an AI revolution in which AI and humans collaborate, utilizing each other's skills, with AI well regulated by humans. In this outcome humans will still have a place in society, providing creativity and dealing with the ethics (inherently what humans are good at) around AI. It is unclear how long this parallel relationship would continue but potentially long enough so that humans discover some higher form of intelligence, thus reclosing the gap between AI and human intelligence and avoiding AI domination.

[6] Russel and Norvig 2010: 24.
[7] Columbus 2019.
[8] The Friendly Brain 2019.

Another strong argument against is the idea that computers cannot become self-aware. Even expert neuroscientists struggle to define or understand the meaning of 'consciousness' but nevertheless it is agreed that humans are 'conscious' and computers are not. This discounts the possibility of AI comprehending its situation on earth and turning on its creators. However, with recent attempts to map the human brain and create so called 'neural networks' – a machine-learning system made up of nodes with various weights – there is a possibility that some version of consciousness is achieved. Yet realistically. this is unlikely to occur in the next decade (if ever) as there is lack of investment and concrete results.

One of the final counter-arguments to the success of AI replacing humans is the level of precautions dealing with the ethics of AI in the modern world. Noteworthy inventors such as Elon Musk have expressed the need for a governing body focusing solely on the safety of AI and its impact on humans. The idea of limiting or constraining the power of learning-style algorithms to ensure pro-human outcomes is a sacrifice many scientists are willing to pay. There is also development into a new field of 'explainable AI' which aims to understand the complex process inside machine learning algorithms to better monitor and control AI.[9]

Before concluding I want to outline the current short term-view for AI. At a conference of 979 technology experts in 2018, 63% said they are hopeful that most individuals will be better off from AI by 2030 (therefore assuming no AI super control in the near-future) with the remaining 37% saying otherwise.[10] This shows there is slight majority favoring a positive outlook but still a worrying number against, even for only 10 years ahead.

To conclude, I believe artificial intelligence will replace humans in the next decade based on current standards and progress. The dangers and unpredictability of AI are obscured by its rapid growth and technological advancements, guiding us to a dystopian future. Clearly, as AI becomes more integrated, government bodies may intervene. However, mankind has a history of not learning from past mistakes. I do not believe in the 'terminator scenario' for AI, as I don't believe a combination of metal and electricity can replicate the 'consciousness' of a biological organ and become 'self-aware'. (I believe this requires some organic matter which is beyond our current scope.) I am also aware that AI is in its early stages and so predictions are imprecise. However, judging by the previous decade: space travel, computers and the internet, I believe there will be an exponential growth (where AI itself boosts AI growth) resulting in human replacement earlier than expected.

[9] See The Lancet Respiratory Medicine 2019. A side point is that the egotistical nature of humans could prevent them willingly creating AI that would be deemed more 'intelligent' or more importantly more 'capable' than themselves. The obvious caveat is accidental creation of these systems.
[10] See Anderson, Lee and Luchsinger 2019.

Bibliography

Anderson, J., Lee, R. and Luchsinger, A. (2018) *Artificial Intelligence and the future of humans*. https://www.pewinternet.org/2018/12/10/artificial-intelligence-and-the-future-of-humans/ . Consulted: 21/08/19

Columbus, L. *Roundup Of Machine Learning Forecasts And Market Estimates For 2019*. https://www.forbes.com/sites/louiscolumbus/2019/03/27/roundup-of-machine-learning-forecasts-and-market-estimates-2019/#7fe2f6337695 . Consulted: 19/08/19

The Friendly Brain. (2019) *How Artificial Intelligence Will TAKE OVER The World*. https://www.youtube.com/watch?v=NOTlRkO3Syk&list=WL&index=2&t=0s . Consulted: 20/08/19

Hvistendahl, M. (2019) *Can we stop AI outsmarting humanity?*. https://www.theguardian.com/technology/2019/mar/28/can-we-stop-robots-outsmarting-humanity-artificial-intelligence-singularity . Consulted: 20/08/19

Hyken, S. (2017) *Will AI take over the world?* https://www.forbes.com/sites/shephyken/2017/12/17/will-ai-take-over-the-world/#d53e45054015 . Consulted: 20/08/19

Kumar, C. *Artificial Intelligence: Definition, Types, Examples, Technologies*. https://medium.com/@chethankumargn/artificial-intelligence-definition-types-examples-technologies-962ea75c7b9b . Consulted: 19/08/19

The Lancet Respiratory Medicine. (2019) *Opening the black box of machine learning*. https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(18)30425-9/fulltext . Consulted: 21/08/19

Russel, S. and Norvig, P. (2010) *Artificial Intelligence: A Modern Approach, Third Edition*. Harlow

Strohmaier, E. and others. *June 2019 TOP500*. https://www.top500.org/lists/2019/06/ Consulted: 18/08/19

historia

Juan Domingo Perón: democrat or dictator?

Nicholas Williams

Juan Domingo Perón, born in 1895, was the well-known, controversial, divisive and still-influential three-times president of Argentina (1946-52, 1952-55 and 1973-74), married to the colourful Argentinian national icon Eva Perón (who was of course famously played by Madonna in the film *Evita*). Eva Peron has become part of Argentina's national heritage. He and his wife became regarded as champions of the working class. Perón himself is regarded as the founder of the Argentine political doctrine of Peronism. Before discussing whether Perón ran Argentina democratically or dictatorially let us look at some background, at both how he got into power, and his life before becoming president.

At the outbreak of WWII Argentina was a divided country, with one side (including, in particular, the armed forces) supporting the German/Axis powers, the other the Allies. Perón was a military man who rose through the ranks in the 1930s to become a colonel. His involvement in politics grew after a military coup in 1943 in which President Ramón Castillo (a short-lived president during a notoriously corrupt period in Argentinian history) was overthrown by General Arturo Rawson. Perón had played an active part in the coup and the new military government appointed Colonel Perón Vice President, Secretary of War and Minister of Labour. Because Perón was enthusiastic about social justice, introducing social reforms such as the country's first social insurance scheme, pensions, job security, labour courts, paid holidays and severance, among other things. This made him popular with the working class. He also used his position to strengthen links with trade unions. And, incidentally, his public image had been strengthened by his role in helping relief efforts after the devastating 1944 San Juan earthquake in which 10,000 lives had been lost.

However, his military superiors didn't like his increasing popularity. He was forced to resign in October 1945, then arrested and imprisoned four days later. His companion was Evita Duarte ('Evita'), who was popular with the poor owing to her own humble origins. With help from trade unions she organized mass protests of 'descamisados', 'shirtless ones', i.e. the poor, working class, against his arrest. Within weeks he was free. The huge amount of momentum and awareness of these protests gave Perón huge popularity, helping him to become president in 1946. As soon as he became President, he founded his own party called the Justicialist party (Peronist party) and, during his first term as President (1946-52), major political and social changes took place.

However, before deciding whether Perón acted more as a dictator or democrat, we need to understand what Peronism is and whom it favoured. Many believe that Peronism was a form of fascism (see the definition of fascism at the end of this essay), owing to the combination of strong nationalism and because Perón was an authoritarian leader. At the same time however, he came into power democratically by winning a large majority in the 1946 Presidential elections. The working class saw Perón as a hero because to Peronism involved a lot of state intervention (i.e. state benefits and a welfare state) and social justice (justicialismo.) He also granted workers paid holidays, a controlled and fixed

wage, pension schemes and house-building schemes. Peronism also involved a lot of nationalization and industrialization because Perón was a strong believer in Argentina relying on itself rather than foreign imports. A famous example of Perón's radical nationalization was in 1947 when he completely nationalized the railway system, which was at the time owned by a British company. Perón very much didn't like the idea of British involvement in Argentina and there is further evidence of this dislike when he shut down the opposition newspaper La Prensa, a newspaper which supported British involvement in Argentina.

Juan Domingo Perón received huge support in his first term and he won a huge victory against a Radical Civic-Union party, a centrist social-liberal party, winning by an 11% margin in the 1946 Presidential election that took place in February. This was despite a huge alliance of anti-Perón factions, including the Radical-Civic Union party, the Communist Party, the conservative National Autonomist Party and various business and financial sectors uniting to prevent Perón from entering the Casa Rosada ('the Pink House', the President's palace). During the build-up to the election Perón and his party organized many democratic rallies through the streets of Buenos Aires. The fact that Perón won such a large majority in these elections is a first and key piece of evidence proving that Perón ran Argentina between 1946-74 under a democratic mandate rather than under dictatorial means.

However, when one looks at the way in which he ruled, one can see a completely different side to the argument that shows that he actually ran Argentina using dictatorial means. For instance, dissident opinion was not allowed, and the press was suppressed. Many of Perón's opponents criticized him for resorting to a form of dictatorial rule. Although Perón maintained the characteristics of democratic rule, he often took away people's powers by nationalizing the broadcasting system and monopolizing the newspaper industry. The most notable case of this was the shutting down of the newspaper 'La Prensa'. La Prensa was an Argentine daily newspaper founded in 1869. It had earned a reputation for being fairly conservative and supported British interests in Argentina. This of course was a big problem for the explicitly nationalist Perón, a President who hated the idea of British (or other foreign) control of certain parts of the Argentinian economy. However, by 1951 the Perón government finally seized control of La Prensa and turned it a propaganda organ for the Peronist government. However, after the overthrow of Perón in 1955, it became independent again. For Perón, the suppression of the press was vital as it was the first stepping-stone to removing opposition opinion and preventing any negative portrayal of himself.

Not only was Perón criticized for his use of force to close down opposition newspapers and the press in general, but he also showed contempt for political opponents and referred to them as 'traitors' and 'agents of foreign powers', trying to portray his opponents as being unpatriotic for not wanting the best for their country. For example, Perón illegally imprisoned politicians and journalists including the leader of the Radical-Civic Union party, Ricardo Balbín. This was the centrist social-liberal party in Argentina who were at the time the second biggest party in Argentina. The fact that Perón illegally imprisoned his opponents and labelled them as a traitors is further evidence to suggest that Perón was in fact acting as a dictator.

In conclusion, it is hard to say clearly whether Perón was a dictator or democrat. There is strong evidence to support both characterizations. For example, Perón's win in the 1946 Presidential elections

is extremely significant because it obviously shows that he acquired power democratically rather than by force, in the way a dictator would. Not only did he win but he also won with a big majority which further shows that he had great popularity, beating combined opposition parties. However, at the same time evidence shows that Perón ran Argentina by dictatorial means: he often used force to remove his opposition, the act of a dictator. If we accept that a dictator is 'a ruler who has complete power in a country, especially power which was obtained by force and is used unfairly or cruelly', it is perfectly obvious that he won his power and mandate in no uncertain terms in the February 1946 elections in a transparent and democratic way. But, by closing down an opposition newspaper, he could be seen by many as 'dictatorial' because Perón was exploiting or abusing power to obtain an unfair advantage—which is clearly undemocratic. He was also famous for labelling opposition as traitors to the country, and he often imprisoned opposition figures. So, there is evidence to suggest he was a dictator, or behaved dictatorially, the balance of the evidence suggests that he was a democratic president.

Bibliography

Dávilla, J. (2013) *Dictatorship in South America*. New Jersey

Mainwaring, S. & Pérez-Liñán, A. (2014) *Democracies and Dictatorships in Latin America: emergence, survival and fall*. Cambridge

Material culture, marriage and gender in Renaissance Italy

Joseph Atkinson

Many historians have suggested that the repeated visitations of the plague which ravaged Italy during the 14th century were key in emphasizing the role of the family as a constant, which was crucial to the foundation of society.[1] The boom in treatises, sermons and government decrees concerning family indicate the increasing interest in family and children as the future of a lineage.[2] However, perhaps the most obvious evidence for the increasing emphasis on family and lineage was the establishment of elaborate wedding ceremonies. Marriages developed as a time for the exchange of extravagant gifts, not least the dowry, which signified the woman being transferred from her kin into a new lineage.[3] Therefore, marriage is a central time for historians of Renaissance Italy to analyse, with the grandiose nature of the various ceremonies providing a range of evidence whether literary, notarial or material. Moreover, these marriage 'rituals' often served to dictate roles in the familial structure, which would serve as a private sphere in which women were often confined, meaning that they are critical to understanding the position of women in Renaissance Italian society.[4]

In his essay on *Material Culture and Cultural History*, Grassby suggests that historians subject goods to both 'etic and emic analysis – the study of their objective attributes and their significance to those who used them'.[5] Using this model as a basis, *cassoni,* wedding chests, and rings will be analysed both for their objective attributes and for their social significance, especially for the contemporary female observer. Through this analysis, the extent to which material history can enhance our understanding of marriage and gender in Renaissance Italy will be assessed in comparison to the established historical consensus, largely built on documentary sources.

The initial stages of the marriage involved the *impalmamento,*[6] in which family members from both sides of the proposed marriage would come together to negotiate, which was then followed by the *giuramento grande*.[7] In these meetings the dowry, and the date and nature of the marriage festivities were agreed. Christiane Klapisch-Zuber, who has produced some of the most authoritative work on women and family in the Italian Renaissance, made use of the Florentine *catasto* of 1427, a land survey to serve as the basis of taxation in Florence, to reach statistical conclusions about the marriages negotiated in these meetings, such as establishing that women married on average eight to fifteen years earlier than their husbands.[8] She also used the economic evidence of inflated dowries and literary

[1] Cohn 2012.
[2] Hay and Law 1989: 35.
[3] Klapisch-Zuber 1985: 240.
[4] Diefendorf 1987.
[5] Grassby 2005.
[6] Klapisch-Zuber 1985: 217-219.
[7] Ibid.
[8] Ibid. 210-211.

evidence of increasingly elaborate marriage rituals to establish the way that marriage gifts were used to solidify family ties in an increasingly intricate set of ceremonies.[9]

Material culture has contributed to our understanding of how marriages were negotiated in two ways. The first is that records showing the increasing spread of *cassoni* and other objects associated with the marriage festivities serve as evidence for the idea that, through the 15th century, marriage rituals became more elaborate. Moreover, given that there is evidence that many families, including the middle-class, rented out objects during the marriage rituals, the increasing prevalence of objects associated with marriage suggest more extravagant marriage ceremonies not just for those in Patrician society but for the middle-class.[10] This is especially important, as the *catasto* has been shown to neglect certain groups, not least women, with names and ages of daughters much more likely to be missing from the records than for sons. [11] Moreover, the *ricordanze,* family records, create a bias towards the literary parts of society, most prominently the wealthy and, while examining records detailing finely painted chests or plates does not solve this problem, the prevalence of renting means it does provide an insight into the artisan-class who might have rented such items to further their prestige.[12]

The second way material culture enhances our understanding is in terms of the transactional nature of marriage in Renaissance Italy. It is by reconstructing the marriage process in terms of the gifts given and received, along with the literary evidence that exists,[13] that a historian can understand the way marriage was viewed and the purpose it served within society. The prevalence of gifts and family heraldry on these gifts, along with the rise of the dowry and counter-dowry further the impression that marriage served not the interests of the two individuals involved but wider familial interests.[14] The exchanging of gifts, adorned with the familial coat of arms, represented the combination of not just two individuals but two complex familial networks.[15]

These general observations about marriage are derived from the etic analysis that Grassby proposed as one of the two key analyses to material history. In considering some more specific examples of objects involved in marriage in Renaissance Italy, emic analysis, considering the perspective of the viewer is required. However, this can be difficult as reconstructing specific responses from viewers is virtually impossible, especially female viewers who were not able to create the same literary records as male viewers. Thus, it is instead more profitable to use the narrative structures featured in these objects, most prominently *cassoni,* to try and identify patterns of identification.[16]

The next ritual is the ring ceremony, which, as other ceremonies, differed from in particular details from region to region but remained present throughout the *ricordanze*. [17] In Florence it involved the husband and his family members, including often a majority of women, gifting the young bride with

[9] Ibid.
[10] Hay and Law 1989: 36-37.
[11] Ibid. 39.
[12] Randolph, A. (2008) in Baskins 2008: 15-30.
[13] Klapisch-Zuber 1985: 220
[14] Ibid.
[15] Ibid.
[16] Baskins 1998.
[17] Klapisch-Zuber 1985: 231-237

rings.[18] This ceremony, intriguing for the importance of the female relatives, can provide interesting insight into their role in Renaissance marriages.

In Figure 1, the diamond serves two purposes. The first purpose is to display the wealth of the husband's family, hinting at the transactional nature of the marriage. The second, and likely more important given the intimate nature of the ceremony, is to symbolize fidelity. Indeed, in an album celebrating a marriage in 1475 Hymen, the Greek God of marriage, is shown wearing a costume patterned by diamond rings.[19]

(Fig. 1) *Wedding Ring, Northern Italy, 15th century*[20]

As with the other objects associated with marriage, they seem consistently to adopt a didactic purpose,[21] insisting upon the women's loyalty and fidelity. Moreover, that female relatives of the husband are involved in this ceremony seems to suggest that while the marriage ceremonies as a collective are about placing the bride within her new family that the ring ceremony was mainly about placing the bride within a group of women in her new family.[22] This also meant the bride was placed firmly in the domestic sphere. Even after gifting the ring, the man retained his power over it and the women may be forced in the future to gift it to a new, younger bride being brought into the family.[23] This established the idea of the ring as carrying a shared lineage and created solidarity amongst the family.[24]

However, while these general conclusions can be well established using the rings which survive from the era, along with the records of the ring ceremonies, there are some examples which throw doubt upon the ideas. Firstly, the band of Figure 1 reads 'Lorenzo to Lena Lena', with Lena being a nickname, probably affectionate.[25] The use of an affectionate or personal nickname on an object related primarily to family, kinship and transaction seems out of place. Moreover, Figure 2 quotes the Gospel of Mathew saying that the 'two shall become one flesh' (Matt. 19:5).[26] A religious image concerned with the marriage taking precedence over previous relationships in one

(Fig. 2): *Ring, Northern Italy, 15th century*

[18] Krohn, D. (2008) in Bayer 2008: 9-17.
[19] Bayer 2008: 100.
[20] Ibid. p.100.
[21] Randolph 2008: 28.
[22] Klapisch-Zuber 1985: 231-237.
[23] Ibid.
[24] Bayer 2008: 100.
[25] Ibid.
[26] Ibid. p.101.

flesh certainly challenges the general conclusions previously drawn from the ring ceremony.

This exposes one of the key difficulties of an emic analysis of material history. In all periods of histories there are anomalies which don't conform to our wider understanding of the period. The difficulty is in determining which of these are anomalies or whether these contradictions are numerous enough to challenge our historical understanding. In this case the religious language is seemingly an anomaly to the largely secular marriage of the period,[27] while the individual inscription seems likely exclusive to the ring the husband gave his wife and not affecting the wider process of family members gifting rings to the bride.

If the ring ceremony was the private confirmation of the marriage, it was the *nozze,* wedding ceremony, which involved a procession through the streets, that legitimized the marriage in the eyes of the public.[28] A key part of this procession was the *cassone,* which served to hold the objects and money which made up the dowry, rather than displaying it openly during the procession.[29] As the marriage 'rituals' became more exaggerated, the *cassone* became more intricate in order to project the wealth of the families involved in the marriage. As a part of this evolution, *cassoni* became increasingly painted with narrative paintings, often depicting scenes from classical mythology layered with symbolism and meaning.[30]

However, there are a number of caveats when analysing the symbolism built into the *cassone*. While the Renaissance saw an increase of literacy, especially due to the interest in classical texts,[31] literacy still lacked especially for women whom fathers often chose not to educate.[32] Moreover, the records of the contemporary response to the *cassone* is limited, with women once again excluded from the male-dominated records, meaning it is extremely difficult to construct individual responses to the narrative paintings.

In order to further explore the issue, Figure 3 and Figure 4, the rape of the Sabine women, must be considered, including the way the story is altered in the panels. Keen to satisfy his large male population and continue the expansion of his city, Romulus, who had founded the city of Rome, orchestrated the abduction of the Sabine women, mostly virgins. This prompted a war between the Romans and the Sabines, which was ended when the women intervened, placing the blame for the war on themselves, which resulted in a peace treaty. This scene is depicted on a number of *cassoni but* makes a number of changes to the story which raise important questions about gender in Renaissance Italy.

The central figure in Figure 3 is Hersilia, daughter of Titus Tatius, Sabine leader, and wife of Romulus, who according to Livy went into the battle with streaming hair and torn clothes.[33] Instead Lo Scheggia, the painter, depicts Hersilia in ceremonial dress, making the scene seem more like a choreographed ritual than the chaotic scene Livy described.[34] Meanwhile, the other female figures are huddled behind her in modest dress. Moreover, the presence of the children in the middle of Figure 3 provide physical

[27] Diefendorf 1987.
[28] Krohn 2008: 12.
[29] Ibid.
[30] Baskins 1998: 16.
[31] Witt 1995.
[32] Witt 1995.
[33] Baskins 1998: 112
[34] Ibid.: 113.

evidence for why the war is being thought, with children, as a representative for the future of a city, at stake.[35]

(Fig. 3) Giovanni di Ser Giovanni, *Hersila reconciles the Romans and the Sabines*[36]

Below: (Fig. 4) Giovanni di Ser Giovanni, *Triumph of the Romans and the Sabines*[37]

Thus, the painting can provide an insight into gender in a number of ways. Firstly, it is unsurprising that the painter has prioritized female modesty by not portraying the chaotic scene that Livy described and displays the attitude that women should be above all chaste and modest, an impression supported by the omission of the beginning of the story in which the women are abducted.[38] The manipulation of the story is crucial, as while we cannot reconstruct the viewer's response, omission of information and manipulation of scene suggest a deliberate cultural idea being established by the patron. Secondly, the women very much conform to their prescribed societal role, childbearing. The presence of the children in the front of the women confirms their role. Thirdly, in some ways Hersilia can be seen as powerful within this depiction, occupying the centre of the painting and providing the link between the two sides.[39] Much like in Italian society, the men dominate the outside, the public sphere, with the women providing the link, through marriage, between the two groups of men. However, Hersilia retains

[35] Ibid.: 118.
[36] Ibid.: 114-115
[37] Ibid.
[38] Ibid.: 112.
[39] Ibid.

autonomy over the private sphere of her domestic setting and over the children below her. The scene is not chaotic because the spheres of influence are clearly defined as the artist or the patron wanted.

While this only represents one *cassone* depicting one myth it serves as a first step to forming an idea of the social constructions operating within Renaissance Italy, which dictated women's role in society. While we cannot imagine all women as a 'Hersilia', as she was depicted in these two panels, we can begin to understand the paradigm of womanhood for Italians during the Renaissance. Moreover, while these *cassoni* seem exclusive to the elite, patrician class, they can also provide some evidence for the position of women in the middle and lower classes. Another *cassone* depicting the rape of the Sabine women shows a number of women, only two of whom are sexually assaulted, the only two wearing simple clothing, who are obviously lower-class.[40] This elite view of marriage in the lower classes suggests that there are more marriages for love and not for alliance, an idea backed up by Klapisch-Zuber's analysis which revealed lower age difference in lower-class marriages.[41]

Material history supports the historical consensus around marriage in the public setting, providing further evidence and context for the transactional nature of Renaissance marriage. However, as cities, especially Florence, began to introduce sumptuary laws, the role of the *cassone* became increasingly domestic.[42] Both the rings and the *cassone* create a clear delineation between the public and private sphere, making clear that the role of the new bride is among the other women, either those behind Hersilia or those passing on the rings. *Cassoni* provided points of identification for women launched into a new domestic sphere. While we cannot suggest the exact response of a woman to a painting like Figure 3, it shows the clear parameters of female power with the possibility for autonomy within those domestic limits.

Emic analysis of material culture requires careful consideration of the social and economic context in which a work takes place. As Grassby points out in his essay, artefacts often don't offer a singular clear message, entirely random factors can decide which artefacts survive the test of time and their provenance is often unknown.[43] Therefore, the conclusions drawn from such analysis cannot be considered absolute and cannot be considered in isolation without looking at other similar objects. However, the analysis provides an extremely useful tool to try and understand the culture of a period and understand the cultural structures individuals, especially those neglected by records, were operating in. Therefore, using the work of documentary sources to provide social and economic context, it is worth further scrutinizing objects associated with weddings so that gender can be 'defined and examined with new eyes'.[44]

[40] Ibid.: 118.
[41] Klapisch-Zuber 1985: 210.
[42] Cook, *What are Cassoni?*
[43] Grassby 2005: 598-600.
[44] Krohn 2008: 14.

Bibliography

Baskins, C. (1998) *Cassone Painting, Humanism and Gender in Early Modern Italy*. Cambridge
(2008) *The Triumph of Marriage: Painted Cassoni of the Renaissance*. Boston

Bayer, A. (2008) *Art and Love in Renaissance Italy*. New Haven

Cohn, S. (2012) 'Renaissance attachment to things: material culture in last wills and testaments', *The Economic History Review 65*(3): 984-1004

Chojnacki, S. (1974) 'Patrician Women in Early Renaissance Venice', *Studies in the Renaissance 21*: 176-203

Cook, C. *What are Cassoni*?
https://www.brown.edu/Departments/Italian_Studies/dweb/arts/cassoni/parts1-2.php
Consulted: *20.08.19*

Diefendorf, B. (1987). 'Family Culture, Renaissance Culture', *Renaissance Quarterly, 40*(4), 661-681.

Grassby, R. (2005) 'Material Culture and Cultural History', *The Journal of Interdisciplinary History, 35*(4): 591-603

Hay, D. and Law, J. (1989) *Italy in the Age of the Renaissance 1380-1530*. New York

Hohti, P. (2010). ''Conspicuous' consumption and popular consumers: material culture and social status in sixteenth-century Siena', *Renaissance Studies, 24*(5),:654-670.

Klapisch-Zuber, C. (1985) *Women, Family and Ritual in Renaissance Italy*. Chicago

McIver, K. (2009) *Renaissance Quarterly 62*(3): 918-921

Robinson, M. (2018) 'The Material Culture of Female Youth in Bologna, 1550–1600', in Cohen E. & Reeves M. (eds.), *The Youth of Early Modern Women* (pp. 235-254). Amsterdam

Witt, R. (1995) 'What Did Giovannino Read and Write? Literacy in Early Renaissance Florence', in *I Tatti Studies in the Italian Renaissance 6: 83*-114

To what extent was the presence of Egyptian Islam the main reason for Napoleon's inability to govern Egypt from 1798-1801?

Leo Tidmarsh

During Napoleon's governance of Egypt, many severe issues arose, resulting in his inability to control and subdue the population, and to realize his dream of emulating Alexander the Great by becoming emperor of the east. The lack of effective communication within Egypt, and between Paris and the new colony are often regarded as a central reason for this but the presence of Islam within the country was arguably the most important factor. Islam helped to create a culture which was completely opposed to that of post-revolution France and of the west as a whole. Alienation created by the differences in culture and the resistance to French government promoted by the Islamic scholars in Egypt resulted in resentment of French rule amongst the general population. Volney stated that a French army invading an oriental region must fight three enemies: first the British, second the Ottoman Porte (government), and third and most difficult the Muslims.[1] In Napoleon's expedition, the commander-in-chief never underestimated the sway of Islam in the country, but I shall argue that he never overcame its influence. Furthermore, he was constantly distracted by Nelson's navy and failed to understand how the Ottoman Porte would react after his invasion of their territory: in a sense, he failed to win any of these three wars.

To a large extent, Napoleon failed to govern and control his colony effectively due to the Islamic values of many in the country. The majority of people in Egypt in 1798 were Sunni Muslims. Of particular importance were the religious scholars, or *ulama*. These figures had established themselves as experts on Islamic law and, as Crone highlights: 'to choose one's imam was thus to choose the group with which one believed salvation to lie'.[2] The Sunni sect of Islam believed their political leader was simply a figurehead: true spiritual guidance was found with the *ulama*. Indeed, this belief is found in the Quran (6:90): 'Those whom God has guided, follow their example'.[3] The Sunni majority looked to the scholars for guidance; they believed that these were the people who would literally guide them to heaven, so were completely reliant on them for salvation. Hence the *ulama*'s refusal to support, and even actively resist, Napoleon's rule was an issue. The *ulama* were unwilling to support Napoleon as without the former Mameluke rulers in charge, the country could not be guaranteed to be run by Muslims, thus challenging their power in Egypt. The enormous influence held by the *ulama* throughout Islamic society can be seen in the 1911 Constitutional Revolution in Iran, where they, the bazaaris, and the intellectuals formed a coalition to overthrow the Qajar dynasty; the role of the *ulama* here was to specifically mobilize the general population into uprising against the ruling power – their great sway within the Islamic community ensured its success.[4]

Although under Ottoman rule in name, about two dozen Mameluke beys ruled Egypt when Napoleon arrived. These men, descendants of slaves from Turkey, taken to Egypt in about 1230, held power over

[1] Said 1978: 81.
[2] Crone 1996: 18.
[3] *The Qur'an* 6:90 tTranslated by M.A.S Abdel Haleem).
[4] Varol 201: 133.

their respective regions in Egypt, exerting a harsh rule over the peasantry. Napoleon arrived in Alexandria, with his revolutionary and secular values, hoping to liberate the Egyptian lower class and thus gain popularity amongst the peoples of the country. Paul Strathern argues that the *fellahin* (or peasants) did not cooperate with French rule through 'the fear, that affected the entire population, that the Mamelukes would soon be returning with a vengeance'.[5] However, it can be argued that the important factor was not that the *fellahin* were afraid of their return but rather the *ulama* desired it and so did the Sunni majority. The contemporary historian El-Jabarti notes how 'after the departure of Murad Bey from Cairo the *ulama* gathered every day at the El-Azhar mosque[6] and read the Holy Books for the success of the Egyptians [the defeated Mamelukes]'.[7] The *ulama* hoped for and expected the return of the old rulers, therefore the local population wished for the same, as it was their only way to achieve salvation, even if they were granted more freedoms under French rule.

To gain trust from the local population, Napoleon spread one message throughout the population in Alexandria: 'I respect God, his prophet, and the Qur'an'. One could argue that although Napoleon read the Qur'an and informative texts on Egyptian history to manage hostility towards French values, he learned of the land he was to conquer through texts (such as prominent Orientalist Volney's *Voyage en Egypte et en Syrie*), not through 'empirical reality'. These texts were written by Orientalists[8] and were based on classical accounts of the Orient, not contemporary Egypt. Therefore, Napoleon was not ready to face modern Egypt, but an Orientalist reinvention of the classical country.[9] Said argues that the members of the *ulama* in the divan were impressed with Napoleon's knowledge of the Qur'an and subsequently the population 'lost its distrust of the occupiers'.[10] It is true that they were impressed with Bonaparte's knowledge, but the *ulama* and thus populace would remain naturally distrustful of a foreign invader, especially one from secular France, where Catholicism had been destroyed through the nationalization of church lands and the exile of religious figures. This is conveyed by the Cairo insurrection, taking place from the 21-22 October 1798. Egyptian distrust of the French had been building for a few months beforehand. Indeed, a *firman*[11] from the Porte was read in Egyptian mosques – inciting anti-French sentiments and renewing the loyalty of the *ulama* to Muslim rulers, in this case, the Ottomans. Many of the conspirators hid and plotted in the al-Azhar mosque conveying the uprising's religious motivations. Many scholars and citizens didn't believe the French's claimed respect of Islam, as conveyed in a manifesto of the Great Lord published widely throughout Egypt at the time of the insurrection, reading: 'The French people are . . . infidels . . . they look upon . . . the Qur'an as fable(s)'. In contrast, the assuredly Islamic rule of the Mamelukes reassured the *ulama*. The two most senior beys were the Sheik el-Bled (chief of the country) and the Sheik el-Hajj (in charge of the pilgrimage to Mecca). The fact the Sheik el-Hajj held such sway in Mameluke Egypt was proof for the *ulama* that the Mamelukes were dedicated to Islam: thus, they firmly supported the beys and so did Egyptians. Without this support, uprisings and revolts soon became an issue, rendering rule much more difficult.

[5] Strathern 2007: 135.
[6] The religious centre in Cairo.
[7] Al-Jabarti, A. (1888 –96) *Merveilles biographiques et historiques, on Chroniques,* Vol. 6 p. 9.
[8] A term coined by E. Said in *Orientalism*, broadly meaning a view typical of the colonialist attitude (particularly in the Middle East).
[9] Said 1978: 80.
[10] Said 1978: 82.
[11] An edict.

The failure of communication during Napoleon's conquest of Egypt, however, helped to exacerbate the issues already prevalent throughout the French invasion. Throughout his time in Egypt, internal communication was continually disrupted by Bedouin tribes who relentlessly attacked caravans travelling between French settlements. Bedouin people were nomads, raiding tribes and villages as they moved through the deserts; they responded to no Imperial power, meaning it was very difficult to control them. One of Napoleon's generals, Menou, was attacked by Bedouins whilst leading an expedition into the Nile Delta in which a savant was killed.[12] Even after expanding French influence towards Suez, Napoleon's communication lines through Upper Egypt continued to be mercilessly targeted by them. Therefore, despite increasing French presence in the region, the local population continued to challenge French rule and authority – another sign of continued Mameluke loyalty. Therefore, without the correct information and news reaching Napoleon's headquarters from around Egypt, he could not react adequately or quickly enough to challenges to his rule throughout the country, thus rendering his grasp in Egypt weaker.

Moreover, the British blockade of Alexandria rendered communication between Paris and Napoleon near impossible. Due to the naval blockade, messages and those carrying them were often captured by the British so that Nelson knew more about what was happening in France than Napoleon did. Messages were rarely conveyed to Napoleon and were done so at great expense to avoid the British and Bedouin who would try and kill and capture Frenchmen. A message dispatched on the 6 July from Paris found Napoleon on 8 September, congratulating him a few months too late on taking Malta.[13] Messages from Paris rarely got through to their recipient – if they did, they were uselessly out of date. This also led to a fatal misunderstanding: Napoleon had convinced himself that the Porte had been convinced of France's right to invade Egypt (Ottoman sovereign territory) and thus did not fear war. In reality, the Porte had declared war with France following Napoleon's arrival in Alexandria. The Directory[14] could not communicate the truth with Napoleon due to the Naval blockade, thus Napoleon was not aware of an enemy he had created which would begin to invade the country very quickly after his return to France.

Finally, the ultimate reason for the failure of Napoleon's expedition was France's dwindling position in Europe. The second coalition of Austria, Britain and Russia was at war with France; furthermore, the French had been pushed back across the Rhine by Austria which resulted in a tactical French withdrawal from Switzerland. Additionally, most of the territory conquered by Napoleon in northern Italy had been reclaimed by Austria and the French were now in retreat towards Genoa. Strathern described that 'Napoleon came to an instant decision' because 'only he could save the country'.[15] Kléber, left in charge after the commander-in-chief's return to France in October 1799, said: 'Bonaparte, after his departure, left not a sou in the till, not even any bills of credit.'[16] The French had suffered considerable losses in the Syrian conquest before Napoleon's departure, spending much money, eventually being defeated by Ottoman-supported Syrians at Jaffa – gaining no land and wasting time, money and lives. The financial shortcomings, combined with the naval blockade, meant the French could not bring more troops to Egypt to help subdue the population. Furthermore, the Porte had finally drawn up an army, and which was mercilessly taking back Egyptian territory. This dire situation led Kléber to successfully negotiate a

[12] Strathern 2007: 221-2.
[13] Strathern 2007: 223.
[14] The committee of five members governing France at the time.
[15] Strathern 2007: 400.
[16] Rousseau, M. 1900 : 78-80.

peaceful withdrawal from Egypt with an Ottoman ambassador – a deal later rejected by Britain and the Porte. After Kléber's assassination, Menou's incompetent command of the Army of the Orient in the face of an Ottoman invasion, combined with a low morale and a strong desire to return to France led to the total withdrawal of the French in October 1801. Without Napoleon's overwhelming charisma to follow, the result was eventual surrender and departure. While many argue that Napoleon's departure was central to the failure of French governance, the reality was that with lack of funds as well as the Ottoman invasion, coupled with low French morale, Napoleon would likely have been forced to withdraw himself.

In conclusion, the Egyptian Islamic majority was the decisive factor in the failure of Napoleon's expedition. The French Army of the Orient arrived in a country hostile to Western values, a sort of 'Occidentalism' to match Edward Said's concept of Orientalism.[17] Before his invasion, Napoleon had a textually re-invented, imagined Orientalist version of Egypt laid out before him, and therefore he was unprepared for the reality which confronted him when he arrived in the country itself. Egyptian Islamic values (namely the importance of religious scholars) meant the population would always be hostile to the culture of post-revolution, secular France. However, other key factors contributed to the failure. Ineffective communication isolated Napoleon in Cairo and meant he was not aware he was at war with the Ottoman Empire; therefore, the army had not been prepared for the subsequent invasion. Yet the most immediate reason for Napoleon's withdrawal from Egypt was the dire situation of French affairs in Europe, leading to his departure and the subsequent collapse. Despite Napoleon's departure, if he had left a country with a population supportive of the French, this decision may not have proved decisive. However, his failure to secure cooperation from the local population made the country extremely difficult to rule and put an end to the hope of continued governance. This opposition from the Egyptians, created and sustained in them by Islam and its scholars in Egypt, ultimately put an end to Napoleon's hopes.

Bibliography

El Feki, S. (2008) '*Napoleon in Egypt: The Greatest Glory* by Paul Strathern; *Napoleon's Egypt: Invading the Middle East by Juan Cole*'. *The Royal Institute of International Affairs* 84.2: 387-389

Kennedy. H (2007) *The Great Arab Conquests*. London

Robinson, F. et al (1996) *Islamic World*. Cambridge

Rousseau, M. (1900) *Kléber et Menou en Egypte depuis le départ de Bonaparte*. Paris

Said, E. (1978) *Orientalism*. London

Strathern, P. (2007) *Napoleon in Egypt: 'The Greatest Glory'*. London

Thompson, J. (1995) '*Napoleon in Egypt: Al-Jabarti's Chronicle of the French Occupation, 1798* by Abd al-Rahman al-Jabarti and Shmuel Moreh'. *Journal of World History* 6.1: 144-147

[17] Robinson 1996: xvi.

The decline of the Ottoman Empire

Alec Kenningham

To the British historian Bernard Lewis, perhaps the most influential post-war historian concerned with Islam and the Middle East, the decline and ultimate fall of the Ottoman Empire was due to the reformist movements (and the subsequent conservative resistance) that emerged throughout the nineteenth century.[1] Lewis, following tradition, looked to the nineteenth century as the period in which the Empire began truly to decline,[2] and, while scholarly literature has generally moved beyond Lewis' argument that reformist movements instigated a decline, it largely remains wedded to the belief that the answer to this question lies in that century. In the 1970s there was a focus on the economics of the Empire, with many analysing the manner in which the Ottomans became entangled in international debt that led to a quasi-loss of sovereignty through the intrusion of the OPDA. The 1990s saw another shift of focus, this time towards the rise of nationalism and the flaws in the Ottomans' colonial occupation of its territories.[3] There is a common factor amongst these evolving opinions: the first is the Whiggish construction of a themed narrative that inexorably leads to the nineteenth century, as it was only in this century that recognisable, traceable forces began to emerge in earnest. There is a conceptual problem here, as the first section of this essay seeks to demonstrate: these arguments find a simultaneity between the symptoms and the causes of decline, mistaking the former for the latter. In fact, the Empire peaked in the late sixteenth century,[4] thus, arguably was in some sort of decline since then, certainly territorially. This hints at much more deep-rooted issues for the Empire that began, somewhat incongruously, around the time of its apogee, and simply culminated in the nineteenth century.

Historians such as Lewis contradict themselves by simultaneously accusing the Sultans of being obstinate in regard to adopting western ideas, as well as being flawed in doing so.[5] This was the general opinion in the 1950s,[6] against the backdrop of the Cold War, which encouraged an almost fanatical enthusiasm for democracy amongst many westerners, and the recent victory of democracy over fascism which caused many historians to look for the narrative of such a victory in Turkey.[7] It is unsurprising, therefore, that the event to which many historians focus on as the turning point in the Empire's fortunes, is the Tanzimat Proclamation in 1839, an attempt by Sultan Mahmud II to liberalize and transform the Empire, building a new style of bureaucracy and economy modelled on the west. It is this top-down reform, which tied the Empire to the west, contrary to the will of the imperial bureaucracy, that these historians regarded as having tipped the Empire into decline, as it caused a divide that proved impossible to overcome. Lewis notes that it is only in the mid to late nineteenth century that Ottoman architecture began to use western, classical techniques, most notably the Dolmabahçe Palace, a lavish

[1] Lewis 2001.
[2] Ibid.
[3] Emrence 2007.
[4] Finkel 2006.
[5] Lewis 2001.
[6] Emrence 2007.
[7] Lewis 2001.

building rigid in form and classical in detail. Lewis claims that this western invasion of Ottoman tradition exemplifies the 'ambitious aims and confused directions' of the nineteenth century Ottoman Empire.[8] Practically, these confused directions are spelled out by the pattern of reform and counter-reform seen during that century; Selim III, an early reformer was killed by a conservative mob, Abdulhamid II led an absolutist regime immediately after the Tanzimat, and, even into the twentieth century, the second constitutional period (the first being in 1876) lasted just eight years and was prevented by Islamic conservatives centred in Istanbul.

Fundamentally this line of argument lays the blame for the Empire's breakdown on an incorporation of western ideas that ate away at the loyalty of the populace and efficacy of the regime. However, the Ottomans only began reforming as a direct result of their failings throughout the eighteenth century; the Empire had to reform, and so it is churlish to lay the blame at the feet of the reformist Sultans.

The 1950s focus on reformism had evolved, by the 1970s, into an interest in the Ottoman economy,[9] a decade in which Turkey was faring well economically on the global stage and so it became natural that historians began to construct a journey from economic weakness and passivity under the Ottomans to economic strength as a republic. There were many problems with the Ottoman financial system that resulted in widespread corruption and embezzlement,[10] and it was in the 1800s that Turkey entered into the global financial system, specifically with the Anglo-Ottoman Free Trade Treaty of 1838. The decision to entangle itself in global financial markets proved to be costly by the 1880s, when the Europeans decided to set up the Ottoman Public Debt Administration, an organization that became a system within the Ottoman bureaucracy, employing 9000 men at its peak, more than the Empire's finance ministry. The OPDA was able to collect its own tax, which was given directly to European tax creditors, as well as fund industrial projects within the Empire. The existence of such an organization epitomizes Ottoman subordination to the great powers both financially and politically. A nation that had become incapable of collecting its own tax was never going to survive for very long. It should be noted, however, that these financial difficulties were not created or even worsened by international trade agreements – foreign trade increased ten-fold during the nineteenth century, which would have done gone far in quelling the rising demand for foreign products,[11] and it was not the agreements themselves that posed problems, rather the inability of the Ottoman state to put in place financial plans whereby they were able to pay back their foreign loans. Where the Empire was hampered by international trade arrangements, it was due to the 'capitulations' they gave to nations. These were agreements with other nations that granted unprecedented freedom to trade within the Empire. Many of these concessions were made three centuries earlier at a time when the Ottomans were winning on the battlefield, and so posed no risk, however they ultimately caused huge problems as it was these that enabled the OPDA to act as it did within the law.

Historians since the 1990s looked away from the international monetary system and have generally followed a global trend of underplaying the influence of the west on other parts of the world.[12] Ottoman studies have been affected by this and so more recently, historians have begun to look away from the high politics of both the Ottoman state and western states, and sought reasons for rapid Ottoman

[8] Lewis 2001.
[9] Emrence 2007.
[10] Finkel 2006.
[11] Finkel 2006.
[12] Emrence 2007.

decline in powerful grassroots movements within the Empire. The movement that stands out as having damaged state control was nationalism. Nationalist agitation began in the Ottoman Empire in the early 18th century and began to grow into separate movements by the end of that century. Breuilly notes that the nationalist movements that emerged under both the Ottomans and the Hapsburgs at similar periods tended to grow in strength during periods of civil reform under Selim III and Joseph II in 1789 and 1765 respectively.[13] However, recent historians have generally claimed that the reason for the growing nationalist movements under the Ottomans was not reform, but the breakdown in the symbiosis between state and peoples, that is to say a lack of connection felt between the people and their rulers. This caused a lack of cohesion among the peoples of the Empire that resulted in a rather colonial feel in the controlled territories.[14] As in the 1950s, when historians focused on reformist movements, and the 1970s when that focus shifted to an obsession with economics, historians since the 1990s have, in exploring nationalist movements, remained fixated on the nineteenth century. Although there is certainly value in shifting the focus from high politics and court intrigue to grassroots movements, historians fail to see that the problem for the Ottomans in cases of nationalist movements was not the strength of those nationalist movements, but the weakness of the state in asserting itself over all its people; it is telling that even as the Empire fell the bureaucracy was almost exclusively Turkish and as they were liberated, previously controlled groups retained, close to untouched, their culture and practices that pre-dated their occupation.[15]

Upon detailed inspection of the Ottoman Empire's problems during the nineteenth century, it becomes clear that many of the problems it faced were either necessary for an Empire attempting to catch up with the great powers, or only became problems due to other faults more deep-rooted in the organization and culture of the Empire. To find these real reasons for decline one must look further back in time, starting at the Empire's zenith, and search there for the reasons and causes of decline.

The end of the reign of Suleiman I is often viewed as the peak of Ottoman fortunes, the end of the empire's 'golden age,'[16] with many looking at the naval Battle of Lepanto as the turning point, after which the state of the empire 'rapidly deteriorated.'[17] Suleiman came to the throne in 1520 and ruled for 46 years, during which his aggressive military policy brought him victory over the Romanians, the Hungarians, the Knights of St John in Crete and the Austrians. Despite his failed siege of the latter's capital at Vienna in 1529, the campaign was successful in ensuring Hungary became a vassal state. The tenth Sultan also conquered Iraq and earned his native title, 'lawgiver,' while also turning the Ottoman state into an 'economic powerhouse.'[18] Suleiman was certainly good at his job; however, he was not beyond fault, failing to achieve a lasting peace with the Safavids on the eastern front with that signed in 1555.

After Suleiman, the image of Sultan evolved over the next century from that of a man of warfare and active rule to that of an effete tyrant cocooned behind the doors of the Topkapi Palace in Istanbul.[19] It is a common accusation that a large factor in the decline of the Empire lay at the feet of 'bad' Sultans, but

[13] Breuilly 2016.
[14] Emrence 2007.
[15] Black 1999.
[16] Finkel 2006.
[17] Davis 2001.
[18] Encyclopedia Brittanica: *Suleyman The Magnificent*.
[19] Finkel 2006.

this seems a rather reductive way of approaching three hundred years' worth of problems. Certainly, the reign that followed that of Suleiman was ultimately a bad eight years for the Ottomans. Selim II failed to inherit his father's magnificence and became known as 'the drunkard,' provoking the creation of the Holy League with his capture of Cyprus and then losing close to the entire Ottoman fleet, expensively built up by his father, at the disastrous Battle of Lepanto. However, Selim was the eleventh Sultan, and the 25 that followed were by no means all terrible. Murad IV was an 'impeccable Sultan'[20] who finally brought peace to the eastern front. Furthermore, many of the reformist Sultans of the 1800s, notably Mahmud II who brought in the Tanzimat reforms that attempted to liberalize the nation, were sound leaders with a firm grip on the state of their nation.

For these Sultans, the problem did not lie within themselves, but in the systems of government that had been laid in place centuries earlier, preventing genuine reform from taking place.[21] The faults in the mechanisms of the Ottoman state had been masked by successes on the battlefield, but quickly became apparent once victory in war could not offer such a distraction. The example of the Janissaries illustrates this perfectly: while serving the empire brilliantly in the first few centuries of its existence, playing a major role in taking Constantinople and defeating the Mamluks, they became a thorn in the side of every late 18th and early 19th century Sultan, none of whom could ignore their looming, conservative power until their successful abolition in 1826. The first standing army in Europe, the corps had developed from an elite group of slave soldiers who played a huge part in the Empire's early success, to a bloated, politically active group of free men desperate to retain their privileged place in society having become a hereditary order that were given land and offices as rewards. They revolted multiple times in the centuries after killing Sultan Osman II in 1622.[22] When the reformist Sultan Selim III attempted to abolish the corps in 1807, they revolted and assassinated him, replacing him with his conservative minded cousin, Mustafa IV.

There were also problems with the system of succession. The system laid out in the fourteenth century was 'open succession' where the Sultan could not choose his heir, and could only go so far in picking a preferred candidate by appointing them to a governorship closer to the capital and hope that they reached Istanbul first upon hearing of his death. This almost inevitably invited civil war, and so in the eighteenth century was replaced by Agnatic Seniority, whereby the eldest man in the family would succeed. This resulted in very elderly Sultans coming to the throne, as well as these Sultans having had very little experience of the outside world, as, later on in the existence of the Empire, the systematic killing of all the Sultan's brothers upon accession was replaced with forced confinement within the 'Golden Cage,' or Kafes - a windowless room that one could only leave having acceded to the throne. The drop in average reign from 26 years to just 12 after Suleiman, and the ten Sultans deposed or executed, are proof of the outdated mechanisms of Ottoman succession preventing Sultans from establishing an effective rule. Once again, the Janissaries, as well as other powerful ministers, abused these deficiencies, on more than one occasion freeing easily manipulated, mentally unwell heirs in order to replace unwanted Sultans. In 1618, for example, Osman II, who dreamed of destroying 'the Drones that eat up his estate', attempted to wrest control of the Empire, but was taken into custody by the janissaries, who then 'drew his starving, raving uncle out of a dungeon by a rope and made him Sultan'. The new Grand Vizier put Osman to death ''by the compression of his testicles'', as Eyliya Celebi

[20] Treasure 2003.
[21] Lewis 2005.
[22] Finkel 2006.

records. The years 1623-56 have been called the Sultanate of the Agas, the janissary commanders, indicating how all pervasive their power was. Thereafter, for another half century, a dynasty of Grand Viziers, the Koprulu clan, effectively ruled the Empire, bringing it first to the gates of Vienna in 1683, and then watching helplessly as Ottoman power was shattered in Hungary and Transylvania, as confirmed in the treaty of Karlowitz (1699).[23]

The Empire's financial and military systems were becoming quickly outdated by the seventeenth century, and this became very apparent during the war that followed the second Siege of Vienna in 1683. Finkel describes the war between the Empire and a second manifestation of the Holy League as an 'unravelling of the empire.'[24] The monetary problems caused by a war on three fronts and the major corruption within the chain of command, with huge amounts of tax money often 'disappearing'[25] resulted in a disastrous war that saw much of Hungary and Romania lost. This period saw innumerable court intrigues and executions of ministers; these could merely be the result of panic at a losing war, but they also suggest that the appointments to posts made by the Sultan were poor, and as was the case, done not at all meritocratically. Bad leadership in this particular case was a factor, with Sultan Mehmed IV having to call upon Fazil Mustafa Pasha as his 'word held more weight with the military than the Sultan's.'[26] Not only does this speak poorly of Mehmed's leadership in particular, but also makes clear the gulf that had developed between the state and the army. The distrust between soldier and politician culminated in a Caesar-like approach on Istanbul by the 6th army based in Hungary that Mehmed was hard pressed to prevent becoming a coup. This was in large part due to unpaid wages but was as much due to the simple fact that the troops were losing. The territorially damaging peaces of Karlowitz and Passorowitz in 1699 and 1718 respectively bore testament to this military failure.

Had the Empire avoided financial ruin it would likely have survived much longer, or at least remained powerful right up until the Great War, but an empire without money will not survive for long. Ottoman finances, as well as those of the empires that previously existed in the region (Seleucids, Parthians, Safavids, Byzantines, Roman) had relied upon taxing the major trade routes that ran from the far east and the subcontinent through the middle east and into Europe. Many western sources speak of the Ottomans 'blocking' these routes in order to exact huge taxes on goods passing through. During the early years of the Empire these trade routes remained lucrative, but, 1498 saw the discovery of something potentially disastrous for the Ottomans. Vasco de Gama's Cape Voyage offered an alternative route to India and the far east that avoided slow and costly land travel and, while initially this route was not viable for large-scale trade, by the seventeenth century it thinned the traffic travelling through Ottoman lands, and this problem was only to increase. This is a major reason that the road networks in the Empire were significantly better in the sixteenth century than the eighteenth.

Whereas the European nations had previously been forced to communicate with the Ottomans in order to ensure a steady flow of eastern commodities, they no longer needed to and this is a large reason as to why the Ottomans fell behind their competitors technologically, where they had previously been scientific pioneers. Moreover, symptomatic of the new trade route was a major drop in direct trade between the Ottomans and Europe, and it was this that encouraged the sixteenth and seventeenth

[23] Goodwin 1999.
[24] Finkel 2006.
[25] Ibid.
[26] Ibid.

century Sultans to offer such capitulations as were to have so disastrous an impact during the nineteenth century.

When approaching this question, it is important that one distinguishes between a decline and the fall. While the Empire only fell in 1918 when the British invaded, it had been 'the sick man of Europe' for almost a century before, propped up by the great powers who needed a force to combat Russian power in the east. Clearly, the Empire had declined by the nineteenth century as evidenced by the problems that existed throughout that century. Thus, it is clear that the cause for its downfall cannot be found in the that century as is laid out by the traditional school of thinking. The developing financial problems of the Empire were what took it from its zenith to its nadir in the nineteenth century, and these were in large part caused by the discovery of the Cape Route in 1498. The inability of the Empire to industrialize alongside their adversaries in the west was caused by the breakdown in communications between east and west, and this in turn was the direct result of drop in trade caused by the new route. Furthermore, the state could not fund an industrial drive akin to that of the Russian Empire and the end of the nineteenth century as its finances were in such a poor state, also partly due to their being less trade. Considering that much of the land held by the Ottomans was not good farming land, trade had always been a vital part of its income. That is not to say that the Ottomans could not have adapted to overcome such a challenge. Where they were truly lacking was in the mechanisms of peacetime governance. The culture and systems that Osman I founded in 1299 proved to be effective only for an expanding, warring nation, and ineffective for the administration of a vast empire spanning across three continents. Thus, the 'why' has been answered, and as for the when, while it seems paradoxical to claim that the seeds for the Empire's downfall were sown in the year it was founded, that seems to be the case that the Empire was only to survive while it continued to expand.

Bibliography

Black , J. (1999) *Eighteenth-Century Europe*. London

Breuilly, J. (2016) *The Oxford Handbook of the History of Nationalism*. Oxford

Davis, P. (2001) *100 Decisive Battles*. Oxford

Emrence, C. (2007) 'Three Waves of Ottoman Historiography, 1950-2007', *Middle East Studies Association Bulletin* 41.2: 137-151

Finkel, C. (2006) *Osman's Dream: The Story of the Ottoman Empire 1300-1923*. London

Goodwin, J. (1999) *Lords of the Horizons: A History of the Ottoman Empire*. London

Lewis, B. (2001) *The Middle East. 2000 Years of History from the Rise of Christianity to the Present Day*. London

(2005) *From Babels to Dragomans*. London

Treasure, G. (2003) *The Making of Modern Europe. 1648 – 1780*. London

Predestined to profit? Reformed Protestantism and economic expansion in the Dutch golden age

Alexander Sarbinski

'If we intend to have the trade of the world, we must emulate the Dutch, who make the worst as well as the best of all manufactures, so that we may be in a capacity of serving all markets and all humours'.[1] So declared the Governor of the English East India Company Sir Josiah Child. His admiration of Dutch commercial prowess was by no means limited to the English mercantile community. In his essay, E. Reinert argued that not only did contemporaneous commentators view the United Provinces as a prosperous polity but they also perceived it as a model of economic development, attainable through appropriate government policies.[2] This desire to emulate Dutch success permeated the writings of, among others, Giovanni Botero and Ludwing Seckendorf. Modern economists often echo these views, referring to the Dutch Republic as the first modern economy characterized by sustained long-run economic growth.[3]

Numerous explanations were proposed for the Provinces' remarkable prosperity. One of the potentially most compelling – while also most controversial- theories pertains to the influence of Calvinism as the predominant religious worldview among the Republic's citizens. The interaction of religion with economic activity was famously analysed by Max Weber, who highlighted the economic disparities between Protestant and Catholic regions in Europe.[4] He attributed this discrepancy to the impact of theological factors, most notably the Calvinist doctrine of predestination, on attitudes towards labour and entrepreneurship.[5] According to Weber's analysis, belief in predestination encouraged assiduousness and frugality – qualities indispensable to the development of profitable business endeavours. He argued that through rejecting sacramental practices as a means to salvation, predestinarian Calvinism instilled in its adherents a peculiar form of spiritual anxiety.[6] Under such circumstances, hard work and successful business operations enabled believers to attain a state of certitudo gratis – confidence in salvation. Consequently, through engendering a distinctly modern attitude of profit-maximizing business, Calvinism contributed to economic development of the polities in which it constituted the dominant denomination.

The United Provinces provide an exceptional opportunity to appraise the significance of confessional beliefs for the process of economic modernization. The onset of Dutch commercial primacy in the early 17th century coincided with a 'shining moment' for Reformed Protestantism.[7] The dissemination of Calvinist beliefs was accompanied by an intensive program of confessionalization whereby Reformed

[1] Reinert 2016: 47.
[2] *Ibid.*: 36.
[3] De Vries van der Woude 2010: 1-2.
[4] See Weber 2005: 1-12.
[5] For a more detailed discussion of the relationship between Predestination and capitalism, see Weber 2005: 56-80
[6] *Ibid.*: 67.
[7] Parker 2018: 189.

ministers worked ceaselessly to impose ecclesiastical discipline on their faithful.[8] This enables the historian to closely examine the potential linkages between the Reformed doctrine and the economic transformation which characterized that period. While it cannot be denied that Calvinist beliefs partially contributed to the Republic's financial florescence, the Weber hypothesis fails to provide a convincing explanation of Dutch prosperity. Several practices and institutions necessary for economic modernization pre-dated the Protestant Reformation while Calvinist orthodoxy could constitute an impediment as well as a boon to commercial expansion.

Historical sources provide a number of potentially convincing arguments in favour of Weber's theory. Firstly, the dissemination of Reformed Protestantism resulted in an increase of the average working time, with considerable implications for household incomes.[9] As J. de Vries noted, in pre-Reformation Europe, the calendar was punctuated with numerous ecclesiastical holidays. Overall, the liturgical year and numerous Saints' days removed between 40 and 50 working days from the calendar of a Catholic worker.[10] Considering its sceptical attitude towards sacraments and ceremonial practices, it is not surprising that the Reformed Church proceeded to alter this situation. In 1574, the first Reformed Synod of Dort recommended the abolition of all religious holidays except for Sunday. As a result, the length of the average working year in the Dutch Republic increased by over 15%.[11] This increase in working time implied a rise the economy's total labour supply and improvements in disposable income. Consequently, while there exists no direct evidence to support the view that Calvinism encouraged greater assiduousness, it cannot be denied that the Protestant Reformation lead to rise in economic activity through stimulating an expansion of labour supply.

Secondly, the beginning of the Dutch breakthrough to commercial primacy coincided with the arrival of large numbers of Calvinist refugees fleeing religious persecution in the Southern Netherlands. This is most clearly evidenced by the aftermath of the siege of Antwerp (1585), which precipitated a wave of immigration into the United Provinces. Among the Calvinist emigres were numerous successful merchants who soon formed the nucleus of Amsterdam's new mercantile elite. Prior to the outbreak of the Dutch Revolt, the Northern Netherlands lacked a clearly defined commercial stratum. The influx of Calvinist traders from the South fundamentally altered this situation. The émigré merchants pioneered new trade routes and established commercial connections across Europe. For instance, the Antwerp refugee Isaac le Maire, was active in trade with Italy, Portugal, France and the East Indies. Perhaps even more prominent was Balthasar Coymans – whom J. Israel regarded as an archetypical exponent of Amsterdam's merchant elite. His successful ventures helped bring about the Dutch breakthrough to commercial primacy in the lucrative 'rich trades' of high-value goods such as spices and cloth. The economic position of Amsterdam's Calvinist merchants – many of whom were confessional refugees from the Southern Netherlands – provides an important insight into the importance of religion for entrepreneurial development. The fact that the founders of Amsterdam's position as a global entrepot were of predominantly Reformed faith can be regarded as a tentative argument in favour of the Weberian notion of the Protestant work ethic.

[8] *Ibid.*: 189.
[9] De Vries, van der Woude 2010: 616-617.
[10] *Ibid.*: 616.
[11] *Ibid.*: 617.

Thirdly, in accordance with Weber's views on the ascetic nature of early capitalism, the Dutch Golden Age economy was characterized by comparatively high levels of savings and capital investment across all its sectors.[12] It is difficult to deny that through condemnation of conspicuous consumption, Reformed Protestantism was favourable to saving and profit reinvestment. Higher savings, in turn, played a crucial role in financing the expansion of the economy's capital stock, leading to higher labour productivity and improved competitiveness. For example, probate statements from the district of Leeuwarderadeel show that the average value of farming equipment relative to the average value of total household wealth expanded from less than 10% to in 1580 to over 17% a century later.[13] The benefits of higher savings and reinvestment of retained profits are also evident in the history of the Dutch East India Company (VOC). The company increased its assets from the initial value of 6.4m guilders in 1602 to over 40m guilders by 1660 entirely through retained earnings.[14] This tendency to reinvest existing profits in new assets seems consistent with Weber's notion that Calvinism facilitated capital accumulation through promoting economical attitudes in financial management.

Nonetheless, numerous historical sources contradict the Weberian narrative of economic development. Firstly, recent analysis of written and archaeological sources casts doubts over the religious origins of the Dutch preference for saving and investment over immediate consumption. In their analysis of late-medieval tax records and extant remnants of Dutch moneyboxes, J. Zuijderduijn and R. van Oosten show that saving behaviour was already present in Holland prior to the onset of the Protestant Reformation.[15] For instance, in 1462 approximately 45% of households in the Dutch municipality of Edam reported owning cash savings.[16] The authors concluded that the population of late-medieval Holland was highly 'disciplined' with respect to their finances. Consequently, the economic virtue of frugality, which is frequently associated with the influence of Protestant thought, was already highly developed in the preponderantly Catholic society of late-medieval Netherlands.

Secondly, according to de Vries, numerous characteristic features of modern economies were already present prior to the introduction of Protestantism.[17] These characteristics included a high level of marketization and the absence of legal impediments to entrepreneurial activity. De Vries argues that this progressive nature of the medieval Dutch economy can be attributed to the 'absence of significant feudal traditions'.[18] The weakness of feudal institutions distinguished the medieval Dutch society from its contemporaries. This socioeconomic flexibility is clearly illustrated by the diverse patterns of landownership and the specialized, market-oriented nature of Dutch agriculture.[19] Dutch smallholders faced no formal constrains in delivering their products to the market. As a result, they often cultivated more sophisticated, high-value crops destined for sale rather than personal consumption. Even more importantly however, the economic flexibility of the Northern Netherlands nurtured a new attitude to economic activity. As de Vries noted, 'where the collectivity is weak, the individual and individualistic behaviour necessarily become more prominent. This creates a situation where personal initiative,

[12] De Vries, van der Woude 2010: 200-203.
[13] *Ibid.*: 203.
[14] *Ibid.*: 670.
[15] Zuijerdujin, van Oosten 2015: 25.
[16] *Ibid.*: 26.
[17] See de Vries 2010: 159-165.
[18] *Ibid.*: 160.
[19] *Ibid.*: 161.

innovation, and responsibility can develop'.[20] Thus, the societal characteristics which Weber attributed to the impact of Calvinism were already visible in the pre-Reformation Netherlands.

Thirdly, notwithstanding the often-repeated assertion concerning the 'modernizing' impact of Reformed Protestantism, the writings of prominent theologians indicate a perceptibly more traditional attitude towards economic activity.[21] This stance is illustrated by the dispute concerning the admittance of bankers to Communion. In 1574, the Synod of Dort deliberated on whether a banker should be permitted to participate in Communion. The theologians' response was negative: 'No, for he has been allowed by the magistrates to operate his bank only because of the hardness and evil of men's hearts, and not because of God's will.'[22] Several orthodox theologians remained intransigently critical of novel financial practices even during the height of the Republic's commercial primacy. For example, in 1646, the theologian, Gisbertus Voetius published a pamphlet entitle *Res Judicata,* in which he refuted the view that bankers should be permitted to attend Communion. As A. Hyma concluded, the pamphlet 'showed plainly that in the provincial towns, removed from the bustle of great commercial enterprises, the attitude of the clergy and the scholars was very slow to change'.[23] This traditional perception of finance propounded by preachers stood in contrast with significance of financial innovations for the Republic's commercial development. The onset of the Dutch Golden Age witnessed the creation of numerous financial institutions granting Dutch traders with important advantages over their foreign competitors. For example, the establishment of the Amsterdam Exchange Bank in 1609 substantially facilitated the financing of mercantile expeditions of the East Indies. Consequently, the attitude of Calvinist theologians towards financial development contradicts the notion of Reformed Protestantism as a driver of economic growth.

Fourthly, while the majority of Amsterdam's mercantile elite was Calvinist, religious minorities were not excluded from commercial entrepreneurship.[24] Amsterdam's Jewish community played a major role in several important commercial enterprises. Many Jewish merchants maintained trading contacts on the Iberian Peninsula and thus substantially facilitated commerce with Spanish and Portuguese domains in the New World[25]. Indeed, the Sephardic Jews constituted one of the most prosperous confessional groups in the Provinces' capital.[26] The successful integration of the Jewish community into the Dutch economy was enabled by a pragmatic policy of religious toleration. Orthodox Calvinist ministers often expressed distaste towards 'heathens' and opposed the granting of additional privileges.[27] This hostility towards religious minorities highlights that orthodox Calvinism could act as regressive force, entailing negative implications for economic growth. Even more importantly, the success of Jewish traders clearly highlights that the Weberian 'spirit of capitalism' was not a uniquely Calvinist phenomenon. Non-Reformed groups were also capable of establishing highly profitable and systematic business enterprises and displayed a remarkably modern attitude towards their business operations.

[20] *Ibid.*: 160.
[21] See Hyma 1938: 326.
[22] *Ibid.*: 327.
[23] *Ibid.*: 330.
[24] See Vanhaelen 2018: 228-229.
[25] De Vries van der Woude 2010: 307.
[26] See Vanhaelen 2018: 228-229.
[27] *Ibid.*: 228.

As the problems discussed above clearly show, the influence of Calvinism constituted only one, and by no means always positive, element in the confluence of factors which enabled the economic florescence of the Dutch Golden Age. Historical sources provide limited evidence in favour of Weber's theory in the context of the United Provinces. While the introduction of Protestantism did increase the average working time, this change constituted a one-off ecclesiastical decision motivated primarily by religious concerns rather than the long-term impact of a Protestant work ethic. Moreover, while the Dutch quality of frugality and the tendency to reinvest profits is often attributed to Calvinist spirituality, archaeological evidence demonstrates that the savings behaviour was already widespread in the late-medieval period. Finally, while the majority of the Dutch elite merchants were Calvinists, confessional minorities also played an important role in the Republic's entrepreneurial life. As de Vries accurately concluded, 'The Reformation removed from its hinges the door leading to a rationalized, commercial society. But, in truth, that door was already open.'[28]

Bibliography

De Vries J. van der Woude A. (2010) *The First Modern Economy: Success, Failure and Perseverance of the Dutch Economy, 1500-1815*. Cambridge

Ghosh P. (2004) 'Max Weber in the Netherlands, 1903-1907. A Neglected Episode in the Early History of the Protestant Ethic', *Bijdragen en Mededelingen Betreffende de Geschiedenis der Nederlanden* 119: 358-37

Hyma A. (1938) 'Calvinism and Capitalism in the Netherlands', *The Journal of Modern History* 3: 321-343

Israel J. (1990) *Dutch Primacy in World Trade 1585-1740*. Oxford

(1995) *The Dutch Republic: Its Rise, Greatness and Fall 1477-1806*. Oxford

Parker Ch. (2018) 'Reformed Protestantism', in Helmers H., Janssen G. (eds) *The Cambridge Companion to the Dutch Golden Age*. Cambridge

Sociological Review 17: 119-148

Van Bavel. B (2010) *The Medieval Origins of Capitalism in the Netherlands* (https://mpra.ub.uni-muenchen.de/49555/1/) Date Consulted: 27.07.2019

Vanhaelen A. (2018) 'Spiritual Culture', in Helmers H., Janssen G. (eds) *The Cambridge Companion to the Dutch Golden Age*. Cambridge

Weber, M. (2005) *The Protestant Ethic and the Spirit of Capitalism*. London

Zuijerdujin J., van Oosten R. (2015) *Breaking the Piggy Bank: What can historical and archaeological sources tell us about late-medieval savings behaviour*. (http://www.cgeh.nl/sites/default/files/WorkingPapers/cgehwp65_zuijderduijnvanoosten.pdf) Date Consulted: *26.07.2019*

[28] De Vries van der Woude: 172.

Why and how is Spain still haunted by Franco?

Ajay Rajapakse

We are witnessing a change in the political landscape of Europe today. Far-right extremism is sweeping across the continent, echoing the old turbulence of the 20th century. In this essay I will focus on Spain's experiences and will try to answer questions on Franco's current presence there: Why is it occurring? How is it affecting the political system? How are the public involved? Franco's continued presence has certainly contributed to the recent and significant rise in far-right extremism that Spain is currently witnessing. Lidia Falcón (who lived and suffered under Franco's rule) states that: 'a lot of Fascists are rising to the surface now'.[1] Clearly, far-right extremism is making a return.

Despite other countries also experiencing a rise in far right-extremism, Spain is observing something that is significantly related to its old dictator. The difference between Spain's situation with that of Italy and Germany lies in the fact its dictatorship only ended in 1975. It formed immediately after the Spanish Civil War (1936-39), a revolution which differed from most others of the 20th century. It is often regarded as a battle of ideologies, between communism and fascism; fighting for dictatorship or democracy. After 3 years of civil conflict Franco's nationalists, supported by Fascist Italy and Nazi Germany, defeated Prime Minster Caballero and his Republican army. The civil war engendered one of the longest fascist regimes of modern times. This is because Franco's dictatorship didn't fall victim to World War Two like the regimes of Hitler and Mussolini, primarily due to Spain's official wartime policy of neutrality. With the deaths of Mussolini and Hitler marking an end to their extreme right-wing dictatorships, Franco's survival ensured his regime's longevity, which is why he remains a troubled memory for Spain today. El Caudillo (Franco) ruled 30 years longer than most Fascist dictators. Any action to eradicate aspects of fascism in Spain were therefore delayed by three decades compared to most of Europe. Thus, when other nations progressed into democracy and liberalism, Spain did not join the trend. This made the transition in 1975 (upon Franco's death) from an authoritarian dictatorship to a democratic state a difficult one, as Franco's existing dictatorship had been well-established and developed for over 30 years. The uneasy transition has led to remnants of 'Francoism' leaking from the past into the present, with the dictator retaining his presence over the nation.

Unlike most European dictators of the 20th century, Franco's body was laid to rest in a glorified structure. 'The monument is a veritable shrine to Francoism and an obligatory pilgrimage for Franco's defenders'; such a description highlights the profound image of Franco that still exists in Spain, as well as the attraction of his shrine to a growing number of extreme right-wing members of public.[2] The moving of his body has caused debates for many years, culminating in the autumn of 2019 when his remains were eventually exhumed. Perhaps a victory for democracy, but this delayed response has scarred the nation. The site was meant to be a neutral burial ground for the fallen during the civil war, yet having Franco's body there for so long enraged many. Despite the removal of the dictator the

[1] Falcón, L . (2019) 'Is Franco's shadow fading?' *The Observer Special report*: 21-23

[2] Encarnación, O. *Spain's Dictator Is Dead, but the Debate About Him Lives On*. At https://foreignpolicy.com/2018/07/27/spains-dictator-is-dead-but-his-popularity-lives-on.

monument remains a centre-piece for Francoism, for a scar that has been left untouched for so many years cannot so easily be removed, let alone forgotten. Moreover, there are clear visual depictions of Franco's regime which have not been eradicated as 'Parliamentary attempts to retrospectively delegitimize the Franco years have been blocked by the ruling Partido Popular (PP)'.[3] Some churches still display the yoke and arrows of Franco (Spain's swastika), several streets remain named after Franco's henchmen and that 500 foot shrine that, although no longer holds Franco's body, profoundly holds his memory. These physical symbols indicate that Franco remains, even in death, ever present in Spain, acting as an inspiration for the extreme right-wing members of society.

The People's Party (PP), which last governed Spain from 2011-18 and is now in opposition, shares much of its DNA with Franco's regime. The first incarnation of the PP (Alianza Popular) was founded by one of Franco's former ministers.[4] It is therefore somewhat unsurprising that the party took a slow and reluctant approach to condemn both the dictator and nationalist street violence. This reluctance is exposed by the ease at which nationalists rioted through Valencia on 9th October 2017, using violence and performing the Nazi salute, to little resistance. The only Spanish party that failed to formally condemn the violence was the PP. The PP also, whilst in power, wanted to stop the exhumation of victims of Franco's repression, but were happy to repatriate the remains of soldiers who fought for Hitler. Clearly, the previous government avoided criticizing or delegitimizing Franco's rule.

Additionally, the violence that Spain has witnessed over the recent years draws some parallels with the violent actions that occurred under Franco, especially surrounding the topic of Catalonian independence. In 2017 the then deputy of the PP and current leader of the opposition, warned that if the Catalonian president dared to declare independence from Spain, he could 'end up like' Lluís Companys, who was a Catalonian leader executed by Franco in 1940.[5] Although this is most likely to be an empty threat, it implies that Spain is currently in a highly tense and hostile relationship with Catalonia, shown by the ease at which officials seemingly use threatening language when talking to others. These threats of course differ greatly from the actual executions carried out under Franco, but it emphasizes that the political demographic has undergone a significant change, and that Spain is once again in turbulent times. Franco's prime ideological passion was nationalism. He opposed Catalonian independence, banned the language and used violence to deter Catalonian protestors and nationalists. We see a similar hostile environment today, as seen in the 2017 violent riots. The controversial action, by MPs and certain members of the public, to disallow a referendum appeared to deny the democratic rights of Catalonians. The violent riots witnessed in October 2017 were somewhat reminiscent of the fascist violence that occurred throughout the 20th century, possibly forming the environment for a second civil war. In 2017 around 1,066 people sought medical treatment, but 886 were classed as having a minor injury or condition.[6] More recently, protest and a subsequent general strike have occurred in Spain (2019-2020) following the sentencing of nine Catalonian independence leaders due to their participation in the 2017 attempted referendum. The Supreme Court sentencing of years imprisonment precipitated outrage in Catalonia which led to the aforementioned protests last year. Of

[3] Simons, J. *Franco's fascism is alive and kicking in Spain*. At https://blogs.spectator.co.uk/2017/10/francos-fascism-is-alive-and-kicking-in-spain/.

[4] Ibid.

[5] Pablo Casado's public comment at Europa Press on 9/10/17.

[6] *Catalonia: Did voters face worst police violence ever seen in the EU?* At https://www.bbc.co.uk/news/world-europe-41677911 *(October 2017).*

course, this violence is incomparable to Franco's frequent death sentences and thuggish violence which culminated in hundreds of thousands of deaths from 1939-75, but this recent violence cannot go without criticism and analysis. The ease at which Spain is being plunged into conflict indicates the fragility of the nation's political hold over the public. New people are falling into the fascist light, with these anti-independence protesters seen carrying right-wing flags, performing the Nazi salute and participating in violence. These events have convinced many that Franco's legacy still casts a shadow over the Spanish people. The acclaimed novelist Javier Cercas stated: 'This is the past that has not passed. The civil war is still here.'[7]

Furthermore, the sudden successes of the far right-wing political party Vox are of great concern to many members of society. They have emerged as the first far-right wing party since the death of Franco. Despite their very slow rise to relative prominence, they are by no means negligible when it comes to politics. In the last 18 months alone Spain has undergone several important elections. In the Andalusian regional election (December 2018), the General Election (April 2019) and the European Elections (May 2019) Vox have gone from zero seats in all three to twelve seats, twenty-four seats and three seats respectively. Additionally, in the snap General Election held in November 2019, Vox further increased their political strength, rising from 24 seats to 52, placing them as the third largest political party by seats in Spain today. Following these elections, where Vox have progressed well, the two main parties have undergone losses. The centre-left government, the Socialist Workers' Party (PSOE), lost control of Andalusia to a non-socialist government for the first time in 36 years. Furthermore, Vox holds some similarities between their political views and with those of Franco's regime. They are often reported to be misogynistic and the Prime Minster stated that Vox wishes to halt legal aid for women beaten by men.[8] Vox has openly stated their desire to deport thousands of Muslims from the country and to repopulate Spain with immigrants from Latin America, in what the President of Vox, Santiago Abascal, is calling 'Reconquista' (reconquest) of Spain, similar perhaps to Franco's nationalist policies. They are also openly anti-feminist and homophobic. When characterizing Vox, Spain's popular journalist, Iñaki Gabilondo states: 'To me its Francoism . . . totally recognizable because I lived it'.[9] Their views towards Catalonia, as stated, also draws great parallels with Franco himself. For many this rise in far-right extremism epitomized by Vox, is reminiscent of Franco's days; as Falcón puts it: 'They're [Vox] the same people [20th-century fascists] except today it's their grandchildren'.[10] Vox has risen with a populist approach and, as Jan Werner Müller stated, populists regard themselves as the only true representatives of the 'real' people.[11] Their ideals strike accord with what Franco's government set out to achieve. Vox has managed to survive due to the PP's failings, similar to the Brexit party's success in the European elections of May 2019. They have used this advantage to elevate themselves, becoming advocates for a far-right manifesto. When analysing the similarities between Vox's ideologies and Franco's we must take care not to exaggerate facts. However, it is noteworthy that there are people who lived through the period of Franco's rule and are also noticing a similar occurrence.

[7] Freedland, J. (28/3/11) 'Spain and the lingering legacy of Franco', *The Guardian*.
[8] *Spain domestic violence: Trail of death shocks society*. At https://www.bbc.co.uk/news/world-europe-46921214.
[9] Gabilondo, I. (2019) 'Is Franco's shadow fading?' *The Observer Special report*: 22.
[10] Ibid.
[11] Müller, J. (2016) *What Is Populism?* Pennsylvania.

It is unsurprising that the Spanish government is opposing the independence of Catalonia because of the region's major contribution to the nation. Catalonia makes up one-fifth of Spain's economy, thus without it attached to the economy, Spain would suffer a significant decrease in their national income.[12] Franco's motive in opposing Catalonian independence may have been completely different to those of today's Spanish government. We must be wary not to exaggerate the similarities between the two periods, for each situation occurred with different circumstances. The actions of Franco are not being recreated to such an extreme extent. 'Ideologies don't travel well over time . . . History doesn't repeat itself, but it often rhymes,' which aptly describes the issue Spain is going through.[13] We must not offend those who lived through the horrors of Franco's Spain, as most modern historians did not themselves endure these trauma on a personal level. Spain has tried to 'forget' the horrors of the past with the 'Pact of Forgetting' (1977) and the 'Historical Memory Law' (2007) which have attempted to remove some symbols of Francoism from the streets of Spain. Thus, there are signs that Spain is moving forward, yet perhaps for some, the shift is occurring too slowly and too late. Spain may be following a general trend of populism sweeping Europe at the moment, which might indicate that this undeniable rise in far-right politics is in fact due to more recent events, rather than a connection to Spain's long dead dictator of the last century.

Franco remains in the minds of the Spanish people. He has woven himself into the fabric of Spanish society which has, although not dominated Spain, certainly interfered and stirred up debates. The extent of his presence is indeed debatable. He is after all dead, and how much power can the dead really have over the living? The multitude of symbols around Spain's streets perhaps suggest only the laziness of the government to remove them. The rise of far-right wing extremism is prevalent across the world and it would be an exaggeration to state that this occurrence is a direct replication of the dictatorships of the 20th century. The violence today cannot be compared to the brutality of 1939-1975. But what is noteworthy is the similarities of Vox's policies, as well as their far-right supporters, compared to Franco's ideals and his fascist support base. George Santayana's aphorism – 'those who cannot remember the past are condemned to repeat it' – is a fearful concern in Spain.[14] The demographic of the Spanish people has changed and, although it would be remiss to draw extreme parallels between Franco's dictatorship and the recent Spanish governments, there are undoubtedly many references to Franco that still haunt the streets of Spain today.

[12] *Here's how bad economically a Spain-Catalonia split could really be*. At https://www.cnbc.com/2017/09/21/heres-how-bad-economically-a-spain-catalonia-split-could-really-be.html.

[13] Simón, P. (2019) 'Is Franco's shadow fading?' *The Observer Special report*: 23.

[14] Santayana, G. (1905) *The Life of Reason: The Phases of Human Progress Volume 1. 284.*

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Fear in global politics

Gabriel Rahman

The frequency of the use of the term 'fear' in political spheres has risen hugely over the last several years, many would argue this directly correlates with the newfound political prominence of so called 'fearmongers' such as US President Donald Trump, UK politician Nigel Farage or Indian and Hungarian prime ministers such as Narendra Modi or Viktor Orbán. These politicians are all often described as differing degrees of 'right-wing', or occasionally 'nationalists' with a typically apodictic stance on immigration, typified by Trump's 2015 remarks at his campaign launch: 'They're bringing drugs. They're bringing crime. They're rapists. And some, I assume, are good people.' Eminent political scientists Bleiker and Hutchinson state that 'fear can be attributed to the feeling that something untoward may happen', and it's this uncertainty, of something 'untoward', the mysterious 'they' that Trump refers to, that many argue He, Farage, Modi, Orbán and many others rely upon for their political success; and the subsequent typically inward looking fearful response to it by the electorate. However, along with this inward response (usually a shift to the right), it is possible also to argue that fear plays an equally crucial role on the 'left', as people seek unequivocal protection for what they see as hard won and quasi-sacred rights that fall under the political umbrella of democracy. The fear of the collapse of this sacralized democracy is what causes many on the left to discount what is often an electoral majority, and disregard their previously amicable fellow citizens as 'racists' or 'bigots'. This type of language has become commonplace in the contemporary public political sphere and is only fuelling division and partisan thinking, which clearly plays a crucial role in the political shape of individual countries and our global political climate as a whole. Furthermore, any potential solutions to the role of fear, and what we can do to try and minimize its global ramifications are of course by nature extremely complex. However, many believe that the key to addressing this growing concern lies within embracing multilateralism and emphasizing the often forgotten positives of globalization.

The current global precedent I have alluded to is that the 'fear', of Bleiker and Hutchinson's 'untoward' or Edmund Husserl's 'other', is typically used most effectively by politicians placed on the 'right' of our political system, traditionally labelled as conservatives. Jonathan Haidt speaks of 'the conservative advantage' in his book *The Righteous Mind: why good people are divided by politics and religion*, and states that this concept of a 'conservative advantage' when appealing to voters stems from our morals. Haidt states our morals are based in our intuition rather than in our logic, and globally conservative parties tend to appeal to more areas of a given voter's moral foundations which are all intuition-based. Haidt speaks of five moral foundations, those of *'Care/Harm, Loyalty/Betrayal, Fairness/Cheating, Authority/Subversion* and *Sanctity/Degradation'*, based on collecting data of over 130,000 American voters. These five foundations are all strongly and equally endorsed by those who label themselves as 'conservative'. However, when those that labelled themselves as 'liberal' went through the same process, only the moral foundations of *'Care/Harm* and *Fairness/Cheating'* were endorsed very strongly, while the remaining three *'Loyalty/Betrayal, Authority/Subversion* and *Sanctity/Degradation'*, were strongly and uniformly rejected. Haidt goes on to state simply that 'Republicans [conservatives] understand moral psychology. Democrats [liberals] don't', as within their slogans, speeches and

campaigns as a whole, they are often more brazen and have a variety of these five moral foundations to choose from. That is true of the infamous Bush campaign featuring (black) murderer Willie Horton's mug shot and (the eventually unsuccessful) democratic candidate Michael Dukakis allowing him a weekend pass out of prison where he went on to murder and rape several people; it is also true of Trump's 'Make America Great Again' slogan, which directly and firmly appealed to both the *'Loyalty/Betrayal, and Sanctity/Degradation'* to such an extent that people were compelled to wear items of clothing with this slogan upon it. The crucial aspect here is that whilst all would agree that the Willie Horton murder is an atrocity, the Republicans managed to convey it in the 1988 campaign as something that was caused directly by the Democratic leniency, thereby using the foundations of *'Sanctity/Degradation'* and *'Authority/Subversion'* and associating the innate fear caused by the violation of these foundations, with poor Democratic policy [weekend passes]. Moreover, Trump appeals to a similar set of foundations, causing fear that liberals simply don't and arguably can't understand with his campaign slogan. His continual anti-immigration and self-proclaimed nationalist speeches allude with varying degrees of subtlety that the high levels of immigration are *degrading* the US and in order to reclaim *sanctity,* or 'make America great again', he must address this. The fear this threat of *degradation* creates amongst Americans is just a singular example of why he has been accused of 'fearmongering', but also arguably the basis for his passionate support. The same idea of anti-immigration 'fearmongering' is now commonplace globally and features in Hungarian, Orbán-funded anti-immigration advertisements, some of which were actually borrowed from Nigel Farage's UKIP adverts from 2016. Along with this, Orbán told state radio that if Hungary were to become an 'immigrant country' it would bring 'terror', again clearly appealing to several of Haidt's moral foundations, including the same *'Sanctity/Degradation'* foundation that Trump and the 1988 Republicans chose to appeal to. The threat of 'terror' causes enough fear to illicit an inward, conservative response in many globally, and the fact that this response has been so marked and dramatic shows the unprecedented extent that fear is now shaping a large proportion of global politics.

Whilst it can be clearly argued that 'fear' plays a role in shaping global politics on the 'right', it is also possible to argue that it plays an equally paramount role on the 'left'. The desire to protect a utopian democracy of civil liberties that arguably never existed in the first place, as well as cherish hard-earned rights for the population arguably create paralysing and divisive fear and societal tension, only widening the gap between people. This is possibly dividing society in a similar way to those on the right. Martha Nussbaum, a professor of philosophy at the University of Chicago states in her book *'The Monarchy of Fear: A Philosopher Looks at Our Political Crisis'* that many on the left see significant episodes in recent political history – such as Trump's election or the Brexit referendum (both of which can be said to have been heavily influenced by fear) – as the start of the 'collapse of many democratic freedoms, such as speech, movement, association or press', or even democracy itself. Many on the traditional left would argue that campaigns like Trump's or Brexit (spearheaded in part by Farage) are 'undemocratic', as they seem to go against many values that we, in an age of 'western' identity politics, of individual rights and representation, have come to associate with democracy. Many, however, including Nussbaum, see these claims as false; some would even go as far as to say that popular support for impeachment of an elected president, or a second referendum after a legitimate yet divisive first one in itself is 'undemocratic', and possibly equally, if not more so than the 'fearmongering' acts that are driving these concerns in the first place. Labelling a large proportion of any given electorate as simply 'racists' or 'uneducated', as has been the case in both the UK and the US, is always dangerous and sets an unhealthy precedent. Ironically, Trump, who many view as having run an essentially 'racist'

campaign for his 'racist' fan base, did better with both Black and Hispanic Americans in the 2016 election than Romney in 2012 (*The Stream*). One could state that the merging of the 'right' and the 'alt-right', in the perception and fears of the 'left' is a subtle but potentially treacherous change, making the political landscape of the major nations very divided; the assumption that everyone who wants to 'make America great again' wants to turn America into a white supremacist haven is simply unfounded, and this is a very real thought for many on the 'left'. The 'if you're not with us you're against us' mentality demonizes a large proportion of the electorate under an essentially self-perpetuating guise owing to the fear of civil liberties and democracy itself being eroded.

Finally, it is very possible to argue that over the last century, our global response to conflict from has been in general, a concerted pro-globalization, multilateral approach, with groups such as the EU or ASEAN forming. These regional blocs generally aim to promote both prosperity through trade, and security, through this trade as well as organized peace initiatives. These were formed as a consequence of global conflict, post-WWII for example in the case of the EU, with the fears of these conflicts fresh in the minds of the countries that created them, and with the aim of preventing these types of atrocities occurring again. However, many cite these conflicts slipping out of living memory as a reason for the recent decline of globalization, with the positives, and the need for them, being forgotten by many. Peter Burian, the EU special representative to central Asia, recently stated at an International Relations conference in Kazakhstan that, in order to remedy this, both the causes and positives of globalization ought to be reiterated to the population. The benefits, such as free trade, and all the job opportunities that come with it, as well as easier lines of communication and the ability to help poorer countries in a sustainable fashion much more easily, all of these benefits need to be made clear. Usman Ahmed, PayPal's Global Head of Public Policy, speaking alongside Burian, stated that 'Free trade is like going to heaven; everyone would like to go but no one wants to jump first.' One can say that, in this time of avarice and political Darwinism, the trust to 'jump first' has dissipated, and the only way to rebuild this trust between countries is through aforementioned regional blocs, or a 'Regional bloc mindset' from which comes the trust to trade freely, as well as the added physical security provided by mutual financial prosperity. Concepts such as multilateralism are in the DNA of an organization such as the EU, and just as they were created out of fear after conflict, there is fear now that with the rise of unilateralism and the 'far right' across Europe, thatthe EU could begin to decline rapidly. Its key principles, like freedom of movement, are those that are being questioned by the aforementioned 'right-wing' politicians and also protected to the point of collapse and division by the previously referred to 'left-wing' mindset. Burian states that decisions like Brexit have been taken out of national interest, as opposed to the multinational interest that previously existed around Europe, a clear sign that the fear of the 'other' or the 'untoward' has affected our global political landscape to such a great extent that our whole national outlook has changed, from outward-looking to inward-protecting. This – many feel – is dangerous and could potentially lead to a repeat of the conflict that saw these regional blocs being needed and formed in the first place.

In conclusion, the marked impact fear has on all parts of the political spectrum is clear. Whichever side it operates on, the end result is usually division and economic and/or cultural vacuity. It is possible to argue, then, that, in order to combat this fear, a large global player 'jumping first' and being caught by the rest of the world could start to lead towards a more cooperative and conducive society. In a time where the politics of fear is practised so nonchalantly, global political generosity and trust may be the antidote.

Bibliography

Alfred N. (2019) 'How fear shapes world politics', https://www.e-ir.info/2019/05/06/how-fear-s hapes-world-politics/

Brown, M. (2017) 'The Leftwing Media's Dangerous and Divisive Lie', *The Stream* https://stream.org/leftwing-medias-dangerous-divisive-lie/

Haidt, J. (2012) *The Righteous Mind: why good people are divided by politics and religion*. London

Hutchison R. and E. (2008) 'Fear no more: emotions and world politics' https://www.cambridge.org/core/journals/review-of-international-studies/article/fear-no-more-emotions-and-world-politics/22B7A68A3FEEA5D5B6313B5FA29F02A7

Lind D. (2019) 'Trump has a long history of fearmongering about immigrant murder', https://www.vox.com/2019/2/5/18213077/state-of-the-union-2019-trump-david-killed-immigrant-family

Matamoros, C. (2018) 'Hungarian government rehashes UKIP anti-migrant poster in new ad', https://www.euronews.com/2018/03/28/hungary-government-s-new-anti-immigration-ad-copies-ukip-s-controversial-anti-migrant-post

Nussbaum, M. (2018) *The Monarchy of Fear: A Philosopher Looks at Our Political Crisis*. New York

Robin, C. (2017) 'Political fear works', https://newrepublic.com/article/140431/political-fear-works

Sullivan, K. (2019) 'Obama leaders fear facts', https://edition.cnn.com/2019/04/29/politics/obama-leaders-fear-facts/index.html

Sullivan, M. (1999) 'A Sociologist explores the culture of fear', https://news.usc.edu/8743/A-u Sociologist-Explores-the-Culture-of-Fear/

To what extent has 'El Plan Colombia' succeeded in combating Colombian drug cartels and left-wing insurgent groups in Colombia?

Luke Townsend

Colombia's History with drug trafficking started in the 1970s when the Medellin Cartel, a group of drug suppliers and smugglers based in Medellin, Colombia, started to smuggle cocaine. Conflict between Colombia's drug cartels and the Colombian and US government arose after 'The Medellin Massacre', where the cartel murdered 40 people in retaliation to the seizure of 600 kilos of cocaine. This event led to years of violence and the current unstable relationship between Colombia and the United States.

In order for the US government to stop this conflict they enabled 'El Plan Colombia'. Bill Clinton and Colombian president Andrés Pastrana signed 'El Plan Colombia' in 2000, commencing the 'War on Drugs'. To enable this war on drugs to happen the US government gave an initiative of $1.3 billion to support the Colombian government's counter-insurgency and counter-narcotic efforts. This initiative was based on the US government's policy to fight the 'war on drugs' using a supply-side perspective. Seventy one percent of the funds given by the US went to military aid in order to train Colombian troops, supply military technology and weapons, and to support a controversial aerial fumigations programme to destroy Coca crops.

From 2001 to 2016 the US government gave $10 billion in aid in order to combat Colombia's drug problem. In fact, on the 4th of February 2016 Juan Manuel Santos visited the White House to promote US support of peace negotiations developing between the Colombian government and the Revolutionary Armed Forces of Colombia, FARC, which is Colombia's most notorious left-wing rebel group and one of the richest guerrilla armies in the world.

One of the biggest successes in 'El Plan Colombia' was that it enabled the Colombian government to combat rebel groups such as FARC and the AUC, a far-right paramilitary umbrella organization, who had become a far greater contributor to the drug trade than their Marxist rivals FARC. By 2001 both FARC and the AUC were on the US terror list. Moreover, through security gains in important regions of Colombia, significant amounts of economic growth were facilitated which was critical in taking down FARC guerrillas and in negotiating an end to more than half a century of guerrilla warfare against the Colombian state. 'El Plan Colombia' has undisputedly contributed to strengthening Colombia's security and economic growth. A result of this is a major drop in violence. And, despite not disrupting the flow of cocaine from Colombia to the US, 'El Plan Colombia' helped to reduce coca cultivation by 18% from 2000 to 2014. However, most importantly the policy has helped create the conditions for peace talks between the Colombian government and the various rebel and terrorist groups in Colombia.

In military terms, 'El Plan Colombia' could be classed as a great success. With the assistance of 'El Plan Colombia', state security forces in Colombia were able to expand their reach to almost all municipalities in the country, which allowed FARC's ranks to drop from 17,000 to an estimated 8,000 fighters. 'El Plan Colombia' was a military success because it was able to supply aid to Colombia so that Colombian state security forces could gain the tools, they needed to combat the FARC, AUC and ELN, the National Liberation Army. In fact, US secretary of State John Kerry said that Plan Colombia 'helped to transform a nation on the verge of collapse into a strong institutional democracy with historically low levels of

violence.'[1] Furthermore, the Colombian ambassador to the US, Juan Carlos Pinzón, said, 'in the year 2000 Colombia was a country on the edge of an abyss. In that moment, the US government began a support plan . . . that achieved the transformation of our country and opened the door for a peace process.'[2] In the struggle for peace in Colombia the assistance of Plan Colombia was vital because without the aid given by the US government, organizations such as FARC, the AUC and the ELN would still be present in Colombia and the US would still be fighting a war on terrorism in Colombia. Since Pastrana and Clinton first signed the agreement, the ELN have been completely decimated thanks to 'El Plan Colombia'. However, there have been many consequences as a result of 'El Plan Colombia', such as the countless human rights violations and increased number of victims owing to cartel activity.

Many members of civil society and human rights organizations tell a different story about the effects that 'El Plan Colombia' has had on stopping drug trafficking and improving the security of Colombia. During the time in which Obama was president, a group of 135 communities, known as CONPAZ, wrote to Obama explaining how they've seen how their 'rights have been violated using the pretext of the armed conflict'[3] and how 'terrorists have been armed and continue to be militarized and, even worse, have seen a rise in the presence of paramilitaries'.[4] Furthermore, CONPAZ has stated that 'Colombia has changed with Plan Colombia and these changes have not necessarily meant the improvement in the quality of life for the majority of Colombians.'[5] According to Lisa Taylor, witness for Peace Colombia Team, human rights violations rocketed in the year 2000 with the massive injection of US military aid under 'El Plan Colombia'. Also, there has been an estimated 6,424,000[6] Colombians victimized because of 'El Plan Colombia'. Furthermore, civil society groups have shown that paramilitaries and state security forces together are estimated to be responsible for 48% of assassinations.

Furthermore, the aim of 'El Plan Colombia' was to disrupt the drug trade and reduce the violence caused by the drug trade. In the first 8 years of 'El Plan Colombia' the number of victims increased significantly owing to internal conflict in Colombia. An example of this is when in 2008 more than 800,000[7] people were victimized, according to the US government's unit for victims. The main culprit for this victimization and violation of human rights has been forced displacement carried out mainly by guerrilla groups, paramilitaries and other rebel groups. The reason for this displacement was that the numerous guerrilla and rebel groups were being pushed back from the heavily populated areas of the country causing innocent bystanders to also be displaced. This 'democratic security' offensive was commenced by Pastrana's successor Alvaro Uribe in 2002.

Another failure of 'El Plan Colombia' was the surge of illegal activity that occurred. For example, during 'El Plan Colombia' when all focus was on security issues, illegal mining started to thrive and became an important source of income for illegal groups. Moreover, 'El Plan Colombia' intensified the threat of criminal gangs. From 2003-2006, 30,000 men demobilized from paramilitary groups and 15% of these fighters became involved in criminal gangs which focused on drug trafficking and extortion.[8] As a result of this increased criminal activity and mining, the Colombian government authorized the use of air raids against them.

[1] https://www.bbc.co.uk/news/world-latin-america-35491504
[2] https://witnessforpeace.org/15-years-later-the-great-success-of-plan-colombia/
[3] Ibid.
[4] Ibid.
[5] Ibid.
[6] Ibid.
[7] https://www.bbc.co.uk/news/world-latin-america-35491504
[8] https://www.bbc.co.uk/news/world-latin-america-35491504

One of the main objectives of 'El Plan Colombia' was to disrupt and reduce the drug trade in Colombia. The Colombian government planned to reduce the number of coca crops in order to reduce the overall amount of cocaine being produced in Colombia. According to the US non-governmental organization, Washington Office of Latin America (WOLA), 'El Plan Colombia' helped to aerially fumigate more than 1.6 million hectares of Coca plants in the country.[9] A consequence of this aerial fumigation was that Colombia's population was in danger because glyphosate, a chemical used in the aerial fumigations, is a carcinogenic substance. Furthermore, according to WOLA, the aerial fumigation strategy didn't even work and land that was cultivated with coca increased from 48,000 to 69,000km^2.[10] In 2015 Colombian security forces seized 252 tonnes of cocaine, highlighting the fact that 'El Plan Colombia' failed in its principal objective of reducing the amount of cocaine produced in Colombia. Furthermore, Colombia has become the world's leading producer of coca. Diana Rojas stated that, 'The plan has made drug trafficking fragmented, making it harder to fight against it.'[11]

In conclusion, 'El Plan Colombia' has failed in its main objective, to reduce the amount of cocaine being trafficked to the US from Colombia, and as a result it has cost the US government over $10 billion in military aid. 'El Plan Colombia' hasn't come close to disrupting the drug cartels because Colombia has become the largest producer of cocaine in the world, thus rendering the billions of dollars the US government invested into the Colombian counter-narcotic divisions ineffective. Furthermore, 'El Plan Colombia' has created many human rights violations and caused the Colombian people to become victimized. This war has caused more than 220,000 deaths over the last five decades and this 'democratic security' offensive has caused more than 7 million people to be displaced.[12] Moreover, while 'El Plan Colombia' has created peace between FARC and the Colombian government, it has left Colombia with over 11,000 casualties due to Landmines.[13] Although 'El Plan Colombia' succeeded in creating peace, it has left Colombia in difficulties and in need of serious aid.

Bibliography

Cooper, M. (2001) 'Plan Colombia:wrong issue, wrong enemy, wrong country', at https://www.thenation.com/article/plan-colombia/ Date Consulted: 6/7/19

Cosoy, N. (2016) 'Has Plan Colombia really worked?' at https://www.bbc.co.uk/news/world-latin-america-35491504 Date Consulted: 8/7/19

Encyclopaedia Britannica. 'Andrés Pastrana Arango, President of Colombia', at https://www.britannica.com/biography/Andres-Pastrana-Arango#ref1074318 Date Consulted: 7/7/19

History.com. (2019) 'History of Drug Trafficking', at https://www.history.com/topics/crime/history-of-drug-trafficking Date consulted: 23/08/19

Miroff, N. (2016) 'The staggering toll of Colombia's war with FARC rebels, explained in numbers ', at https://www.washingtonpostss.com/news/worldviews/wp/2016/08/24/the-staggering-toll-of-colombias-war-with-farc-rebels-explained-in-numbers/ Date Consulted: 23/08/19

[9] https://www.bbc.co.uk/news/world-latin-america-35491504

[10] Ibid.

[11] Ibid.

[12] https://www.washingtonpost.com/news/worldviews/wp/2016/08/24/the-staggering-toll-of-colombias-war-with-farc-rebels-explained-in-numbers/

[13] Ibid.

Taylor, L. (2016) '15 Years Later: The 'Great Success' of Plan Colombia', at http://upsidedownworld.org/archives/colombia/fifteen-years-later-the-great-success-of-plan-colombia/ Date Consulted: 6/7/19

Washing Post Editorial. (2016) 'Success in Colombia', at https://www.washingtonpost.com/opinions/success-in-colombia/2016/02/14/e8ff53f2-d0f5-11e5-abc9-ea152f0b9561_story.html?noredirect=on&utm_term=.845ab62cb5c5 Date Consulted: 10/7/19

Volckhausen, T. (2016) *15 Years of Plan Colombia: Victories and Failures* https://colombiareports.com/plan-colombia-victories-and-failures-after-15-years/ Date Consulted: 10/7/19

The Catalan independence referendum

Henry Collins

The Catalan independence referendum of 2017 was a vote held in October of that year in the Spanish autonomous community of Catalonia. It was called by the government of the region and asked Catalan voters their opinion on the formation of Catalonia as a sovereign state. Even before the referendum took place, it was declared illegal in September 2017 by the Spanish government, on the grounds that it breached the Spanish Constitution. Nevertheless, the vote proceded and the pro-independence side won.

The vote was the result of an increasingly assertive call for independence by modern Catalonian political parties, stimulated largely by two major factors. Primarily, following the Spanish financial crisis, nationalist politicians in Catalonia successfully redirected popular anger at austerity towards the Spanish government in Madrid. Moreover, in Barcelona in 2010, Spain's constitutional tribunal rejected parts of a new statute that would have given Catalonia more autonomy. Globally, these provocations coincided with the cases of Canada-Quebec and the United Kingdom-Scotland – in which governments recognized the democratic principle as the essential foundation of decision-making – which roused pro-independence Catalans. When examining the complexities of the Catalan referendum, the picture that emerges is one of an unresolved, entrenched confrontation between the Catalan and Spanish national projects. Pro-independence Catalans claim that a vote on the matter would be entirely within the basic principles of democracy, the principles outlined in Article 1 of the Constitution. The Spanish government, however, refers to article 2 of the Constitution, which states that the constitution is based on the 'indissoluble unity of the nation'. Thus, the government argues that any referendum which aims to break up the nation can have no legal authority. The arguments of both are constitutionally founded yet contradict each other, producing a political deadlock.

The central government founded its argument for the illegality of the referendum on the Spanish constitution, which was written in 1978. The constitution doesn't explicitly allow a referendum where one autonomous region of Spain can decide by itself to break away from the nation. Following the crucial articles, 1 and 2, Catalonia doesn't exist as a nation with the right to decide its own constitutional future; rather, it exists as part of the 'indivisible homeland of all Spaniards'. Spain is a single 'demos' formed by 'all Spaniards'; the Catalans are regarded as a part of that single demos and this automatically deems any attempts to hold a referendum on self-determination in Catalonia illegal. Accordingly, for a legal referendum to take place, either the Spanish parliament would have to change the constitution, or if there was no reform of the constitution, the entire Spanish electorate would need to be consulted on the separation of Catalonia from the nation state. Such a referendum would still require the consent of the central government and must be voted on by all eligible to vote. Thus, the government and Mariano Rajoy argued that Puidgemont, then President of the government of Catalonia, acted illegally when he attempted to force through first the referendum and then the independence of Catalonia.

The state's argument was strengthened further by article 149.1.32 of the constitution, which covers the constitutional regulation of referendums. In particular, this states that only the central state is

competent to authorize 'popular consultations through the holding of referendums'. In other words, only the national government can decide whether a referendum can be held. The national government finds additional support for their position in the Judgement of the Constitutional Court (JCC) 103/2008 – the case of the President of the Government against the Basque Parliament – which found the 'popular consultation for the purpose of ascertaining public opinion in the autonomous community of the Basque country on commencing negotiations for achieving peace and political normalization' to be unconstitutional. Certainly therefore, the constitution does not provide the possibility of calling a referendum by which the citizens of Catalonia alone could legally decide on the independence of the territory. Even by the statute of Autonomy of Catalonia, the referendum is manifestly illegal, because the 'Law of juridical transition and foundation of the republic of Catalonia', which was approved in a parliament session on 6th September 2017, cannot stand. This is because the law detailed that the 'independence would be binding with a simple majority, without requiring a minimum turnout' yet explicitly the Statute of Autonomy for Catalonia states that a two-thirds majority, 90 seats, in the Catalan parliament is required to permit any change to Catalonia's status.

An additional factor was the conduct of the referendum itself: the adverse circumstances in which it was held meant that international legal standards for the holding of referendums were not met. The police had been ordered by the Catalonian High Court to try to prevent the referendum, and during the process of the vote the National Police and Civil Guard used force to prevent voters going to the polls. The International Limited Observation Mission (ILOM) highlighted that 'because of the adverse circumstances under which the event took place . . . the referendum could not comply with key international standards.' Exemplifying this is the statement by the Crisis Assessment and Treatment Team (CATT) that 'In the face of external interference there were improvisations and last-minute changes to the voting process that were not always consistent across Catalonia or with what was in the law or in the manual.' Organizers of the referendum were under threat of arrest and needed to remain discreet in their preparations: this gave rise to issues of transparency that invalidated the vote.

Thus, in their preliminary reports, all international observers seemingly concluded that the referendum was illegal.

Nonetheless, those arguing in favour of the Catalonian Independence referendum also refer to the Spanish Constitution when making their case. Article 1.1 states that 'Spain is established as a social and democratic state, subject to the rule of law, which advocates as the highest values of its legal order the following: liberty, justice, equality and political pluralism.'

This establishes the principle and values of democracy. Further, Article 92 of the Constitution states that '1. Political decisions of special importance may be submitted to all citizens in a consultative referendum. 2. The referendum shall be called by the King at the proposal of the President of the Government, following authorization by the Congress of Deputies. 3. An organic law shall regulate the terms and procedures for the different kinds of referendum provided for in this Constitution.' Thus, the principle that difficult questions can be put to the people and their voice be heard is enshrined in the constitution. Further legislation, in the form of the Catalan Act which covers popular consultations by referendum in the autonomous region of Catalonia, states that Catalan citizens can vote on political issues of particular importance in the scope of the powers of the Generalitat (regional government).

The 1978 constitution is supposed to offer a flexible outline where both the 'indissoluble unity of the Spanish nation' and the 'provision for the right to autonomy of nationalities' in Article 2 must be accepted. This pluri-national constitutional understanding of the state is prevalent in Catalonia and a few other autonomies. Therefore, nationalist leaders there read the Spanish authority's persistent restrictive interpretation of the agreement to be a blatant violation of the constitution to the authorities of Catalonia. The democratic principle was not being upheld (as was seen in 2014, when the Spanish government banned even a non-binding vote on Catalan self-determination). Thus, political leaders felt enabled to hold the referendum unilaterally, without state interference. Perhaps this was more an emotional response to the spirit of the Constitution than a strictly legal response.

Article 92 and The Catalan Act allow only for Advisory Referendums. The outcome of any such referendum cannot have directly effective legal consequence, but in effect it would be unconstitutional and against the values laid out in Article 1 of the constitution not to listen to the referendum. (This article is particularly significant as essentially it informs the interpretation of the rest of the constitutional text.)

Another factor that mitigates the illegal conduct of the referendum is that all international observers agreed that those involved in the preservation of order attempted to their utmost ability to comply with international standards. An international parliamentary delegation observed that 'as far as the organization of polling stations is concerned . . . the process was prepared thoroughly and in agreement with the existing legislation', and 'those who worked in the polling stations did so in good faith, and we saw no sign of attempts to manipulate the vote'. The ILOM acquiesced that 'polling staff performed to the best of their ability in trying to cope and in trying to follow electoral procedures.' The situation was epitomized in one statement: 'the democratic process was threatened but it was not destroyed.'

Ultimately, the latent illegality of the process was countered in the eyes of Spaniards and the international community by the pervasive repression of the Spanish authorities and their disregard of civil rights obligations. Strikingly, it was claimed that Catalan voters were subject to 'a degree of force never before seen in a European member state' and this transformed the referendum into an act of resistance and desire to be heard. It becomes trivial for the national government to mention the 'low' 42% turnout when riot police violently prevented voters from reaching ballot boxes. Generally, external politicians refrained from commenting on the issue; however, the images of human rights abuse published by the media made the referendum an increasingly international issue.

Article 155 of the Spanish Constitution proved problematic in this context. Article 155 states that 'If an Autonomous Community does not fulfil the obligations imposed upon it by the Constitution or other laws . . . the Government, after lodging a complaint with the President of the Autonomous Community and failing to receive satisfaction therefore, may, following approval granted by an absolute majority of the Senate, take the measures necessary in order to compel the latter forcibly to meet said obligations, or in order to protect the above-mentioned general interests.' Both the procedure and extent of the methods used to apply Article 155 have been questioned however by commentators, who asks how compatible this article is, if it almost permits authoritarian behaviour that is against the democratic framework of the Constitution.

The application of these methods has already resulted in challenges before the Constitutional court. Nevertheless Article 8 states that 'the Army's mission is to guarantee the sovereignty and

independence of Spain, to defend its territorial integrity and the constitutional set-up'. Therefore, inevitably constitutional conflict arises again.

The Spanish authority's actions in the period leading to the referendum, and their responses to developments the following day, were potentially incompatible with the legal and constitutional framework of Spain; this includes Spain's international human rights obligations. Primarily, the government authorities raised grave concerns with regards to freedom of expression, assembly, association and due process in their measures to try and forcefully stop the referendum from proceeding naturally. Moreover, images of Catalan citizens peacefully attempting to vote and being greeted by extremely forceful police have been strongly criticized by human rights organizations as negligence by the Spanish government. These actions coincide with the measures realised following the referendum which are comparably legally ambiguous: for example, local pro-independence leaders Jordi Sanchez and Jordi Cuixart, were immediately imprisoned without bail; later, they were charged with sedition. These actions are certainly legally inconsistent in their degree.

Ultimately, the calling of a future 'popular consultation' over the commencement of the constitutional reform process leading to the establishing of the sovereign state of Catalonia is clearly possible within the guidelines of the constitution, which are principally democratic. However, the Spanish government, unwilling to risk the 'indissoluble unity of the nation', is prepared – rather undemocratically – to prevent this, as only the central government can authorize such a legal consultation. As the October 2017 referendum was not centrally authorized its illegality is blatant. Nonetheless, preventing the authorization of the referendum could be challenged by the government of Catalonia in court, as explicitly unconstitutional and against the basic principles of Article 1. Certainly, there are multiple, less rigid ways of interpreting the constitution, which is being purposely adhered to by the government, for its own benefit.

The response of the Spanish authorities, similar to the actions of the pro-independence movement, has failed to maintain correct legal procedure. Their overly forceful response reflects the increasing polarization of the nation state. In the face of rising tension, it is clear that negotiations between the Generalitat and Spanish authorities must take place and regulatory changes must be carried out to resolve the political standstill.

Bibliography

Website links

http://idpbarcelona.net/docs/blog/legality_referendum.pdf

https://en.wikipedia.org/wiki/Catalan_declaration_of_independence

https://www.economist.com/the-economist-explains/2017/09/26/why-the-referendum-on-catalan-independence-is-illegal

https://en.wikipedia.org/wiki/Law_on_the_Referendum_on_Self-determination_of_Catalonia

http://theconversation.com/self-determination-is-legal-under-international-law-its-hypocritical-to-argue-otherwise-for-catalonia-86558

https://www.politico.eu/article/catalonia-independence-nationalist-government-is-a-threat-to-europe-referendum/

https://www.bbc.co.uk/news/business-45723474

https://www.euppublishing.com/doi/full/10.3366/scot.2018.0231

https://www.bbc.co.uk/news/world-europe-29478415

https://www.tandfonline.com/doi/abs/10.1080/23269995.2015.1083326?tokenDomain=eprints&tokenAccess=yHGSIUQJcY7GdQhsurg7&forwardService=showFullText&doi=10.1080%2F23269995.2015.1083326&doi=10.1080%2F23269995.2015.1083326&journalCode=rgld20

https://www.cambridge.org/core/journals/european-political-science-review/article/economic-expectations-and-support-for-secession-in-catalonia-between-causality-and-rationalization/B1621ED712D460228A4FF6ED95ABD975

http://www.catalannews.com/politics/item/catalan-poll-80-want-a-mutually-agreed-independence-referendum-with-spain

https://www.researchgate.net/profile/Yanina_Welp/publication/321934266_The_Catalan_Independence_referendum_An_assessment_of_the_process_of_self-determination/links/5a49fc16458515f6b0591af8/The-Catalan-Independence-referendum-An-assessment-of-the-process-of-self-determination.pdf

https://books.google.co.uk/books?id=uozbBAAAQBAJ&pg=PA152&lpg=PA152&dq=jcc+103/2008&source=bl&ots=Ivhsz5wVGI&sig=ACfU3U1P-QShvv9sRUIGEAH3PfPs5SDZ0Q&hl=en&sa=X&ved=2ahUKEwieu5aN8qzkAhWnsKQKHRWvBgMQ6AEwAnoECAkQAQ#v=onepage&q=jcc%20103%2F2008&f=false

https://www.bbc.co.uk/news/world-europe-41677911

https://www.independent.co.uk/news/world/europe/catalonia-independence-leaders-jailed-spain-judge-sedition-jordi-sanchez-jordi-cuixart-latest-news-a8004001.html

Books

Castro, L. ed. (2013) *What's Up with Catalonia*? Catalonia Press

To what extent does race affect the political and economic state of Malaysia?

Samuel Chan

When people hear about Malaysia, they may often think about the tropical country located in southeast Asia with balmy weather, breath-taking landscapes and mouth-watering food, making it the perfect tourist destination. But beneath the sandy beaches, sprawling cities and emerald rainforests lies a dark history and culture of social struggles that shaped the political and economic stages of Malaysia into what it is today.

Malaysia has only been brought into the political spotlight twice in the last few years, but for rather infamous reasons. One of them is the 1MDB scandal, considered one of the biggest financial fraud schemes in history, where funds of up to $4.5 billion for a government development organization were put into personal accounts of former Prime Minister Najib Razak and other associates of him and 1MDB. The second time was when 92-year-old former Prime Minister Mahathir Mohamed won the 14th Malaysian general election in 2018, ousting Najib Razak, and currently making him the oldest serving state leader. There is one prevalent socioeconomic factor in common that these two significant political events: race.

One of the most distinguishing factors of Malaysia is its racial diversity. 62% of the population consists of the local and indigenous Malays, 20.6% Chinese and 5.7% Indian. Four religions dominate the country: Islam, Buddhism, Christianity and Hinduism, but Islam reigns as the official religion of Malaysia with 61.3% of the population identifying as Muslims. Unfortunately, history has proven that with diversity and different races, people are bound to face discrimination. Malaysia, as a melting pot of cultures and ethnicities, is thus doomed to cook up a political and economic state of prejudice. This essay will explore the events and policies influenced by race and the extent of political, economic and societal impact on Malaysian society.

Even before the Federation of Malaya (the region today known as Peninsular Malaysia) gained independence on August 31st, 1957, racial divisions and tensions were prominent in Malaysia. Despite the Malays settling in the area before the Chinese immigrated there, the Chinese and Indians were considerably much wealthier than the Malays. In the late 1800s, British colonizers opened the Federation's doors to Chinese and Indian migrant workers to work in its expanding industries, especially in tin mining, and rubber and palm oil plantations. This allowed these minorities, mainly the Chinese, to earn more income and gain greater control of the Federation's economy. Additionally, the British discouraged the Malays from producing rubber, instead producing only food for domestic consumption. This created a disparity in wealth between the races was passed on through generations. In 1970, the Malays owned about 2.4% of the economy's wealth.

What hit the nail on the head was the May 13th protests, which occurred after 1969 general elections — the first after Malaysia (which includes East Malaysia) gained independence in 1963. As a result of the Malays' main political party losing many seats to the Chinese-majority parties and following the celebration of the Chinese, the Malays violently retaliated. The Malaysian government sought to reduce

tensions between the races and achieve greater national unity; thus, they implemented the New Economic Policy (NEP) in 1971.

The NEP was a 20-year socioeconomic affirmative action plan to eliminate poverty and reduce the disparity between the rich and the poor, namely the Chinese and the Malays respectively. By the end of the policy in the 1990s, poverty was reduced to 17.1%, close to its target percentage of 16.6%, and managed to restructure the economy and redistribute the economy's wealth back to local Malaysians. Foreign ownership had been reduced from 63.6% to 33.9%. The Bumiputera, another term for the indigenous Malays meaning 'sons of the soil', had increased their share of the country's wealth from 2.4% to 19.3% as a result of the policy. An increasingly large proportion of Bumiputeras were moved from less profitable agricultural sector to the middle class, and more were employed in expanding industrial sectors.

However, one of the main downfalls and criticisms of the NEP was the privileged treatment the Bumiputeras received from the Malaysian government in relation to social services and jobs. Developers were required to allocate at least 30% of all Malaysian property to the Malays. There are even exclusive areas of land that can only be purchased by the Bumiputeras, known as Bumi Lots, as well as discounted prices when purchased. The bias towards the Malays meant that no assistance was received by the Chinese or Indian Malaysians. This impaired the poorer minorities, particularly the Indians, as they owned fewer businesses and had less wealth than the ethnic Chinese communities. Despite making up 10 percent of the population, ethnic Indians only owned 1.5 percent of the economy's wealth following the implementation of the NEP, and are among the poorest and uneducated in the country.

One of the most significant effects of this racial divide is the human capital flight of the minorities who feel disadvantaged as a result of the policy's effects in education and employment. Public universities in Malaysia were required to fill at least 60 percent of their places for the Bumiputeras. What may be worse is that if students were accepted based on secondary school grades, only 5 percent of undergraduates would be Malays, meaning universities are producing sub-par graduates to work in the economy. This segregation has also caused indignation among minority communities. A survey conducted in 2017 found that almost half of their ethnic Chinese participants would leave the Malaysian economy, particularly those with higher education, and it is estimated that about 1 in 10 Chinese Malaysians work abroad. More educated and promising workers feel that they have fewer opportunities to earn a higher income, and so migrate and find work elsewhere, with feelings of marginalization discouraging the minorities who still are in Malaysia. This 'brain drain' and the production of unemployable graduates has overall reduced the skill and size of the Malaysian labour force, which has possibly hindered long-term productivity and growth for the economy.

As briefly suggested before, Malaysian political parties are also mainly separated by race, and rely on racial segregation in order to gain support. The Barisan Nasional (BN) coalition, which governed Malaysia for more than six decades after independence, often relied on ethnic Malays to support and keep them in power. This coalition is formed by three parties: the United Malays National Organization, the Malaysian Chinese Association and the Malaysian Indian Congress. Each was formed to protect the interests of the Malays, Chinese and Indians respectively. Already, in the parties that have governed Malaysia since its independence, there is a pronounced racial divide dictated by racial values and opinions. In the most recent election, 95 percent of Chinese voters and 60 to 70 percent of Indian voters voted for Pakatan Harapan, BN's opposition in the election.

In particular, during the 14th general elections in 2018 in which the BN coalition was voted out of power, UMNO had attempted to appeal to the Malays and split the electorate into the Bumiputeras and the Chinese, Indians and non-Muslims in order to secure enough votes. Former Prime Minister Najib Razak has put forward initiatives, such as the Bumiputera Economic Empowerment Programme, which have been said to have been an attempt to sway votes towards them. Experts say that the Pakatan Harapan coalition relied on Mahathir Mohamad's influence to steal some Malay votes, especially in rural areas. This was because he was a strong advocate for Malay rights and Islamic values during his first premiership, winning the approval of many Malays. Among other factors, such as a change in attitudes of the young and the growing and apparent corruption of leaders, the opposition was able to conquer the odds and win the election.

There is no doubt that there are also other factors which may influence the political and economic state of Malaysia. ASEAN has assisted through alleviating the political tensions between Malaysia and other southeast Asian nations, such as during Singapore's secession from Malaysia, and contributed quite heavily towards trading, investment and development in the country. However, this arguably had a greater influence on Malaysia's relations with other neighbouring countries, rather than the impact on the domestic society. The words of politicians are far more likely to have a greater impact on the eyes and ears of Malaysians and their attitudes than an organization it's a part of. Corruption has been rampant amongst Malaysian leaders, such as the 1MDB scandal concerning Najib Razak, which has played into the trust of Malaysian citizens into their politicians and leaders. Still, the methods and reasons used to keep these politicians in power is primarily because of race. Religion plays quite a similar role as race in Malaysian politics, as the majority of ethnic Malays are Muslims hence politicians will appeal to both factors when garnering support. However, because of the lack of unity in Islam reduces its impact on the political stage, religious matters are more of a 'side effect' of generations of racial politics.

The harsh truth is that race persists as an important factor in Malaysia's society, and not always in a positive manner. It is unfortunately engrained in the minds of Malaysians as a way of life, and the divide between the races will persist. The Bumiputera will continue to benefit from the policies that favoured them, the Indians will stay impoverished without the help of the government, and the Chinese will remain resentful for staying at an economic disadvantage. Though it has left scars in Malaysian society, there may be an optimistic future ahead for the country, displayed by the changes in attitudes of the young Malays, who recognize and are against discrimination and corruption, swaying the votes towards a less race-based Malaysia. Many experts believed that it was impossible to vote out Najib Razak and the 60-year-reigning BN coalition, but it was miraculously done in 2018 in the 14th general elections. After these elections, a primary opposition leader Anwar Ibrahim has been released and is continuing his work in Malaysian politics. He was jailed for sodomy under the rule of Najib Razak and with the support of Mahathir Mohamed, the man who now advocated for his release.

Moreover, the racial diversity and differences do not have to be a burden nor a limitation, but could be used as an advantage, to adapt and drive the Malaysian economy to grow. Malaysia is renowned for its culinary eminence, for its mix of flavours and richness derived from different cultures. The same could be used for its economy and its political state. Malaysia continues to live quite harmoniously among the races, and it is not uncommon for one to know many languages and converse with other races. Each culture, race and person offers a different perspective, experience and skillset that can meld and create a national unity unlike any other country. Harnessed positively, Malaysia's unique diversity could build

a prosperous kingdom from the rubble of its disunited ruins. It will be difficult and complicated to undo the generations worth of systematic race-based attitudes, but there's hope for a better, brighter future for Malaysia that requires persistence, integrity, confidence and unity to achieve it.

Bibliography

Brant, R. *Malaysia's Lingering Ethnic Divide*. news.bbc.co.uk/2/hi/asia-pacific/7121534.stm. Date Consulted: 21 August 2019

Brant, R. *Malaysia Questions Ethnic Preferences*. news.bbc.co.uk/2/hi/asia-pacific/8165746.stm. Date Consulted: 16 August 2019

Chua, L. (2016) *Christianity of Culture: Conversion, Ethnic Citizenship, and the Matter of Religion in ... Malaysian Borneo*. New York

Central Intelligence Agency. *The World Factbook: Malaysia*. cia.gov/library/publications/the-world-factbook/geos/my.html. Date Consulted: 23 August 2019

CNA Insider. *Malaysia General Election: The Race Card | Insight | CNA Insider*. www.youtube.com/watch?v=N-6EylybOc8. Date Consulted: 21 August 2019

The Economist. *Malaysia's Ruling Party May Be Gone, but Its Racial Policies Survive*. www.economist.com/asia/2018/06/07/malaysias-ruling-party-may-be-gone-but-its-racial-policies-survive. Date Consulted: 15 August 2019

Financial Times, director. *1MDB Scandal: the Malaysian Fraud Explained*. *YouTube*, YouTube, 18 Dec. 2018, www.youtube.com/watch?v=2WV3sIcWNxE. Date Consulted: 21 August 2019

Fuller, T. *Criticism of 30-Year-Old Affirmative-Action Policy Grows in Malaysia*. www.nytimes.com/2001/01/05/news/criticism-of-30yearold-affirmativeaction-policy-grows-in-malaysia.html. Date Consulted: 18 August 2019

Goh, M. *Educationists in Malaysia Concerned That NEP May Cause Race Polarization*. web.archive.org/web/20071012140204/http://malaysia-today.net/blog2006/newsncom.php?itemid=886. Date Consulted: 22 August 2019

Loanstreet. *4 Bumi Attributes You Should Know About Malaysian Properties*. loanstreet.com.my/learning-centre/bumi-land-jargons-explained. Date Consulted: 20 August 2019

Means, G. (1978) 'Public Policy Toward Religion in Malaysia', *Pacific Affairs*, vol. 51, no. 3: 401.

Milne, R. S. (1976) 'The Politics of Malaysia's New Economic Policy', *Pacific Affairs*, vol. 49, no. 2: 235–242.

Malaysia Today. *The NEP - The Good and The Bad*. *Malaysia Today*, www.malaysia-today.net/2012/06/21/the-nep-the-good-and-the-bad/. Date Consulted: 17 August 2019

New Straits Times. *Success of the New Economic Policy*. www.nst.com.my/news/2015/09/success-new-economic-policy. Date Consulted: 20 August 2019

Rahim, ASA. (2014) 'A Critical Assessment the Contribution of the Agriculture Sector in the Growth of the Malaysian Economy', *Unpublished Article. Retrieved from http://economics.dstcentre.com/on* 16 :1-6 Date Consulted: 17 August 2019

Razak, A. *May 13, Never Again: The 1969 Riots That Changed Malaysia*. pages.malaysiakini.com/may13/en/. Date Consulted: 20 August 2019

Sukumaran, T. *Is Malaysia Race-Based Politics over? By-Election Offers Clue*. www.scmp.com/week-asia/politics/article/2158098/has-malaysia-moved-past-race-based-politics-election-will-give. Date Consulted: 22 August 2019

Sukumaran, T. *What's Causing Malaysia's Ethnic Chinese Brain Drain*?. www.scmp.com/week-asia/politics/article/2095012/whats-causing-malaysias-ethnic-chinese-brain-drain. Date Consulted: 22 August 2019

Singapore Business Review. *Workers' Brain Drain Could Lag Malaysian Economy*. sbr.com.sg/economy/asia/workers-brain-drain-could-lag-malaysian-economy. Date Consulted: 15 August 2019

UK punk and politics 1975 – 1984

Wolfgang Boettcher

INTRODUCTION

For some, punk rock is associated with recklessness, disorder, violence and often, mistakenly, racism. *The Mirror* newspaper referred to punk in a headline as 'filth and fury'.[1] Others argued that punk rock was the epitome of a unique working-class ethos and creativity – a movement built on DIY ethics, eliminating inequality, anti-racism and the hope for a better world. This dissertation seeks to evaluate the political ideology of punk by examining scenes, subgenres and, above all, the music giving rise to the ideology. Primary and secondary sources will be examined and critiqued, revealing punk as a far more considered and sophisticated ideology than tabloid headlines might otherwise suggest.

In 1975, the Sex Pistols formed, bringing together ideas of lare 1960s and early 1970s American garage bands, forming a new aggressive breed of rock'n'roll – punk Rock. While the influencp of the Sex Pistols is often debated, the band is regarded by many as the spark that ignited the London Punk explosion in 1976. Inspired by their success, many groups incorporated their own controversial themes into music adopting an increasingly abrasive, angry tone, which is a trademark of the genre. Understandably, punk gained wide recognition as a violent and disorderly movement. In this essay, I argue that punk is a thoroughly misunderstood genre, inherently revolutionary and overtly anti-establishment. In order to do this, I intend to investigate specific examples and expressions of the punk movement, especially 'London '77'and 'Anarcho-Punk' that blossomed from the original unk explosion.

SECTION 1 – UNITED KINGDOM, 1975-79

'I don't even know what tomorrow will bring
But let me tell you, having no future is a
terrible thing
Standing around just waiting for a career
I don't take drugs and I don't drink beer
But this I say
We have the right to work'

'Right to Work', Chelsea, 1977

[1] Miller, Russell. 'Who Are These Punks?' *Daily Mirror*, December 2 1976, p9.

In order to make sense of the key beliefs of British Punk, one must first understand the political and social discontents of the 1970s. These discontents gave birth to the movement and appeared in two different forms: (1) frustrations with the musical status quo; and (2) outrage at the lack of opportunities for the young generation.[2]

The musical status quo. The primary inspiration for the birth of punk came from the state of mainstream pop music. The record industry was stagnating. Professional musicians no longer pushed music boundaries, but stuck to 'tried and tested' formulas in the name of profits and record deals. Eriksen argues that in an '. . . attempt to justify their own drift away from the raw energy and youthful exuberance of early rock'n'roll . . . many rock stars produced ghastly hybrids of pretentious lyrics'.[3] mainstream music was increasingly commercial, elitist and condescending to the 'faceless crowd'. The punk attitude to the band Pink Floyd illustrates this. Punks found their records to be overproduced and lacking the raw energy that appealed to the new generation. Johnny Rotten and Steve Jones of the Sex Pistols famously wore Pink Floyd T-shirts altered to state 'I HATE PINK FLOYD'.

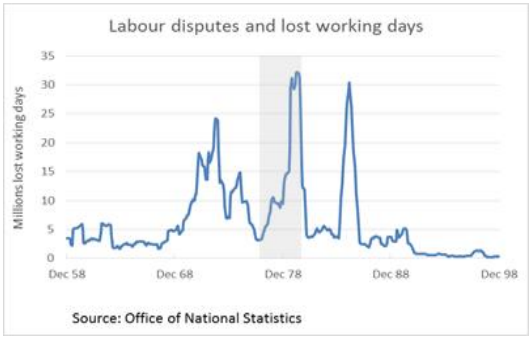
Johnny Rotten and Paul Cook from the Sex Pistols wearing the famous '*I Hate Pink Floyd*' shirt.

The youth of the 1970s tired of sophisticated and pretentious idea of 'high art'. Record companies, owing to lack of finance, would not take risks with lesser-known bands or anyone with radical new ideas. This complacency prevented new bands from emerging. Frustrations from this musical status quo led to a new type of band. Eriksen describes this as the 'ideology of the garage band' built upon DIY ethos to counter lack of support from the music industry.[4]

Lack of opportunity. Discontent with the musical status quo contributed significantly to the birth of punk, but lack of social and economic opportunity for young people was of critical importance. The music industry was a microcosm of broader social issues of the 1970s. Eriksen argues that punks were 'consciously aware of the extreme contradictions existing in modern society' and that the genre is built around 'the angry protest' of the youth population.[5] The lack of opportunity, an abundance of 'dead-end' jobs and the infamous 'Winter of Discontent (1978-79)' contributed to a rise in nihilistic beliefs.

[2] Ibid. sec. 13, para. 5.
[3] Ibid. sec.13, para. 5.
[4] Ibid. sec. 13, para. 6.
[5] Ibid. sec.13, para. 11.

Punk became an outlet for these frustrations. These frustrations are evident in the official labour disputes data during this period.[6]



This chart illustrates spikes in labour disputes and lost working days in the 1970s, showing socio-economic discontent. The years 1976-82 are highlighted in grey. This spike in labour disputes lines up with the birth and rise of punk.

Office of National Statistics

The key question raised at the outset is whether British punk originated purely from musical frustration or a deep-rooted frustration with the social and political establishment. The evidence suggests that punk developed first from a desire to push musical boundaries without the restrictions of the record industry, but, as time progressed, working class socio-economic struggles materialized, found expression in the lyrics and music, leading to the politicization of the entire genre.

SECTION 2 – ANARCHO-PUNK, 1977-84

By 1977, interest in anarchism became apparent in the London Punk scene. Songs like 'Anarchy in the UK' by the Sex Pistols introduced to the movement this relatively unknown ideology. However, the Sex Pistols were by no means anarchists. Bands like the Sex Pistols in the mid-70s merely appropriated anarchist imagery to generate controversy and illustrate ideas of 'hedonistic' freedom present in the scene.[7] It wasn't until 1977, when Penny Rimbaud and Steve 'Ignorant' formed the band 'Crass', that anarchist ideology found a permanent home in punk. 'Crass' and its feminist counterpart 'Poison Girls', were some of the first bands to explore true, political anarchism in their music. This marked the birth of a yet another subgenre of punk – anarcho-punk.

In 1910, Pyotr Kropotkin, a Russian revolutionary philosopher, considered by many as the father of anarcho-communism, defined anarchism as:

> *'. . . the name given to a principle or theory of life and conduct under which society is conceived without government – harmony in such a society being obtained, not by submission to law, or by obedience to any authority, but by free agreements concluded between the various groups, territorial and professional, freely constituted for the sake of production and consumption, as also for the satisfaction of the infinite variety of needs and aspirations of a civilized being.'* [8]

[6] Office of National Statistics, 'Labour Disputes in the UK: 2017, Table 1: Labour Disputes Annual Estimates.' May 30, 2018.
[7] Cross 2010.
[8] Kropotkin 1910: 1.

For punks, anarchism is the abolition of all unnecessary, and unjust, hierarchies and we can begin to understand why the punk scene so wholeheartedly adopted the ideology. Anarcho-punk emerged directly from the discontent of the late 1970s and arose as both a political and musical reaction**.**

Political reaction. In 1979, a conservative government led by Margaret Thatcher was elected offering new hope for the future. When socio-economic conditions failed to improve, many began to doubt the entire system, rather than any single political party. The idea of abolishing the system altogether appealed to large portions of the punk scene. At the same time, the Thatcher administration poured funds into military and police forces and backed US foreign policy ('Cold War Standoff').[9] Cuts were made to the social wage and increasing numbers were 'going on the dole' as job losses accelerated. At the same time, the increasing presence of a 'Nazi fringe' and other far right movements in became of utmost concern to many punks. Anarchism opposes all unjust hierarchies and is inherently anti-racist and anti-fascist. Thus, anarchism was appealing to many people disgusted by the rise of the far-right.

Musical reaction. Punks were also pushed towards anarchism by stagnation within the punk music scene itself. Many were unhappy with the mindless nihilism of the scene. By 1977, some felt the scene to be 'politically sterile' and 'unambitious'.[10] This contributed significantly to the birth of anarcho-punk, as many felt inspired to act through direct action. Many also felt that by 1977, punk had been co-opted by the 'establishment'. In January 1977, 'The Clash' signed a £100,000 record deal with CBS.[11] This was a betrayal of the punk ethos. Cross speaks of how every aspect of the movement had become profit-orientated, from the rise of punk rock 'designer labels' to endless lucrative record deals. Punk was becoming exactly what it set out to protest against! The song 'Punk is Dead' by Crass, released in 1977, summarized discontent many punks felt with the state of the London scene.[12] This song, clearly calls out the Clash for their record deal with CBS as well as the growing focus on fashion, rather than the original DIY ethics promoted at the birth of the movement.

Yes that's right, Punk is dead
It's just another cheap product for the consumers head
Bubblegum rock on plastic transistors
Schoolboy sedition backed by big-time promoters
CBS promote the Clash
Ain't for revolution, it's just for cash
Punk became a fashion just like hippy used to be
Ain't got a thing to do with you or me'

Punk is Dead, Crass, 1977

[9] Cross 2010, sec. 1, para. 2.
[10] Ibid. sec. 5, para. 2.
[11] Ibid. sec. 2, para. 7.
[12] Crass. *Punk Is Dead*, Crass Records, 29 October 1978.

A greater understanding of Crass' overall political message might be grasped by looking at the lyrics of the song 'Big A Little A' released in 1982.[13] The song's structure has three main sections. In each section, Steve Ignorant takes on the character of a different figure of despised authority – God, the Queen and the Prime Minister. These three figures represent the epitome of the status quo, and through satire and parody, Steve Ignorant and Crass illustrate what is problematic about the establishment.

Lyrical Stanzas	***'Big A Little A' by Crass (1982)***
God	*Hello, hello, hello, this is the Lord God, can you hear…* *We'll blind you with morality, you'd best abandon any hope,* *We're telling you you'd better pray cos you were born in sin* *Right from the start we'll build a cell and then we'll lock you in*
The Queen	*Hello, hello, hello, now here's a message from your queen* *As figurehead of the status quo I set the social scene* *I'm most concerned about my people, I want to give them peace* *So I'm making sure they stay in line with my army and police* *My prisons and my mental homes have ever open doors* *For those amongst my subjects who dare to ask for more* *Unruliness and disrespect are things I can't allow* *So I'll see the peasants grovel if they refuse to bow*
The Prime Minister	*Introducing the Prime Sinister… she'll do it with an army* *Who at times of threatened crisis are certain to be there* *Guarding national heritage no matter what or where* *Palaces for kings and queens, mansions for the rich* *Protection for the wealthy, defence of privilege* *They've learnt the ropes In Ireland, engaged in civil war* *Fighting for the ruling classes in their battle against the poor*
The Final Stanza	*If you don't like the rules they make, refuse to play their game* *If you don't want to be a number, don't give them your name* *If you don't want to be caught out, refuse to hear their question* *Silence is a virtue, use it for your own protection* *They'll try to make you play their game, refuse to show your face* *If you don't want to be beaten down, refuse to join their race* *Be exactly who you want to be, do what you want to do* *I am he and she is she but you're the only you.*

[13] Crass. *Big A Little A*, Crass Records, August 1982

These three stanzas demonstrate many of the above-mentioned discontents with society, most notably, the unchecked power of the army and the police to enforce the will of the establishment. The final stanza, however, is the driving message – that we should live independent of the status quo by refusal to cooperate with the establishment, or by direct action to achieve self-determination. Without doubt, anarcho-punk is the most political punk subgenre to emerge from the original movement. It is based upon the fundamental ideas of direct action, DIY ethics and anarchism and thus is inherently political.

SECTION 3 – THE MARXIST CRITIQUES

As well as looking at subgenres, Marxist critiques of the entire punk genre illustrate the extent that punk reflects communist ideology. There are two main strains of communism – the classic (authoritarian) Marxist-Leninist ideology, and the more libertarian forms (anarchism or syndicalism). Evaluation of the views of punk held by 'The Progressive Cultural Association', 'The Communist Party of Great Britain' and the USSR's 'Young Communist League' illustrates the limited extent of punk's connection with radical leftist politics.

The USSR provides the most well-known form of Marxist-Leninist ideology. While the USSR was communist, the attitude towards punk was primarily in line with authoritarianism. The Young Communist League stated in an interview with *Rolling Stone* magazine that:

> *'The music and lyrics of punk rock provoke among the young fits of aimless rage, vandalism and the urge to destroy everything they get in their hands. No matter how carefully they try to clean it up, it will remain the most reactionary offspring of the bourgeois mass culture.'* [14]

Similar to British media, punk is presented as a destructive youth trend and as 'the most reactionary offspring of the bourgeois mass culture'. This negative view stems from punk's rejection of the status quo and 'establishment'. While the USSR's 'establishment' was different from Britain's, it was still a state with repressive institutions that punk openly challenged. The Soviet regime relied on mass state control and obviously opposed any movement that challenged this status quo.

Likewise, the English Maoist PCA (an offshoot of the Communist Party of England) is equally critical of punk.[15] In a statement made to the *New Musical Express* newspaper in 1977, the PCA argued punk was a bourgeois conspiracy to prevent class struggle:

> *'This is part of the entire process that has developed over the last two decades, when pop music has been used as part of an attempt to pacify and disarm the revolutionary sentiment of the youth. In the'6o's there was a growing world-wide anti-imperialist sentiment. It was no accident that the bourgeoisie at this time promoted rock music and through it such trends as 'Flower Power 'and the 'Hippy' movement with their cult of 'peace and love.'* [16]

[14] The USSR's Young Communist League. 'The USSR's Young Communist League on Punk Rock', *Rolling Stone Magazine*, 20 October 1977.
[15] Dancis 1978: 60.
[16] The Progressive Cultural Association. 'Excerpts and a summary of the PCA statement', New Musical Express, 10 September, 1977

Punk was a conspiracy to 'encourage dissent between generations as a way of diverting attention from deteriorating social conditions'. They argued that BBC censorship of punk records was a government '. . . ploy intended to build up punk's image as anti-establishment'. This may seem farfetched, but the PCA's condemnation of punk may be rooted in what Dancis argues is the '. . . the friendly attitude of rival left groups towards the new music', most notably the Communist Party of Great Britain.[17] Unlike the PCA, the Communist Party of Great Britain was staunchly in favour of punk. Anthony Wall, a music critic for the party, stated that punk bands '. . . attack enemies that rock has rarely dealt with previously'. He praised bands like the Clash who used 'their music to protest against the frustrations and conditions that afflict working class youth'.[18] To the Communist Party of Great Britain, punk was a movement that should be supported by all leftist ideologies and was vital in raising class consciousness.

In summary, the compatibility of an ideology with the punk movement relies not merely on economic ideology, but also on the extent of its authoritarianism. It is logical that the PCA and the USSR take negative stances towards punk as these political groups were founded on Marxist-Leninist beliefs and are authoritarian. Likewise, given that punk ideology challenges directly the state, authority and the status quo, it is understandable that *libertarian* socialist organizations would be supportive.

CONCLUSION

The evidence and sources in this dissertation show that punk was not as straightforward as tabloids might have suggested. The movement was not one of mindless violence, aggression and hatred, but rather, a well-considered set of beliefs (with minor differences in ideology across the various subgenres) and a world view that strived for positive social change. This dissertation has three main conclusions – that punk was (and is) inherently anti-capitalist, libertarian and revolutionary:

Anti-capitalism. Punk is anti-capitalist due to the socio-economic circumstances from which it emerged. During the late 1970's and early 1980's, discontent with society was commonplace. Lack of opportunities for young people and unemployment was rampant. Many attributed this to stagnation of capitalism – a stagnation that was also apparent in the music industry. In the eyes of many, mainstream music had become a formulaic, corporate cash grab. Punks also held anarchist beliefs and opposed all unjust hierarchies and authority. Capitalism, by its very nature, relies on hierarchy to function. Hence, punk was anti-capitalist.

Libertarianism. Above all else, punk focused on individual autonomy, anti-authoritarianism and liberty. Punk does not oppose specific economic system, but rather challenges the idea of the state and authority. As a subversive musical movement, punk was critical of any ruling body or establishment, whether was communist or capitalist. By its very nature punk is incompatible with authoritarian regimes of any variety.

Revolutionary. Finally, punk challenges the status quo and is blatantly revolutionary seeking to unite all individuals regardless of race through collective solidarity. Like all subversive art forms, punk represents a musical struggle against authority, unjust social hierarchy and the status quo.

[17] Dancis 1978:60.
[18] Ibid.: 60.

Punk, or subversive art more generally, plays a vital role in our society by encouraging the spread of non-mainstream ideas and brings social discontent into the spotlight. Subversive art opens up a continuous dialogue between all members of any society and maintains a constant, cyclical and revolutionary discourse confronting the status quo.

Bibliography

Chelsea (1977) *Right to Work*, Step-Forward Records, June 1977

The Clash (1977) *White Riot*, CBS, March 1977

Crass (1978) *Punk Is Dead*, Crass Records, 29 October 1978

(1982) *Big A Little A*, Crass Records, August 1982

Cross, R. (2010) 'There Is No Authority But Yourself', *The Individual and the Collective in British Anarcho-Punk,* 4.2 Summer 2010

Dancis, B. (1978) 'Safety Pins and Class Struggle: Punk Rock and the Left', *Socialist Review* 8.3: May-June, 1978, p60

Eriksen, N. (1980) 'Popular Culture and Revolutionary Theory: Understanding Punk Rock.' *Theoretical Review* 18, September-October 1980

Kropotkin, P. (1910) 'Anarchism', *Encyclopedia* Britannica: 1ff.

Laing, D. (1978) 'Interpreting Punk Rock', *Marxism Today*, April 1978: 124

Miller, R. (1976) 'Who Are These Punks?' *Daily Mirror*, December 2, 1976, p9

Office of National Statistics. (2018) 'Labour Disputes in the UK: 2017, Table 1: Labour Disputes Annual Estimates.' May 30, 2018

The Progressive Cultural Association (1977) 'Excerpts and a summary of the PCA statement', *New Musical Express*, 10 September 1977

The Shend. 'Angst and Anarchy, Crass's Penny Rimbaud looks back to 76', *Offbeat Magazine*, Issue #3, p38

The USSR's Young Communist League (1977) 'The USSR's Young Communist League on Punk Rock', *Rolling Stone*, 20 October 1977

What is the value of a state?

Leo Sterz

In this essay I will discuss the aspects of a state which people could argue add value. First, I will outline how we in the UK came to have the system of democracy that we do, then the various types of democracy in Europe. I will go on to discuss the moral framework around which governments could make decisions, and whether this is the correct way to do it. Finally, I will examine how justice is exacted in society, and whether this is of value.

In the UK we have entrusted our government to politicians who make decisions on behalf of the population. An early version of this democratic system – or at least a limit on autocratic power – was first agreed at Runneymede on June 15th 1215, by King John in the Magna Carta, where he was forced to sign away his autocratic power, and henceforth had to consult the rich aristocracy before he could make decisions; he also had to abide by the law like every citizen. John still had powers, unlike our monarchs today, who are only showpieces and sources of revenue. This shift away from a centralized powerhouse can be seen as adding value to the political climate, as it theoretically allowed for a more democratic country. In the UK today we have a representative democracy, also known as an indirect democracy, where elected officials represent a group of people: more specifically the UK is a unitary parliamentary constitutional monarchy. In Switzerland, however, they have a direct democracy, with deliberative and participatory elements; they have more thickly applied referendums compared to the UK. In Switzerland people can apply to 'deliberate' over laws and legislation, campaigning to change them. In the majority of western-style democracies, there is a presidential system of government and a parliamentary one, with a lower chamber such as the House of Commons, which is restrained by an upper chamber. This is a system of polyarchy. In the UK we vote for representatives (MPs), though many would say that they vote for a party. The prime minister is not elected as such, as the President of the United States is elected President, but is the leader chosen by their party and, by convention, chosen by the monarch to form a government. The Weimar Republic, 1919-1933, was arguably one of the most democratic republics in the last century, with universal suffrage, no matter income or sex. It had a parliamentary democracy with a proportionally representative system: this meant that every vote did count; the votes were counted across Germany not just in individual counties. This, however, was also its downfall, as it meant extremists could gain power.

This idea of a democracy is seen by many as valuable but is limited in its scope for collective decision making. First and foremost, the idea of a representative government, or a leader at all, comes from the notion that it is impractical to involve everyone in government. But this is also common sense, as people need to do their jobs, and cannot possibly dedicate sufficient time to finding out enough about politics to make well informed decisions. Making decisions is arguably the most significant responsibility of a government; how they should make these is a crucial question, as well as deciding whether the outcome is moral or not. A utilitarian approach, as outlined by John Stuart Mill, would make the case that a moral decision is one which creates the most happiness for the most people, and Jeremy Bentham's interpretation also takes into account the happiness and wellbeing of animals in the felicific calculus. Another option is duty-based decision-making, where politicians follow their duty to

serve the best interests of the people and can only make decisions which remain within the parameters of their duty. Kant, with his universal maxim (universalizability), also provides a similar decision-making algorithm, which is useful because the maxims avoid prejudice and cannot be changed to fit a situation: they are constants, almost like a constitution, which the United Kingdom does not have. Another possibility is consequentialist decision-making, where the consequences are the most important. Here, the means are not important, as long as the end is beneficial. There are infinite of these algorithms and ultimately formulae for making decisions, but hardly any of them give any direct moral guidance. Morality is essentially relative, as over time morality changes dramatically, and, in a digital age, across a matter of weeks. This simple fact ultimately renders any such decision-making system obsolete, and that is why we have a government that takes on the responsibility of making these decisions morally, and, because humans aren't perfect, some of the decisions made are not necessarily the most moral ones.

Given the discussion in the paragraph above, what is the worth in creating the front of a democratic system, which claims to take ideas from even the lowest echelons of society? And claims that all the decisions made are sensible ones working towards the collective good? In Plato's *Republic*, he talks about his ideal *polis*: a perfect society where everyone works to create the most effective community, by specializing in a certain area. He also talks about a philosopher king, who is the wisest and most intelligent, and can therefore solely make the best decisions for the *polis*; this would also mean that there is no unnecessary time put into deliberating or discussing the validity of a decision. However, some people would argue that this infringes on our free will, and that we should be allowed some say in our politics. However, Plato's reality is not too far from our political system. Firstly, in the current system of government, the average person has very little influence over policy-making, as participatory democracy in the UK is very thinly spread, so people have little direct influence. However, people can increase their involvement, which could be beneficial, as only people who are passionate are heard. However, it also means that people whose political views aren't necessarily the most politically correct can advertise themselves. Secondly, and arguably more importantly, what is the value of our freedom, and do we really have any? A determinist would argue that there is merely an illusion of free will, that we are trains on a track, but that the tracks are invisible, and the decision-making power we think we have is merely the view to the left and right of the tracks. If this is true then it doesn't matter what we do, the outcome will always be the same; all the decisions we make are pre-programmed; all the decisions we make can be predicted. Therefore, it follows that any system of government we have can be as totalitarian as it wants, as it would always be that way.

Justice in society is key and gives any state its value. Some argue that the UK has a well-functioning judicial system and that justice is almost always served. One counter-argument is the number of run-ins we have with the law that actually go to court: hardly any do, because insurance companies, for example, don't want to pay the fees for a lawyer; people also don't want to take the risk of losing, so they settle out of court. There is so little trust in the system of justice that people avoid it at all costs. Just as on the high seas, in court you are in god's hands. This prompts the question: if our system is so broken, what's the point in having it? In la Follette's view, the justice system must be morally justified; it must act as a deterrent, serve to retribute and reform, and can only justifiably deprive someone of liberty. But, because the judicial system is seen as being inconsistent, many would question whether, without reform, it can fulfil any of the tasks outlined above. Then there is the issue of law enforcement: in lots of countries there is the misconception that it is there to preserve the safety of the government and

maintain law and order; but, as Rawls rightly points out, its job is to protect the weak from the state; it is not a tool of the government to limit freedom, but to preserve the rights of all citizens, and in this function it is very important for justice. Prisons are an essential part of the justice system, but the it faces a popular stigma: people view incarceration as a punishment, which it shouldn't be for the people who still have hope of rehabilitation. Prisons should work towards upgrading people socially, not degrading them to something less than human. The prisons in the USA are an example of a system that is overwhelmed and doesn't have the funds or infrastructure to support successful rehabilitation. Hence, the prisons lose their value; they become instead holding cells for people waiting to die. On the subject of death, in some countries the death penalty was and still is a very big part of the justice system. However, the value of this punishment is not always certain: it could be justified as working as a deterrent to criminals, yet in countries that have the death penalty, crime persists, and therefore it could be argued that it has no value in preventing crime, or solving the problems created by crime. Justice in possessions and finances is also important, as some people believe it is the function of the state to redistribute wealth and give to the poor and take from the rich, and that this forms part of justice. Nozick, in *Anarchy, State and Utopia*, says that people are entitled to legitimately acquired natural assets, that justice is entitlement: people are entitled to possessions and earnings as long as they remain within the law whilst acquiring them.

Ultimately the value of a state is clear: it means a society can work more effectively whilst avoiding struggles for power. However, the exacting of punishments in most western democracies, as well as law enforcement, sometimes have questionable value in preventing further crime. Courts are also often seen as ineffective and of little to no value, as people question their ability to pass a true verdict. On the other hand, the way our democracies work is reliable, as long as we stick to one form, and don't mix and match.

nomos . . . physis

Is there life elsewhere in the Milky Way?

Dmitri Pittas

The question of life elsewhere in the universe is cause for speculation and controversy as we have not yet observed the green-skinned, one-eyed aliens of Sci-fi films. As we cannot observe every solar system in our galaxy, we cannot completely rule out the possibility of extra-terrestrial life, however as time goes on with no evidence of this other life, we become increasingly doubtful. Nonetheless, we can attempt to solve this problem via a probabilistic argument, through mathematics, physics, an analysis of Earth's history and how life was able to begin. It is important to understand that the feedback mechanisms I shall discuss later take place over hundreds of millions of years, geological timescales which are unfathomable to the human mind, which has an average lifetime of a mere 80 years. Earth itself was formed 4.56 billion years ago, and the Universe some 13.7 billion years ago.[1] I shall refer to life frequently, and when I do, I refer to life as we know it, with a carbon backbone, which passes all the constraints for something to be categorized as alive on Earth, including movement, sensitivity and reproduction. This is important to our calculations, as it could be possible for life to be formed in another way in which humans cannot comprehend.

Firstly, I shall outline the Drake equation, used for calculating the possibility of intelligent extra-terrestrial life:[2]

$$\mathbf{N = R_* * f_p * n_e * f_l * f_i * f_c * L}$$

- **N** is the number of civilizations in our galaxy with which communication might be possible
- $\boldsymbol{R_*}$ is the rate of star formation in our galaxy
- $\mathbf{f_p}$ is the fraction of stars which have planets
- $\boldsymbol{n_e}$ is the number of planets that could potentially support life per star
- $\boldsymbol{f_l}$ is the fraction of those planets that go on to develop life
- $\boldsymbol{f_i}$ is the fraction of those planets that proceed to develop intelligent life or civilizations
- $\boldsymbol{f_c}$ is the fraction of civilizations that develops a technology to release a detectable signal of their existence into space
- **L** is the length of time for which such a civilization releases detectable signals into space

There are certain values for these that we know already from NASA and the European Space Agency's research, including R_* which is, on average, 2 new stars formed per year and f_p which is 1, so, each star in our galaxy, on average, has at least one planet.[3]

Next we must calculate n_e, by establishing Earth's characteristics throughout its history which made it favourable to life, and the frequency of them all occurring elsewhere in our galaxy. In order to establish

[1] Cox 2014.
[2] Howell 2018a.
[3] Graham87 (n.d.)

the possibility of Earth-like planets forming elsewhere, we must go back to the beginning of the Universe, to the big bang to discover how Earth formed. After the big bang, space started expanding and cooling. Just one second after the big bang, the universe was filled with a mixture of protons, electrons, neutrons, positrons and neutrinos. After 100,000 years, matter cooled to the point that free electrons managed to become entrapped in orbits around positive nuclei, forming hydrogen and helium gas.[4] This gas then formed into clusters which formed galaxies, these subdivided to form the billions of stars observable today.

Through the course of the Milky Way's history, over 100 million red giant stars have formed and exploded converting 2% of our galaxy's hydrogen and helium to form the heavier elements of carbon, oxygen, iron, magnesium, silicon, and more that were required to form Earth, through a process called nucleosynthesis. Nucleosynthesis occurs at high temperatures and pressures in the centres of stars, and new elements emerge from the merging of helium atoms. Three helium atoms merge creating carbon; carbon and helium merges, forming oxygen; two carbon atoms will merge to form magnesium, and so on.[5]

Nucleosynthesis occurred across the galaxy, so there is an abundance of Earth-sized rocky planets. In addition to having a solid and liquid exterior, a habitable planet must be in a habitable zone known as the 'Goldilocks Zone' from its star, just close enough that water cannot freeze, yet far enough that water cannot evaporate.

Further conditions for life include:

- The planet having plate tectonics
- A magnetic field
- Fellow giant gas planets
- Being large enough to maintain an atmosphere of specific composition
- Having a favourable surface temperature

A planet, if it is large enough, can form an atmosphere that has a strong enough gravitational force upon the gases to prevent them from escaping. The velocity of a particle needed to escape Earth's atmosphere is 11.2 km/sec, whilst Jupiter's escape velocity is 60 km/sec, and the moon's escape velocity is just 2.4 km/sec, hence why the moon has no atmosphere because all the gases require less energy to escape. This explains the formation of Earth's and Venus's atmosphere, as they are similarly sized. Earth's magnetic field has countered the stripping of the atmosphere by diverting charged particles from the sun, which are hazardous to life, around the planet.

Earth initially developed an atmosphere very different in composition to the one we have today. Our planet's early atmosphere consisted of mainly carbon dioxide, hydrogen sulphide and methane, with almost no oxygen, due to the nature of oxygen's high reactivity. This favours initial life, as life requires carbon to form, and used the carbon dioxide in the atmosphere to create the first cells whilst oxygen was in fact poisonous to initial primitive life. There is also evidence of liquid water on Earth from as

[4] Sawyer (n.d.).
[5] Tate 2010.

early as 4.4 billion years ago, which means that the surface temperature must have remained within the freezing and boiling points of water, 0°C and 100°C.

Earth has kept this stable climate through three main processes:

- Firstly, through greenhouse gases in the atmosphere, these are gases with three or more atoms in, such as carbon dioxide, water vapour, methane and ozone. These increase the Earth's ability to trap heat, ensuring the temperature is not too cold.
- Secondly, through the 'tectonic thermostat feedback'. This feedback mechanism enhances weathering when carbon dioxide in the atmosphere or temperature is too high, releasing calcium ions into the oceans, leading to removal of carbon dioxide as calcium carbonate, lowering the greenhouse gas concentration. On the other hand, when carbon dioxide in the atmosphere or temperature is too low, less weathering occurs, allowing for a greater build-up of carbon dioxide from volcanoes, increasing the greenhouse gas concentration.
- Finally, the planet's surface reflectivity, represented on a scale called Albedo, affects how much radiation is absorbed from the sun. Earth's Albedo is 0.3, compared to Venus's Albedo which is 0.7. High Albedo lowers the temperature of the planet's surface.[6]

The volumes of the oceans have remained constant over Earth's history, through a balance of removal and addition of water. Water is removed from high in the atmosphere due to ultra-violet radiation which causes the H_2O molecule to split up into hydrogen and oxygen molecules, the hydrogen can escape to space whilst the oxygen is too heavy and slow so reacts with iron, sulphur, or carbon. However, to counter this, water is added to the surface from Earth's interior, via the movement of the plates, and the cracks in the crust, hence the importance of plate tectonics on a planet's habitability. Furthermore, the Earth has a 'water trap', where, as altitude increases, temperature decreases rapidly, down to –60°C where water vapour cannot exist and hence forms clouds preventing the water from being split up by the UV radiation just above the atmosphere.[7] From investigating all these constraints and the data from the Kepler Space Mission, which is attempting to observe and record Earth-like planets in our galaxy, it is proposed that there are approximately 30 billion Earth-like planets orbiting stars, out of the 100 billion stars in the galaxy hence our value for n_e is 0.3.[8]

From here on, all the variables we shall discuss are very uncertain and subject to disagreement. Arguably, the hardest variable to calculate is f_l as we only have one sample of data to investigate, Earth. Life on Earth seems to have arisen as soon as the conditions were favourable, hence implying the number could be close to 1, however this could be an anomaly, we will never know, unless life is found to have arisen on Mars, Europa or anywhere else.

Life seems to have originated from one Universal Common Ancestor (UCA), from which all life since has evolved from.[9] If life forming was common, there should have been multiple lineages from which all life can be linked back to, but there is not, implying that life forming is a rare and uncommon process

[6] Langmuir 1985.
[7] Ibid.
[8] Howell 2018b.
[9] Yonezawa 2010.

to occur. Another theory is that micro-organisms were sent here by a technological civilization on a long-range space craft, in this case Earth would not be an example of a habitable planet from which life could evolve.

The final hypothesis I shall discuss is that life seems to defy the Universal Laws of Thermodynamics, which states that there is an inevitable tendency toward increasing disorder, however life seems to go against these laws, as life is the appearance of order from disorder, hence why life forming may be rare and unique to Earth. This is all speculation of course, and hence our value for the probability of life developing if the conditions are favourable is one of the most uncertain, yet we shall assign a value of 0.5.

Intelligent life is a vague phrase, as a dog, for instance, could be considered intelligent, when compared to a plant. However, intelligent life in this essay refers to a species that can make use of its planets resources and can assert dominance over the planet, as humans have done. Initially, unicellular organisms must have a Carbon backbone to evolve into multi-cellular organisms, as it could be possible for primitive life to form with a Silicon backbone, then for intelligent life to develop, aerobic respiration must occur which requires oxygen from the atmosphere, which is made by photosynthesis. This is important as through aerobic respiration, the cell makes 18 times as much energy from each glucose molecule as anaerobic respiration does, essential for increasing brain capacity. Photosynthesis began around 2.4 billion years ago, meaning intelligent life had 2.4 billion years to develop. One approach to calculating f_i is that out of the billions of species that have lived on Earth, only humans have managed to become intelligent, implying our value for f_i is low. However, there is a trend showing increasing complexity of organisms over time, due to mass extinctions and evolution, indicating that intelligent life was bound to occur.[10] Therefore, our value for f_i is 0.8.

Next is the calculation of f_c. A problem that develops is that other civilizations may use other forms of communication which humans cannot detect, this is a valid argument, however Hydrogen is the most abundant element in the universe, and it is assumed any extra-terrestrial astronomer would be tuned to the '21 cm line' which is the exact frequency of radio waves that Hydrogen atoms emit.[11] There is also the problem that civilizations may be too far away for us to communicate with, which is a likely reason why we have had no contact with extra-terrestrial life so far. Humans have only been releasing detectable signals to space for the last 80 years, so only intelligent life within an 80 light year radius of Earth could have received these signals. It could be that they simply are untrusting, and do not wish to communicate with civilizations on other planets. Therefore, I shall assign a value to f_c of 0.2.

The lifetime that a civilization releases detectable signals into space depends on how rapidly they become extinct, whether by meteorite impact, or lack of self-preservation. Using humans as an example, with the emission of greenhouse gases from the burning of fossil fuels, temperatures may rise so high as to end the human species, in which case the lifetime of communication available would be approximately 150 years. However, if humans do become more ecological, there is no reason why we couldn't live for millions of years more. Consequently, I will state the value of L to be 10^6.

[10] Langmuir 1985.
[11] Cox 2014.

In conclusion, the number of civilizations in our galaxy with which communication might be possible is:

$$2 * 1 * 0.3 * 0.5 * 0.8 * 0.2 * 10^6 = 48{,}000 \text{ civilizations.}$$

This presents a problem called the Fermi Paradox:

> *Owing to these calculations, life in our galaxy should be teeming with life, yet we have seen no sign of it.*[12]

The solution to this could be that life is unique to Earth, and that, as with so much in our galaxy, we just do not know for sure.

Bibliography

Choi, C. (2017) *Our Expanding Universe: Age, History & Other Facts | Space*. https://www.space.com/52-the-expanding-universe-from-the-big-bang-to-today.html. *Consulted: 03/08/19*

(2017a) *Silicon-Based Life May Be More Than Just Science Fiction.* https://www.nbcnews.com/mach/science/silicon-based-life-may-be-more-just-science-fiction-n748266. *Consulted: 09/08/19*

Cox, B. (2014) *Human Universe*. London

(2016) *Universal: A Guide Through The Cosmos*. London

Graham87. (n.d.) *Drake Equation*. https://en.wikipedia.org/wiki/Drake_equation. *Consulted: 04/08/19*

Howell, E. (2018) *Fermi Paradox: Where are the aliens*? https://www.space.com/25325-fermi-paradox.html. *Consulted: 10/08/19*

(2018a) *Drake Equation: Estimating the odds of finding E.T.* https://www.space.com/25219-drake-equation.html *Consulted: 08/08/19*

(2018b) *Kepler Space Telescope: The Original Exoplanet Hunter.* https://www.space.com/24903-kepler-space-telescope.html. *Consulted: 06/08/19*

Langmuir, C. (1985). *How To Build A Habitable Planet*. New Jersey

Sawyer, P. (n.d.) *The Earliest Atmosphere*. http://forces.si.edu/atmosphere/02_02_01.html. *Consulted: 04/08/19*

Tate, J. (2010) *Nucleosynthesis*. https://www.universetoday.com/51797/nucleosynthesis. *Consulted: 05/08/19*

Windley, B. (n.d.) *Geological History of Earth*. https://www.britannica.com/science/geologic-history-of-Earth. *Consulted: 03/08/19*

Yonezawa, T. (2010) *Was the Universal Common Ancestry proved?* https://www.nature.com/articles/nature09482. *Consulted: 11/08/19*

[12] Howell 2018.

The effectiveness of the World Anti-Doping Agency's analytical techniques

Louis Goodwin

On September 27th, 1988, the whole sporting world was sent into shock. Two days earlier, 100,000 people packed into the Jamsil Olympic Centre in Seoul to watch Canadian sprinter Ben Johnson race a world-record 100-metre sprint time of 9.79 seconds, defeating his arch-rival Carl Lewis. However, the spirit of the Olympics was soon torn apart as it was revealed that Johnson had been tested positive for the performance-enhancing steroid stanozolol and had to be instantly deprived of his Olympic gold medal.[1] 31 years later, the World Anti-Doping Agency (WADA) is facing record-high levels of athletes using performance-enhancing drugs in sport. Across almost every sporting discipline, many of the best athletes have turned to these drugs in order to boost their chances of winning major events – and as more money has been put in to develop these drugs, WADA is struggling with the challenge of detecting and preventing the use of these complex drugs.[2] Indeed, many believe that the chemical analytical techniques used by WADA are not sufficient in order to detect many of these drugs and prevent athletes from utilizing them in sport. Others believe that although the scientific tests are increasingly thorough, WADA and the International Olympic Committee (IOC) have to tackle the issue of corruption in international sport and change the attitudes of athletes about taking these drugs in order to fix the now institutional problem of performance-enhancing drugs. This essay will evaluate WADA's scientific processes and determine whether they are effective at detecting and preventing the use of performance-enhancing drugs in sport.

As the threat of performance-enhancing drugs affecting sporting results increases, scientists working for the Anti-Doping Agency have had to continuously develop new technologies in order to make the detection of these chemicals happen more frequently, thus controlling all performance-enhancing drugs used. WADA needs to follow a clear definition of performance-enhancing drugs in order to control their use in sport – indeed, *The American Academy of Pediatrics* wrote in its sporting policy statement that 'a substance should be considered performance-enhancing if it benefits sports performance by increasing strength, power, speed, or endurance (ergogenic) or by altering body weight or body composition'.[3] This definition may be seen as very broad, and hence one can tell that WADA needs to take into account a large range of substances which could affect any of the factors included in this statement. To resolve this issue, WADA has had to create a Banned Substances List so to regulate the use of performance-enhancing drugs in sport.

Since its first publication in 2004, WADA has annually released a new 'List of Prohibited Substances and Methods', containing a broad range of substances which it believes affect sporting ability.[4] In order to test an athlete for performance-enhancing drugs, samples are usually taken from an athlete's urine then tested at one of WADA's thirty-one accredited laboratories around the world. Dr. Alan Brailsford

[1] Montegue 2012.
[2] Pound 2004.
[3] Gomez 2005.
[4] World Anti-Doping Agency 2019.

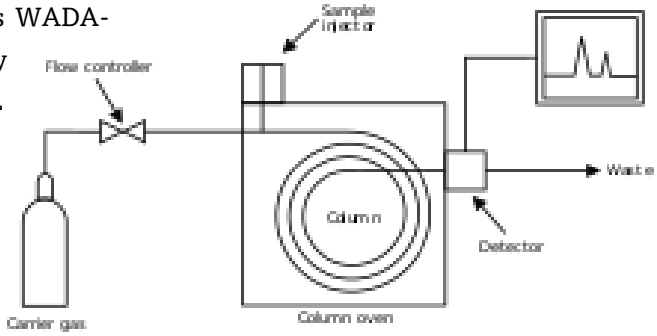


Figure 1: Diagram of a Gas Chromatograph

of King's College London, head of the United Kingdom's WADA-accredited laboratory, tells me that 'drugs are already routinely being tested for at low ng/mL or pg/mL concentrations in urine'.[5] A nanogram per millilitre concentration means that the substances are being tested at the level of a billionth of a gram for each millilitre of urine, and this means that even the smallest amount of a performance-enhancing drug could be detected. The majority of tests used to identify substances in an athlete's urine use gas chromatography in conjunction with mass spectrometry, hence figuring out the exact chemical coordination of the substances used. Gas chromatography is an analytical technique that can identify substances that can be vaporized (converted into a gaseous form) without the substance decomposing. The vaporized gas is moved into the chromatography without reacting by being placed in a carrier gas, which is an inert gas (one that is very unreactive, such as helium), in a process called the mobile phase. The substances and the inert gas travel to the stationary phase, which is a microscopic layer of liquid or polymer inside a metal tubing called the column. The vaporized urine samples are sent towards the column and elute through the stationary phase. Elution is a process in which different compounds pass through the stationary phase at different speeds due to various chemical structures and their abilities to be adsorbed by the stationary phase. This means all the different urine samples can be separated from each other, meaning they can pass a mass spectrometer at different times and hence be identified separately.[6] Although gas chromatography is very effective at separating substances when used with mass spectrometry, it is limited to substances that are very volatile, and hence other drugs may not pass through the gas chromatograph easily. Gas chromatography is used in conjunction with mass spectrometry, which is a very important analytical technique. In mass spectrometry, the gaseous compounds are bombarded with high energy electrons to create positive ions of the same substance, then are accelerated by charged plates in order to pass a magnetic field. Owing to the various masses of the positive ions, each substance deflects the magnetic field at a different projection and will meet an analytical device at a different point – identifying the relative masses of the different substances. With complex organic molecules, the bombardment phase may break up some of the bonds and create molar fragments. Owing to the different breakages that could happen, there will be different readings on the same mass spectrometer, with fragments of different intensities. This is useful, however, since we can find out the total molar mass of the substance (by finding the last major peak on the spectrometer reading) and work out the structural formula.[7] Therefore, one can tell how that in conjunction with gas chromatography, mass spectrometry is able to actively analyse and detect substances in a test for performance-enhancing drugs. As WADA increasingly gets large funding from government agencies, more money can be invested in continuing to develop these state-of-the-art techniques in order to detect and prevent the use of performance-enhancing drugs in sport.

Although the technologies being used in the tests for performance-enhancing drugs continue to develop, much stress has been placed on the actual list of banned substances which claim to enhance

[5] Brailsford 2019.
[6] UCLA 2016.
[7] Curtis 2015.

athletic performance. According to WADA, 'The [Banned Substance] List is updated annually following an extensive consultation process facilitated by WADA', and contains many chemicals which they believe enhance sporting performance. The list includes substances such as anabolic steroids, which are prohibited at all times (in and out of conditions) since any amount at any time period will affect sporting performance – however, many substances are only prohibited during competition (since they have a short-term effect) or only in certain sports (usually drugs that affect concentration, in sports such as shooting).[8] Although WADA claims to detect all of these drugs and states that they are all rightfully on this list, there have recently been many critics of the banned substance list. For example, there have been cases like that of former Liverpool Football Club defender Mamadou Sakho, who is suing WADA for £13,000,000 after they (in conjunction with the Union of European Football Associations) tested him positive for the fat-burning substance higenamine, and subsequently banned him from appearing in the 2016 Europa League Final and hence from being selected for France in that summer's European Championships – however, the banned substance list at the time had not explicitly stated higenamine on it, and so Sakho's ban was incorrectly enforced.[9] Furthermore, although there exists a sport-specific banned-substance list, authorities like the anti-doping manager for the Board of Control for Cricket in India, Dr. Abhijit Salvi, say that 'WADA needs to rethink on the policies and the medicines have to be sports specific rather than having a general [banned substance] list'.[10] Although Sakho and Salvi believe that the banned list is too harsh, there are many who believe that some drugs have had so much financial funding that they could simply slip through the system and not be detected as performance-enhancing. However, Dr. Alan Brailsford told me that 'The list already has phrases such as 'and other substances with a similar chemical structure or similar biological effect(s).'[11] So, in most cases, compounds are already prohibited if not already specifically named.' Therefore, if WADA's funding grows, they will be able to analyse the structure of each compound in the athlete's urine or blood and from there detect any new performance-enhancing drugs. Although the current banned substance list is very large, there is much confusion about how easily a new drug can be placed on the list and be regulated.

Although WADA is developing better technology for detecting the use of performance-enhancing drugs and evolving a detailed banned substance list, many believe that one cannot solve the use of these substances without tackling the environment that causes many athletes to dope. In a conversation at the Royal Society's Summer Science Exhibition, Professor Sue Backhouse of Leeds Beckett University told me that athletes currently live in a 'dopogenic environment', in which they are encouraged or even forced to take performance-enhancing drugs.[12] This environment has been caused by the great scale of competition in professional sport, a scale which causes many to dope so to have a chance of winning their event. For example, Brian Fogel's Oscar-winning documentary *Icarus* revealed the structure of Russian state-controlled doping and persisted that this scheme was forced on every athlete and was overseen by direct associates of President Vladimir Putin.[13] Such large-scale doping means that many athletes do not have a choice but to dope, and hence Backhouse argues that doping should be reframed

[8] World Anti-Doping Agency 2019.
[9] Kirk 2019.
[10] Sen 2019.
[11] Brailsford 2019.
[12] Backhouse 2019.
[13] Fogel 2017.

as a 'consequence of environmental conditions and opportunities and not just personal choice'.[14] This argument is enforced by case studies such as German shot-putter Heidi Krieger, who was doped without knowledge, and was forced to change her gender such were the male characteristics she gained after unknowingly taking masses of steroids and growth hormones.[15] Therefore, it can be argued that the only way to fully prevent doping must be to change the 'dopogenic environment' and to tackle the root causes of taking performance-enhancing drugs.

In conclusion, the World Anti-Doping Agency is currently facing a growing problem of the use of performance-enhancing drugs in sport. With increased funding and the combination of gas chromatography and mass spectrometry, WADA has increasingly been able to detect the use of performance-enhancing drugs – however, although the Banned Substance List is updated annually, there are many legal implications of detecting and managing every substance on the list. Furthermore, it is certain that performance-enhancing drugs cannot fully be controlled if the environment surrounding their uptake is not changed. Hence, although to a large extent the chemical analysis that the World Anti-Doping Agency carries out is effective at detecting the use of performance-enhancing chemicals in sport, the agency itself is not doing enough to prevent the uptake of these drugs and change the increasingly drug-encouraging sporting environment at the moment. I believe that more funding and more action at the sporting grassroots levels is hence needed to prevent the continued use and development of performance-enhancing drugs in all sports.

Bibliography

Backhouse, S. (2019, July 6). *Human Causes of Performance-Enhancing Drugs Uptake*. (L. Goodwin, Interviewer)

Bergan, A. E. (2019, March 4). *Doped for a Gold medal – How Heidi became Andreas*. Retrieved from Anti-Doping World: https://antidopingworld.wordpress.com/2019/03/04/exclusive-doped-for-a-gold-medal-how-heidi-became-andreas/

Bergan, A. E. (2019, March 4). *Doped for a Gold medal – How Heidi became Andreas*. Retrieved from Anti-Doping World: https://antidopingworld.wordpress.com/2019/03/04/exclusive-doped-for-a-gold-medal-how-heidi-became-andreas/.

Brailsford, A. (. (2019, July 22). *WADA Analytical Techniques*. (L. Goodwin, Interviewer)

Curtis, G. (2015). 'Modern Analytical Techniques I', in *Edexcel A-Level Chemistry* (ed. Curtis, G.): 225-236. Hodder Education.

Fogel, B. (Director). (2017). *Icarus* [Motion Picture].

Gomez, J. (2005, April). *Use of Performance Enhancing Drugs*. Retrieved from American Academy of Pediatrics Committee on Sports Medicine and Fitness.: https://www.ncbi.nlm.nih.gov/pubmed/15805399.

Kirk, T. (2019, July 24). *Former Liverpool star Mamadou Sakho sues for £13m over drug test 'that damaged career'*. Retrieved from The Evening Standard Online: https://www.standard.co.uk/sport/football/liverpool/former-liverpool-star-mamadou-sakho-sues-for-13m-over-drug-test-that-damaged-career-a4197221.html.

[14] Backhouse 2019.

[15] Bergan 2019.

Montegue, J. (2012, July 23). *Hero or villain? Ben Johnson and the dirtiest race in history*. Retrieved from CNN: https://edition.cnn.com/2012/07/23/sport/olympics-2012-ben-johnson-seoul-1988-dirtiest-race/index.html.

Pound, R. (2004). 'Performance Cheats: Doping', in *Inside the Olympics* (ed. Pound, R.): 49-86. Vancouver

Sen, A. (2019, August 1). *Prithvi Shaw ban: WADA needs to rethink and make sports-specific policies, says BCCI anti-doping manager*. Retrieved from Hindustan Times: https://www.hindustantimes.com/cricket/prithvi-shaw-ban-wada-needs-to-rethink-and-make-sports-specific-policies-says-bcci-anti-doping-manager-exclusive/story-bFHNi09mrZvzcGnoGHoLMI.html.

UCLA. (2016, Friday 1). *Gas Chromatography Theory*. Retrieved from UCLA Chemistry Website: http://www.chem.ucla.edu/~bacher/General/30BL/gc/theory.html.

World Anti-Doping Agency. (2019). *What is Prohibited: 2019 List of Prohibited Substances and Methods*. Retrieved from World-Anti Doping Agency: https://www.wada-ama.org/en/content/what-is-prohibited

Synthetic insulin – a matter of life and death

Nicholas Field

Diabetes was first described around 1500 BC by ancient Egyptian doctors who noted 'too great emptying of the urine' (1). However, it is only within the last hundred years that the principal causes of diabetes mellitus have been understood, and the critical hormone, insulin, has been identified. Since the first purification from canine pancreatic extract, the science of pharmaceutical insulin has developed rapidly, leading to the award of two Nobel prizes and a fascinating story of Chemistry. Before discussing this narrative, it is necessary to outline the physiology of the body and pathophysiology of diabetes.

The human body must control blood glucose concentration within a tight range in order to function correctly. When the glucose concentration falls below the lower limit of this physiological range, a situation known as hypoglycaemia, the body responds by secreting hormones, including glucagon and adrenaline, to restore blood glucose to normal (2). The other effects of these hormones on the body include hunger, tremor, sweating and an increased heart rate. If the blood glucose concentration falls too low, impaired cognitive function, reduced conscious level, seizures, coma or even death may occur (2). Insulin, a peptide hormone secreted by beta-cells of the pancreatic islets of Langerhans, acts to lower blood glucose concentration (3, 4). The release of insulin is stimulated directly, at the level of a glucose-sensing mechanism within each beta-cell, and by neural stimulation through the autonomic nervous system, controlled by glucose-sensitive neurones in the brainstem and the ventromedial nucleus of the hypothalamus (5). Under the influence of insulin, the liver and muscle cells take up glucose and convert it to glycogen, an insoluble branched polysaccharide storage molecule. Insulin also facilitates lipogenesis (the formation of fat) in adipose tissue and inhibits gluconeogenesis (the synthesis of glucose from non-carbohydrate molecules, such as fatty acids and amino acids) (6).

The disease (more properly nowadays considered as a group of diseases) in which insulin activity is deficient, is termed diabetes mellitus. Type 1 diabetes, which is the most common form in children and slim young adults, is caused by an immunologically mediated destruction (auto-immune; self-destruction) of the pancreatic beta-cells. This results in absolute insulin deficiency which can be rapidly fatal if left untreated. Type 2 diabetes is more prevalent in middle-aged and older people. On a background of genetic predisposition, a high body mass index associated with excess eating results in the body becoming insensitive to insulin; initial compensation, through increased stimulation of the pancreatic beta cells, is followed eventually by progressive loss of insulin secreting capacity (7).

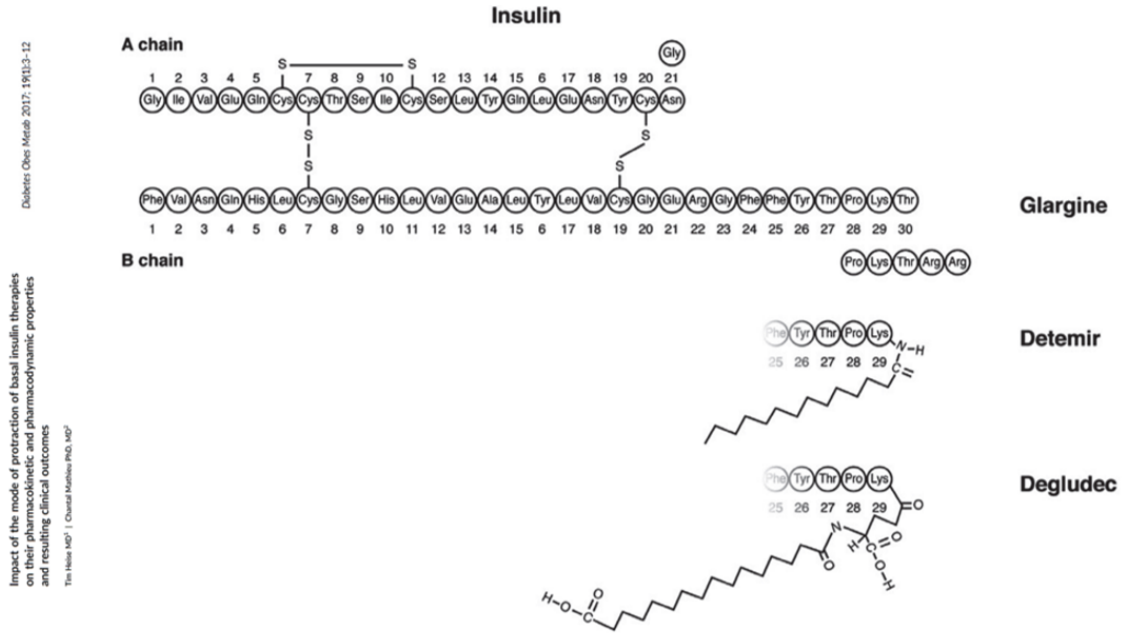
In the two major types of diabetes and in other rarer forms, normal glucose homeostasis is impaired by relative or complete lack of insulin. If not correctly managed, this results in prolonged excessive blood glucose concentration (7). In the short term, very high glucose concentration causes dehydration because glucose is excreted in the urine, taking water with it in a process known as osmotic diuresis. In type 1 diabetes, the complete absence of insulin and the associated extreme physiological stress can cause ketoacidosis, a rapidly developing and life-threatening situation arising from the breakdown of fatty acids to ketones (by oxidation) and the associated acidification of the blood. Persisting or

repeatedly raised blood glucose damages blood vessels, resulting in impaired microvascular supply of oxygen to cells. This manifests in the long-term complications of diabetes, including blindness, kidney failure, heart attack, stroke and lower limb gangrene, necessitating amputation (7).

While type 2 and other forms of diabetes may be treated by a range of medications, including tablets and injections, type 1 diabetes must be managed through administration of insulin, in place of that which would otherwise be secreted by the pancreas. The frequency of administration is dependent on the type and dose of insulin used, and on its specific blood concentration profile. The aim of insulin therapy is to try and reproduce normal (physiological) insulin secretion. Achieving this requires an understanding about the effects of dietary intake, physical activity, stress and illness on blood glucose concentrations. With this knowledge, and with reasonably accurate blood glucose measurements, it is possible to anticipate insulin requirements (8). Turning knowledge into effective treatment requires pharmaceutical insulin preparations with reliable pharmacokinetic (how the concentration of a drug and its metabolites changes over time after administration) and pharmacodynamic (how the body is affected by the drug) properties.

It had been shown, by the beginning of the 20th century, that it was possible to lower blood glucose levels in animals using extracts of pancreas. It was, however, impossible to perform tests in humans as the extracts could not be sufficiently purified. In 1921, a recently qualified Canadian doctor, Frederick Banting, hypothesized that one could destroy the enzyme-secreting parts of the pancreas through ligation of the pancreatic ducts, leaving only the islets of Langerhans intact. These islets, he correctly believed, would continue to secrete the substance, theorized by others as '*insuline*,' while inactivation by digestive enzymes would be reduced. Banting took his idea to John Macleod, professor of physiology at the University of Toronto, who gave him laboratory space and the services of an assistant, medical student Charles Best. Together, Banting and Best tested the hypothesis, successfully reducing hyperglycaemia in dogs that had been rendered diabetic by removal of the pancreas. Purification of the pancreatic extract was subsequently achieved with the help of Professor James Collip and the first administration to a human occurred on 11th January 1922: the treatment could now be safely administered. With the cooperation of Eli Lilly and company, the process was improved, increasing yield and implementing standardization that enabled companies across the globe to start production. For their work in isolating insulin, Frederick Banting and John Macleod were awarded the 1923 Nobel Prize for Physiology or Medicine. There was controversy between them as to who should have received it; Banting decided to share his portion of the prize money with Best, while Macleod shared his with Collip (9).

Thirty years elapsed after purification of insulin before its molecular structure was elucidated by Frederick Sanger. Sanger was awarded the Nobel Prize for Chemistry in 1958 for this feat (and again in 1980 for determining base sequences of nucleic acids). The insulin molecule consists of two peptide chains, A and B, connected by two disulfide bonds, with a further disulfide bond within the A chain (see figure on first page) (4). These two peptide chains are, in fact, synthesized in ribosomes as a single peptide chain precursor, also known in medicine as a prohormone. After initial synthesis and formation of the disulfide bonds, part of the prohormone, known as C-peptide, is enzymatically removed. C-peptide and mature insulin are therefore produced in equimolar proportions (10). Natural insulin molecules in solution form dimers and hexamers (11).



The first insulins to be commercially produced were extracted from bovine and porcine pancreas. Despite minor peptide sequence differences, they have very similar properties to human insulin. With advances in genetics in the 1970's, human sequence insulin became the first medicine to be synthesized by recombinant engineering. For many decades, insulins were available in solution, or, for longer duration of action, in suspension. The most successful long-acting preparation combined insulin with protamine, a protein extracted from fish milt, in a 5:1 molar ratio, and Zn^{2+} ions, to form Neutral Protamine Hagedorn (NPH) insulin (11). NPH insulin suspension forms a depot of amorphous crystals at the injection site. This depot slowly dissolves, protracting the action of the insulin. Whilst this method provides a low-cost product, still widely used today, it has numerous problems associated with reliability of its pharmacokinetic and pharmacodynamic profiles. It requires thorough mixing before injection to ensure accurate dosing (12). Another significant source of variation in the action of NPH is the subcutaneous environment into which it is injected. Furthermore, the shape and size of the amorphous crystals of insulin may vary significantly from one injection to the next (11).

The next insulins to be developed were zinc 'Lente' suspensions. These used varying concentrations of Zn^{2+} ions to generate crystalline insulin without requiring the addition of protamine. Although they were in production for several decades, they have fallen out of favour because of their large intra-individual variability in pharmacokinetics and pharmacodynamics.

At the beginning of the new millennium, the first soluble basal insulin analogue, insulin glargine, was introduced. The structure of insulin glargine differs from that of human sequence insulin by substitution of the asparagine at position A21 by glycine (replacing a tail consisting of an amine and ester group on the asparagine with a hydrogen on the glycine), and by the addition of two arginine amino acid residues to the end of the B chain, in the new positions B31 and B32 (11). The addition of these two positively charged guanidinium groups changes the isoelectric point to pH 6.7, rendering the insulin soluble in weak acids but relatively insoluble at neutral pH (13).

In the vial, insulin glargine is mixed with a preservative, metacresol, to lengthen the shelf-life. Glycerol is added, possibly to increase surface tension to aid injection. Varying quantities of hydrochloric acid and sodium hydroxide are included to balance to pH 4, as well as water for injection (a pharmaceutical term for highly purified, deionized water). The addition of zinc chloride forms Zn^{2+} ions, about which insulin hexamers form (11). These hexamers, after injection, precipitate in the neutral subcutaneous space. This results in a more protracted action as it takes a longer time for insulin monomers to dissociate from the depot and be absorbed into the bloodstream. In comparison to NPH insulin, this causes a longer and flatter time-action profile of less variation. This increases the predictability of the insulin, resulting in a more practical basal insulin for background use. In clinical studies where subjects with type 1 and type 2 diabetes received either once daily doses of insulin glargine or once- or twice-daily doses of NPH, those given glargine were shown to have significantly reduced risks of nocturnal hypoglycaemia (reviewed in reference 11).

The manufacture of insulin glargine is achieved through genetic modification of *Escherichia coli* bacteria. Plasmids are cut open with specific restriction enzymes at specific places in the DNA sequence. The DNA sequence for the insulin glargine molecule is then 'sewn in' using specific ligase enzymes. The plasmids act as vectors and are reinserted into the *E. coli*. The transgenic bacteria are then grown in large fermentation tanks which have various environmental controls to ensure both that the bacteria grow very rapidly, and so produce large amounts of insulin glargine, but also that no intruder organism may grow as well (14). After a set period of time, the mixture is 'harvested'. The insulin glargine is removed by a filtration and purification process and is subsequently combined with the other chemicals that make up the insulin in a vial for injection.

The next basal insulin analogue to be produced using recombinant DNA technology was insulin detemir. Despite having a similar action to insulin glargine, detemir has a significantly different structure. The amino acid at position B30, threonine, is omitted, and a 14-carbon myristoyl fatty acid is attached to lysine at position B29 (11). As with insulin glargine, insulin detemir is dissolved in a solution of glycerol, phenol, and metacresol, which all act as preservatives. The source of Zn^{2+} ions for insulin hexamers to form around comes not from zinc chloride but from zinc acetate, which, as a weak acid, buffers changes in pH so avoids drastic changes in solubility of the insulin upon injection. The remainder of the solution is made up of sodium chloride, disodium phosphate dihydrate, hydrochloric acid, sodium hydroxide and water for injections (15). The ratios of these are particularly important in a solution of insulin detemir as it is essential that the insulin remains at a neutral pH of 7 from in the vial to injection. At the subcutaneous site of injection, the myristoyl fatty acid tail allows the molecules to bond as dihexamers, each hexamer about a single Zn^{2+} ion. Subsequently, whilst still in the subcutaneous tissue, the myristoyl groups bind to albumin, pulling the dihexamers apart so as to be absorbed as a protein-insulin complex into the blood. This reaction between the dihexamers and albumin can only occur in neutral pH and is key to the more stable time-action profile of the insulin (11). Further reversible binding to albumin in circulating blood acts to buffer changes in absorption rate caused by differences in local blood flow at the injection site, decreasing within-patient pharmacodynamic variability in comparison to insulin glargine (16).

The large-scale pharmaceutical manufacture of insulin detemir is similar to that of insulin glargine, except that its DNA sequence is expressed in a strain of yeast called *Saccharomyces cerevisiae*, and acylation is performed after initial purification of the unmodified insulin molecule from the fermentation broth (15).

A more recent development of insulin glargine is a three times concentrated formulation, U300, or 300 units/ml, which, because it forms larger micro-precipitates in the subcutaneous space than U100 (100 units/ml) insulin glargine, has a longer duration of action. The most recently marketed soluble basal insulin is insulin degludec. It has a less variable PK/PD profile than insulin glargine or insulin detemir, with very little peak in action (17). Insulin degludec has a more complicated structure than previous basal insulin analogues but is closer in design to insulin detemir than insulin glargine. The amino acid threonine has been removed from position B30, and, in its place, a 16-carbon fatty diacid with a glutamic acid group has been attached to the lysine at B29 (11).

Insulin degludec is dissolved in a solution of the same chemicals as insulin detemir (18), though the ratios of concentration between them varies from batch to batch. Before injection, the insulin degludec hexamers are in the presence of phenol, causing one end of the hexamer to open. Due to the interaction between fatty diacid side chains of one hexamer and the Zn^{2+} ion of another, the hexamers bond together to form stable dihexamers. Upon injection, however, the phenol diffuses away from the site, causing both ends of the dihexamers to open. This allows long, multihexamer chains to form in the subcutaneous tissue at the injection site (11). Over time, the Zn^{2+} ions at each end start to diffuse away, causing the chains to dissociate, first into dimers, and then into monomers. These insulin degludec monomers are then absorbed into the blood. As the multihexamer chains can only be broken down from each end, the result is a highly protracted, flat PK/PD profile. There is further protection from proteolysis (enzymatic breakdown) and clearance by the kidneys because of reversible binding to albumin in blood. The half-life of insulin degludec (concentration of 100 units/ml) was shown to be 25.4 hours with a variation in glucose lowering effect four times lower than that of insulin glargine in a 42-hour glucose clamp study of subjects with type 1 diabetes. Due to the extremely flat profile of its effect, adjustments in blood insulin concentration occur very slowly (11).

Thus, in the past hundred years, pharmaceutical insulins have developed from being chemically uncharacterized extracts of canine, bovine and porcine pancreas into highly specific, genetically-engineered molecules produced efficiently on vast scales. The outcome of these discoveries has been the development of reliable treatments for diabetes, a disease that was, for millennia, thought to be incurable. This has saved the lives of tens of millions of people.

Undoubtedly, in the future, more advances will come. Prototypes of implantable insulin pumps with built-in blood glucose sensors are being tested (19). Other groups are attempting treatment through restoring or protecting beta-cells, primarily through stem-cell and pancreatic tissue engineering (19). Other approaches include methods to reduce human error in dosing, to improve the design of insulin delivery devices, and to create new modes of insulin delivery, such as by inhalation (19). Reducing the variability of action is a crucial aspect of any development, as this enables better anticipation of insulin needs. A highly-desired treatment is self-regulating, glucose-sensitive insulin analogues; however, this field of research is still in its infancy. Finally, bearing in mind that the majority of people with diabetes live in developing countries, it is imperative that the cost of new treatments is controlled, to make them accessible to all in need (19).

References

1. Lakhtakia R. (2013) 'The History of Diabetes Mellitus', *Sultan Qaboos University Medical Journal, 13(3): 368-370.*

2. Zammitt N. and Frier, B, (2005) 'Hypoglycemia in Type 2 Diabetes', *Diabetes Care* 28(12): 2948-2961
3. Best, C. and Scott, D. (1923) 'The Preparation of Insulin', *Journal of Biological Chemistry* 57: 709-723
4. Sanger, F. (1958) 'The Chemistry of Insulin: Nobel Lecture', December 11, 1958. *Nobel Lectures, Chemistry 1942-1962*. Elsevier Publishing Company. Amsterdam. 1964
5. Thorens, B. (2011) 'Brain glucose sensing and neural regulation of insulin and glucagon secretion', *Diabetes, Obesity and Metabolism* 13 (Suppl. 1): 82–88
6. Green, N/, Stout, G., Taylor, D. and Soper, R. (1990) *Biological Science 2: Systems, Maintenance and Change*. Second edition. Cambridge
7. Kumar, P. and Clark, M. (1994) *Clinical Medicine, Third Edition (revised)*. London.
8. Shah, B. and Zinman, B. (2002) *The treatment of type 1 diabetes mellitus*, in Wass, J. and Shalet, S. (eds): *Oxford Textbook of Endocrinology and Diabetes*. Oxford.
9. Bliss, M. (1982) *The Discovery of Insulin*. Toronto.
10. Steiner, D. (2011) 'Adventures with Insulin in the Islets of Langerhans', *The Journal of Biological Chemistry* 286(20): 17399-17421
11. Heise, T. and Mathieu, C. (2017) 'Impact of the mode of protraction of basal insulin therapies on their pharmacokinetic and pharmacodynamic properties and resulting clinical outcomes'. *Diabetes, Obesity and Metabolism* 19(1): 3-12
12. Brow, A., Steel, J., Duncan, C., Duncan, A. and McBain, A. (2004). 'An assessment of the adequacy of suspension of insulin in pen injectors', *Diabetic Medicine* 21: 604-608
13. European Medicines Agency (2005) *Lantus European Public Assessment Report Scientific Discussion*. At https://www.ema.europa.eu/en/documents/scientific-discussion/lantus-epar-scientific-discussion_en.pdf (accessed 22 August 2019)
14. Website: https://www.bbc.co.uk/bitesize/guides/zx6g87h/revision/2 (accessed 22 August 2019).
15. European Medicines Agency (2004). *Levemir European Public Assessment Report Scientific Discussion*. At https://www.ema.europa.eu/en/documents/scientific-discussion/levemir-epar-scientific-discussion_en.pdf (accessed 22 August 2019)
16. Heise, T., Nosek, L., Biilmann Rønn , B., Endahl, L., Heinemann, L/, Kapitza, C. and Draeger, E. (2004). 'Lower Within-Subject Variability of Insulin Detemir in Comparison to NPH Insulin and Insulin Glargine in People With Type 1 Diabetes', *Diabetes* 53: 1614-1620
17. Heise, T., Nørskov, M., Nosek, L., Kaplan, K., Famulla, S. and Haahr, H. (2017). 'Insulin degludec: lower day-to-day and within-day variability in pharmacodynamic response compared with insulin glargine 300 U/ml in type 1 diabetes', *Diabetes, Obesity and Metabolism* 19(7):1032-1039
18. European Medicines Agency (2013). *Tresiba European Summary of Product Characteristics*. At https://www.ema.europa.eu/en/documents/product-information/tresiba-epar-product-information_en.pdf (accessed 22 August 2019)
19. Zaykov, A., Mayer, J. and DiMarchi, R. (2016). 'Pursuit of a perfect insulin' *Nature Reviews Drug Discovery* 15: 425-439

The moons of Saturn and Jupiter: a space oddity?

Darius Joshi

Jupiter and Saturn have a total of 141 confirmed moons. However, the definition of a moon is ambiguous. It is often defined as 'an astronomical body that orbits a planet or minor planet';[1] yet, if this was the case, this essay would have to cover an indefinite number of moons all of different shapes and sizes – some as large as small planets, others merely a couple metres in diameter. For ease of communication, I will only consider the five largest and most intriguing. Jupiter's four largest moons (Ganymede, Callisto, Io, and Europa – often described as the Galilean moons) were discovered in 1610 by Galileo Galilei, while Saturn's largest moon (Titan) was discovered 45 years later by Christiaan Huygens. All were discovered prior to the massive planets of Uranus and Neptune. The characteristic that intrigues me most about these moons is that they all share seemingly habitable environments despite existing outside the Circumstellar Habitable Zone and being more than 790 million kilometres from the sun. I will analyse the extent of their habitability by focussing on four variables: the presence of liquid water, tidal effects, atmosphere, and axial tilt.

In astronomy and astrobiology, the Circumstellar Habitable Zone (hereafter CHZ) is the range of orbits around a star within which an astronomical body can support liquid water given sufficient atmospheric pressure.[2] The bounds of the CHZ are based on Earth's position in the Solar System and the amount of radiant energy it receives from the Sun. The CHZ is also known as the Goldilocks zone; the metaphor describes an environment that is 'just right'. However, this theory has faced a lot of criticism, mainly owing to its assumption that the only source of radiant energy for an astronomical object is from the Sun – it neglects the effects of **tidal forces**. The five moons in question orbit the two most massive planets in the solar system. These planets also have the most moons of any in the solar system (Jupiter, 79, and Saturn, 62). Tidal heating (also known as tidal working or tidal flexing) occurs through the tidal friction processes: tidal energy is dissipated as heat in either the surface ocean or interior of a planet or satellite.[3]

$$\dot{E}_{\text{Tidal}} = -\text{Im}(k_2)\frac{21}{2}\frac{R^5 n^5 e^2}{G}$$

$\dot{E}_{Tidal}$ = Tidal Energy

$Im(k_2)$ = Efficiency of body dissipation within satellite

G = Gravitational Forces (low)

R = Satellite's Mean Radius (high)

n = Mean Orbital Motion

e = Eccentricity (high)

[1] Wikipedia [online] available at https://en.wikipedia.org/wiki/Natural_satellite.

[2] Huang, Su-Shu. (1959) 'Ocurrence of life in the Universe', *American Scientist* 47.3: 489-93

[3] Wikipedia [online] available at https://en.wikipedia.org/wiki/Tidal_heating.

Over time in a two-body system, the initial elliptical orbit decays into a circular orbit (tidal circularization). However, sustained tidal heating occurs when the elliptical orbit is prevented from circularizing owing to additional gravitational forces from other bodies that keep tugging the object back into an elliptical orbit (for example, the other moons of Jupiter). Owing to the many small gravitational forces (G) exerted on the moons by each other, they remain balanced in an elliptical orbit (high eccentricity, e), and thus they have some of the greatest tidal energies in the solar system, as demonstrated by the equation for tidal energy above. This is the reason why Io is the most volcanically active body in the solar system. Volcanic activity can be the perfect ingredients for life, after all, the majority of scientists believe life on earth began in hydrothermal vents underneath the ocean.[4] However, Io is an extreme example, constant volcanic activity and intense radiation make Io an unlikely destination for life. It is the larger moons with more moderate orbital energies that cultivate a more reasonable surface temperature. Jupiter's moon Europa and Saturn's moon Enceladus (discovered a century later than the others in 1789 by William Herschel) have tidal forces that provide the source of a moderate temperature under their icy surfaces. This temperature is warm enough to sustain a hidden **ocean of liquid water** under its icy surface.[5] Scientists are certain of this fact on Enceladus where in 2005, NASA's Cassini spacecraft discovered that icy water particles and gas gush from the moon's surface at approximately 800 miles per hour (400 meters per second) (Figure 1). This liquid was even sampled by the passing Cassini spacecraft.[6] It was revealed to contain **silica nanograins**, which can only be generated where liquid water and rock interact at temperatures above 90 degrees Celsius. In this way, hydrothermal vents are almost certainly under the surface of Enceladus. The vents have the ability to provide a source of heat, liquid water, minerals and, chemicals; all the right ingredients for life. For this reason, Enceladus and Europa have the desired amount of tidal heating that can create a habitable zone under their surface despite being 552 million kilometres outside of the CHZ.[7] An atmosphere is considered by astrobiologists to be vital in developing prebiotic chemistry, sustaining life and for surface water to exist. It blocks almost all of the Sun's dangerous rays from reaching the surface. It traps heat, making the surface a comfortable

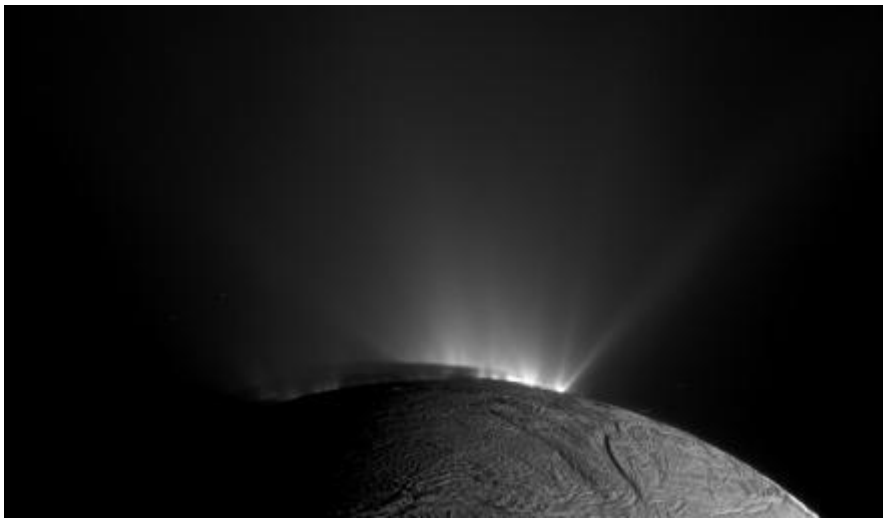


Figure 1: NASA's Cassini spacecraft captured this image of Enceladus on Nov. 30, 2010. It shows the jets of water gushing from the surface.

[4] MIT School of Engineering [Online} available at https://engineering.mit.edu/engage/ask-an-engineer/how-did-life-on-earth-begin/.

[5] "Frequently Asked Questions about Europa". NASA. 2012. Archived from the original on 28 April 2016. NASA [online] available at https://www.nasa.gov/.

[6] "Deepest-Ever Dive Through Enceladus Plume Completed". Jet Propulsion Laboratory. October 28, 2015.

[7] Not a raw photo (enhanced brightness): NASA [online] available at https://www.nasa.gov/.

temperature. The oxygen within the atmosphere is also essential for life. Most natural satellites in the Solar System lack significant atmospheres, the sole exception being Saturn's moon Titan.[8] It is an extraordinary moon that is more massive than Mercury with an atmosphere made mostly of **nitrogen**, like Earth's. Titan has clouds, rain, rivers, lakes and seas of liquid hydrocarbons like methane and ethane with towering mountains of solid ice. The Cassini spacecraft (tasked with monitoring Saturn and its moons) took numerous gravity measurements of Titan revealing that the moon is hiding an underground ocean of liquid water (likely mixed with salts and ammonia). Titan's subsurface water could potentially be a suitable spot to nurture microbial life, while its surface lakes and seas of liquid hydrocarbons could conceivably harbour life that uses different chemistry than we're used to.[9] Titan is like no other moon in our solar system; it was even formed in an entirely different way. Titan's atmospheric nitrogen ratio (94.2%)[10] suggests the moon's building blocks formed early in the solar system's history, in the same cold disk of gas and dust that formed the Sun (called the protosolar nebula), rather than forming in the warmer disk of material that Saturn later formed from (called the Saturn sub-nebula). This atmosphere makes Titan more like a planet than a moon (Figure 2). Amazingly, Titan's air

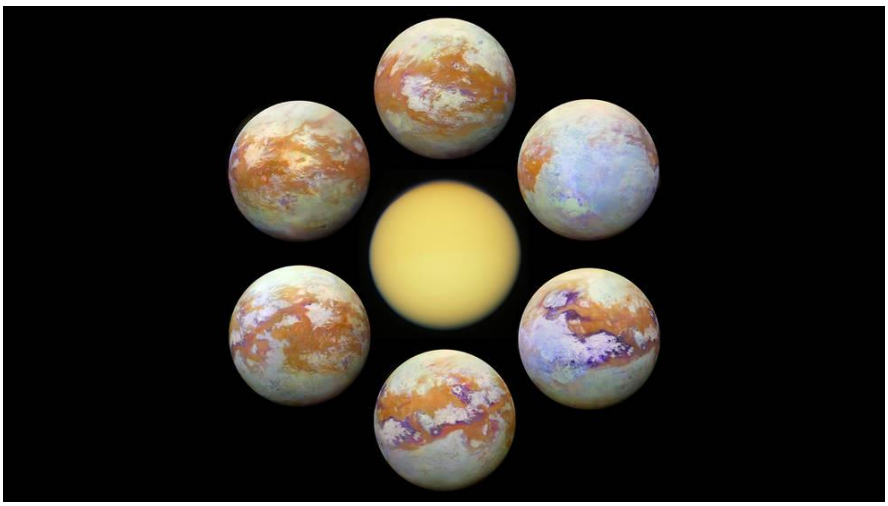


Figure 2: Infrared images of Titan from Cassini – Normal image of Titan at centre surrounded by infrared images of different faces of Titan expose the previously hidden weather patterns on the moon. It is very much a living moon.

is even dense enough that a human could theoretically walk around on its surface (providing one had an oxygen mask and protection from sub minus 150˚C temperatures). However, an atmosphere is a rare characteristic. It is where most moons do not fulfil the full conditions for habitability. Ganymede and Callisto, the two most massive moons of Jupiter lack any atmosphere that provides the environment to support life. Astronomers using the Hubble Space Telescope found evidence of only a thin oxygen atmosphere on Ganymede in 1995.[11] Similarly, Callisto, the most heavily cratered object in the solar system, has a thin atmosphere that leaves it vulnerable to even the smallest of meteors causing them to scar its surface as meteorites. Without an atmosphere nor a sub-surface ocean there is little chance that these two moons could harbour life. Whilst Europa and Enceladus also have a thin atmosphere, their

[8] Wikipedia [online] available at https://en.wikipedia.org/wiki/Habitability_of_natural_satellites#Atmosphere.
[9] NASA Science [online] available at https://solarsystem.nasa.gov/moons/saturn-moons/titan/overview/.
[10] Catling, David C. & Kasting, James F. (2017). *Atmospheric Evolution on Inhabited and Lifeless Worlds*. Cambridge
[11] Hall, D.T. & Feldman, P.D. et al. (1998). 'The Far-Ultraviolet Oxygen Airglow of Europa and Ganymede', *The Astrophysical Journal* 499.1: 475-81

vast oceans of water provide a theoretically ample environment for life. However, it is Titan that has an atmosphere most suited to harbouring life.[12]

The final variable of habitability is the delicate matter of the moon's axial tilt;[13] this potentially can solely delineate whether a moon has a good environment for life. The Earth is tilted at an angle of 23.5° relative to our orbital plane causing moderate seasons. Titan's orbital tilt with respect to the sun is very close to Saturn's axial tilt (about 27°). This means that the direction of incoming sunlight is driven almost entirely by Titan's day-night cycle and Saturn's year cycle. The axial tilt causes seasons and weather formations on Titan. Seasonal weather changes include larger hydrocarbon lakes in the northern hemisphere during the winter, decreased haze around the equinoxes due to changing atmospheric circulation, and associated ice clouds in the South Polar regions.[14] We know this for certain because the Cassini spacecraft was able to picture clouds and weather formations in Titan's thick atmosphere. Titan may lack hydrothermal vents that could potentially kickstart life; however, its thick clouds could do the job just as well with **lightning**. Although no evidence of lightning activity has yet been observed on Titan, computer models suggest that clouds in the moon's lower troposphere can accumulate enough charge to generate lightning from an altitude of roughly 20 km.[15] Despite the absence of any know hydrothermal vents, the presence of lightning in Titan's atmosphere would favour the production of organic materials on its surface making Titan's surface an even more viable home of life. On the other hand, the slight axial tilt of Europa and Enceladus (a maximum of 1.5°)[16] excludes the chance of seasons forming on the moons. However, as the habitable environment for life would be far from the surface for both of these moons, the lack of seasons would not be as important.

To conclude, it is Titan, Europa and, Enceladus which are the most likely to harbour life, therefore excluding Earth, they are the space oddities of our solar system. Each are unique and have the potential to harbour life of completely different kinds we are used to. In Europa and Enceladus, it is probably in the form of single celled organisms nurtured in the hydrothermal vents in the warmer pits of the oceans. However, it will be long before we are certain of this. The subsurface oceans are difficult to access; submersible probes have been proposed which would drill through the icy surface. However, plans were scrapped in a bid to prevent contamination of the subsurface oceans[17] (also there is a risk of the detection of Earth organisms from the spacecraft instead of native life). In Titan it is the organic material produced by the energy from the lightning on its surface which is most promising for life. Excitingly, certainty of this could come sooner than later. NASA announced on the 27th June 2019 it will send a spacecraft to Titan to fly across its surface to study how life there could develop. 'Dragonfly' is scheduled for launch in 2026, arriving at Titan eight years later. The spacecraft will touch down in dune fields in the moon's equatorial regions. From there 'Dragonfly', effectively a flying drone the size of a Mars rover,

[12] NASA Science [Online} available at https://www.nasa.gov/image-feature/jpl/seeing-titan-with-infrared-eyes.

[13] Axial tilt is the angle between a planet's rotational axis at its north pole and a line perpendicular to the orbital plane of the planet.

[14] Lakdawalla, E. (2004) *Titan: Arizona in an Icebox? at The Planetary Society* https://www.planetary.org/blogs/emily-lakdawalla/2004/20040121-titan-arizona-in-an-icebox.html.

[15] Chow, D. (2010). *Titan's Thunder Could Point to Alien Lightning* at https://www.space.com/8381-titan thunder-point-alien-lightning.html

[16] Bills, B. G. (2005) 'Free and forced obliquities of the Galilean satellites of Jupiter', *Icarus* 175: 233-47

[17] *Preventing the Forward Contamination of Europa.* (2000) National Academy of Sciences Space Studies Board. Washington (DC): National Academy Press.

will fly across the surface of the moon (Figure 3). It will be powered by an MMRTG.[18] With this mission we will finally be able to find solid answers to whether Titan is habitable.[19]

Figure 3: This illustration shows NASA's Dragonfly rotorcraft-lander approaching a site on Titan.

[18] MMRTG (multi-mission radioisotope thermoelectric generator) convert the heat from the natural decay of a radioisotope into electricity. Reliable power from the MMRTG will allow it to operate for several years.
[19] NASA [Online] available at https://www.nasa.gov/press-release/nasas-dragonfly-will-fly-around-titan-looking-for-origins-signs-of-life.

Overdiagnosis in psychiatry: its effect on children and ethnic minority groups

James Kakanyera

Over the past 20 years, health service providers and mental health organizations have noticed a significant rise in the prevalence of mental health in children and young people. In a survey conducted in 2004 by the Office for National Statistics (Green et al., 2005), it was shown that 1 in 10 young people ages 5 – 16 were clinically diagnosed with a type of mental health disorder (emotional, hyperactive or behavioural) out of a sample size of 7977 families. The same organization undertook a second survey in 2017 (Mental Health of Children and Young People in England, 2017), and it was shown that now 1 in 8 (12.8%) of 5 – 19 year olds have been clinically diagnosed with a mental health disorder; an increase of 2.8% overall in 13 years. However, epidemiological studies have shown that the trends in the prevalence of mental health disorders have seen mixed effects, which tells us that the rise in these diagnoses is likely due to overdiagnosis. This occurs when often during early screening for a disorder, when a patient is mistakenly diagnosed with a disorder. The effects of what this does to a patient's life are often detrimental, and particularly when a patient is diagnosed at a young age. This essay will explore how overdiagnosis occurs and what effect this has on the doctor-patient relationship as well as in children and ethnic minorities.

Overdiagnosis is defined as 'the diagnosis of a medical condition that would never have caused symptoms or problems' (National Centre for Biotechnology Information, 2017). This is different from a misdiagnosis; in that an overdiagnosis is a 'correct' diagnosis that shows all the symptoms of an illness, but none of these symptoms are directly linked to a particular illness. For example, one might have several of the symptoms which show for ADHD; poor concentration skills, impulsiveness, disorganization or trouble multitasking, but these may just be persistent behaviours of an individual, and not necessarily a diagnosable condition. Overdiagnosis often arises as a result of screening tests; these tests are conducted before symptoms show to try and prevent and reduce the effects of a condition. These cases are also quite common in cancer screenings, for breast cancer and prostate cancer screenings small tumours may be found which turn out to be non-progressive or slow growing (which would have no effect on the patient) but are diagnosed as malignant. This is often discovered after the patient has died, when the cause of death is related to other causes, not the tumour. This has applications in mental health, as health professionals find it much more difficult to diagnose, as symptoms are mostly behavioural or obscured. Thus, it is much harder as they must distinguish between actual symptoms and simple personality traits or behaviours of a patient. This will often lead to an overdiagnosis or a misdiagnosis.

A study was conducted which looks at the relationship of Black, Asian and Minority Ethnic (BAME) groups and mental health professionals, specifically in their overdiagnosis. (Suite et al., 2007) The article examines the history of racism in mental health, even touching on the invented disorder of 'drapetomania' by Samuel A. Cartwright. It describes the 'uncontrollable urge [of African slaves] to escape slavery, destroy property on the plantation, be disobedient, talk back, fight with their masters

and refuse to work.' This example clearly demonstrates how Cartwright has over diagnosed here - instead of viewing their revolt and disobedience as an argument against slavery he characterized it as a mental health disorder. The study also argues how this sense of prejudice is continued up to now; it states, 'since the 1970s to the present, international studies have shown overdiagnosis of schizophrenia in African American, Afro Caribbean and [Hispanic communities].' The reasons for this are clinician prejudice and a lack of contextual diagnosis; the former being that clinicians could view those of colour as 'simpler' and 'emotionally unstable', the latter meaning that a generic standard is used to assess patients instead of understanding individual circumstances to make an informed decision. This study implies that physicians have shown to be employing prejudices and stereotypes to make overdiagnoses in mental health, particularly towards BAME groups.

Healthcare professionals have only recently been made aware of the effects of overdiagnosis, and many studies have been run to show how it detrimentally effects an individual, particularly within mental health; one case looks at the overdiagnosis of ADHD. The BMJ conducted research into what is described as 'enthusiastic diagnosis' of ADHD in children and concluded that it can cause severe harm to children with mild symptoms (Thomas et al., 2013). This is because children often take medication like Ritalin, which is not necessary, furthermore overdiagnosis undermines the value of the diagnosis that children with more severe symptoms have. It describes results showing that prescribing rates of ADHD-related medicines like methylphenidate and dexamphetamine have increased by 72.9% from 2000 to 2011 and pinpoints the cause for this drastic rise as 'shifting definitions'. This is because several different criteria are used for diagnosis, those being the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) and the *International Classification of Diseases* (ICD). These have been used interchangeable, resulting in different definitions of what ADHD looks like. For example. The DSM has changed the number of symptoms required for diagnosis several times over its various issues, going from 8 to 12 to 12/10 (depending on the age of the patient). This inconsistency in diagnostic standards means it is more difficult for psychiatrists to distinguish between those with the disorder and those without, and this lack of certainty can lead to a break down in the doctor-patient relationship. This is caused by mis-/overdiagnosis of ADHD by a doctor, causing the patient to lose trust in their doctor's opinion, then either seeking alternative counsel or disengaging from the healthcare system altogether. The breakdown of the doctor-patient relationship is one of the main effects of overdiagnosis, and whilst it may not directly affect patients, this issue causes a general lack of trust in doctors and their ability to make informed decisions. Whilst autonomy – the patient's power to choose their own course of treatment – is still valued as one of the pillars of medical ethics today, the patient's autonomy can only be successful if the patient is fully informed of all factors and information. In a situation where over-/misdiagnosis has happened, and this relationship has broken down, the patient feels they can no longer trust their clinician's opinion, and thus makes a decision without being told of the different factors the doctor has observed. This may have serious consequences coming onto more severe decisions which need to be made.

A previously mentioned article looked at the feelings of mistrust between certain groups and their clinicians, specifically Hispanic and African American communities. In a study taken by the Commonwealth Fund 2001 Health Care Quality Survey, 18% of Hispanic Americans, 16% of African Americans and 13% of Asian Americans said they felt disrespected by healthcare professionals on account of their race or ethnicity (Suite et al., 2007). Furthermore, 15% of African Americans, 13% of

Hispanic Americans and 11% of Asian Americans said they felt they would be better served by a therapist/physician of a different race/ethnicity. This study shows how racial prejudice can be a factor which causes the breakdown of a doctor-patient relationship, and specifically in the United States, historical ties to racism have caused doctors to have biased opinions towards these groups, and potentially over diagnose them based on stereotypical behaviours and actions.

Another effect of overdiagnosis is the direct effect on the patient. This can be related to taking medication which can cause bodily harm or social issues involved with a condition. In children being diagnosed with a mental health disorder can cause serious social problems for an individual, with the revelation of this resulting in peer rejection, potentially problems with academic achievement and higher risk of injury (Thomas et al., 2013). This difficulty through early stages of one's life can have serious impact of the overall quality of life, as the patient may have lower self-esteem as a result and more difficulty communicating with others, all of which could contribute to more mental health issues developing later in life, particularly mood related disorders.

Overdiagnosis can also negatively influence the patient's health as well; the number of stimulants being taken for ADHD has increased majorly in the last 20 years, by 700% over the 1990s (Mackey & Kipras 2001). A study in overtreatment of ADHD in children suggests that the increase in the sale of psychostimulants – drugs used to improve mental processes and physical functions – like Ritalin have increased to the point where misuse and overdose of the drug is more widespread (Dunlop and Newman, 2016). The popularity of psychostimulants are not only limited to those with mental health issues; instead many high school and university students are using them as concentration tools for schoolwork. The inconsistency in diagnosis of ADHD has led to psychostimulants being more readily available to students in pharmacies, whether they have ADHD or not, as by limiting the diagnossi of ADHD to fewer symptoms and simpler behaviours, this allows some to be more deceptive and gain access to those drugs. Thus, we have created a system in which young people are incentivized to illicitly use and abuse drugs due to overdiagnosis and failing standards in spotting symptoms.

The significant rise in clinically diagnosed mental disorders is still being explored, with some explanations having been suggested as to why this phenomenon has taken place. Firstly, healthcare professionals are using varying and different criteria to diagnose patients, leaving a very blurred threshold for those who have mental disorders and those who don't Secondly, physicians may have stopped using diagnostic criteria altogether; a study conducted in United States showed that only ¼ of paediatricians in a sample used DSM diagnostic criteria (Wolraich et al., 2011). Some of these doctors may be diagnosing based off bias or prejudice, as seen by a study looking at the history of racism in mental health, which shows that overdiagnosis impinges on ethnic minority groups using stereotypes. The use of overdiagnosis is becoming an increasingly difficult problem to combat, given the effects it is having on a doctor-patient relationship by losing trust, as well as the social issues and health issues which may arise as a result of it. One of these involve teenagers more easily using psychostimulant drugs for recreational or studying purposes, which can often end in overdose or death. These serious social and health problems which arise can argue that screening tests may need to be more rigorous, or perhaps a standardized method of diagnosing for mental health disorders, particularly in children and young people.

References

Dunlop, A. and Newman, L. (2016) 'ADHD and psychostimulants — overdiagnosis and overprescription', *MJA* 4.204: 139

Gowensmith, W.N., Murrie, D.C. and Boccaccini, M.T. (2012) 'Field reliability of competence to stand trial opinions: how often do evaluators agree, and what do judges decide when evaluators disagree?', *Law and Human Behavior* 36.2: 130

Green, H., McGinnity, A., Meltzer, H., Ford, T. and Goodman, R. (2005). *Mental health of children and young people in Great Britain*. 1st ed. [ebook] Norwich: Office for National Statistics, pp.8,9. Available at: http://digital.nhs.uk. [Accessed 21 Aug. 2019]

Guarnera, L.A., Murrie, D.C. and Boccaccini, M.T. (2017) 'Why do forensic experts disagree? Sources of unreliability and bias in forensic psychology evaluations', *Translational Issues in Psychological Science* 3.2: 143

Jensen, P.S., Kettle, L., Roper, M.T., Sloan, M.T., Dulcan, M.K., Hoven, C., Bird, H.R., Bauermeister, J.J. and Payne, J.D. (1999) 'Are stimulants overprescribed? Treatment of ADHD in four US communities', *Journal of the American Academy of Child & Adolescent Psychiatry 38*.7: 797- 804

Juviler, M. (1960) 'Psychiatric opinions as to credibility of witnesses: A suggested approach', *Calif. L. Rev*. 48: 648

Kvarnstrom, E. (2017). *The Dangers of Mental Health Misdiagnosis: Why Accuracy Matters – Bridges to Recovery*. [online] Bridges to Recovery. Available at: https://www.bridgestorecovery.com/blog/the-dangers-of-mental-health-misdiagnosis-why-accuracy-matters/ [Accessed 20 Jun. 2019]

Mental Health of Children and Young People in England, 2017. (2018)

National Centre for Biotechnology Information. (2019) *What is overdiagnosis?*. [online] Available at: https://www.ncbi.nlm.nih.gov/books/NBK430655/. [Accessed 15 Aug. 2019].

Spitzer, R.L. and Fleiss, J.L. (1974) 'A re-analysis of the reliability of psychiatric diagnosis', *The British Journal of Psychiatry* 125.587: 341-347

Suite, D., La Bril, R., Primm, A. and Harrison-Ross, P. (2007) 'Beyond Misdiagnosis, Misunderstanding and Mistrust: Relevance of the Historical Perspective in the Medical and Mental Health Treatment of People of Color', *Journal of The National Medical Association* 99.8: 1-3

Thomas, R., Mitchell, G. and Batstra, L. (2013) 'Attention-deficit/hyperactivity disorder: are we helping or harming?' *British Medical Journal* 347.7932: 18-20

Wolraich, M.L., Lindgren, S., Stromquist, A., Milich, R., Davis, C. and Watson, D. (1990) 'Stimulant medication use by primary care physicians in the treatment of attention deficit hyperactivity disorder', *Pediatrics* 86.1: 95-101

Quantum entanglement of living bacteria with photons

Jovan Tijanic

Quantum theory is an important aspect of modern physics that explores the counterintuitive but fascinating behaviour of nature at the subatomic and atomic scales. It has numerous practical applications (transistors, lasers, atomic clocks, and MRI,[1] to name a few) and offers fascinating possibilities for future technological development (quantum computers, for example). [References – in square brackets – are listed in the order to which they are first referred in the essay.]

Quantum effects are an integral part of the physical world, which raises questions of how they occur in living organisms and whether the organisms evolved to take advantage of those effects. A recent experiment based at the University of Sheffield initially investigating energy pathways of bacteria has revealed upon further analysis that the bacteria might have entangled with the light used in the experiment.

But first, we will attempt to describe quantum entanglement for those unfamiliar with the phenomenon. Let's say that two particles interact in some way (collide, for example), entangling in the process, and are then separated at an arbitrarily large distance. Measuring the value of a property (like spin) of one particle instantly 'sets' the value of the same property of the other particle, no matter the distance of separation. This is remarkable considering that information cannot travel faster than the speed of light in a vacuum (which does not necessarily mean the particles are violating this limit by sharing information during the measurement). These two particles can no longer be considered as separate entities. Entanglement has many applications in quantum computing and cryptography, among other fields of study. (See [2,3] for further explanation.)

For the sake of clarity brief explanations of certain other terms will follow, all derived from the referenced sources. A pattern of motion which has the property that at any point the object moves perfectly sinusoidally, and that all points move at the same frequency, is called a mode.[4] An Optical (micro)cavity or optical (micro)resonator is an arrangement of optical components which allows a beam of light to circulate in a closed path, confining the light to a small volume.[5, 6] An electron hole (or deficiency) bound to an electron is called an exciton (see [7]). Lastly, the least number of mutually independent parameters (coordinates) required to uniquely define a system's position in space, time, etc., is the number of so-called degrees of freedom (see [8]).

Many physicists believed that observing quantum effects in living systems was impossible. One such physicist was Niels Bohr, a pioneer of quantum theory. This seem to be because the instruments used to observe these effects would exchange energy with the objects observed, interfering with the effect.[9] However, advances in both theoretical and experimental physics now allow scientists to overcome the issue.

The scientists who conducted the previously mentioned experiment have published the results in a 2017 paper titled *Polaritons in Living Systems: Modifying Energy Landscapes in Photosynthetic Organisms Using a Photonic Structure*. The experiment is summarized below (see [10]).

'Photosynthetic organisms rely on a series of self-assembled nanostructures with tuned electronic energy levels…' (certain discrete values of energy a particle, i.e. an electron, can have in the structure) '…in order to transport energy from where it is collected by photon absorption, to reaction centres where the energy is used to drive chemical reactions'.[10] The species of bacteria used in the experiment, *Chlorobaculum tepidum*, is a member of the family *Chlorobiaceae* (see [11]) and absorbs light with complexes called chlorosomes. An exciton is created for the purpose of carrying energy, and is transferred to the protein baseplate and then to the reaction centre. The experiment shows that one can access the exciton-photon coupling (i.e. interaction) regime and form so-called polariton states through coherent energy exchange in an optical microcavity, created by suspending a bacterial solution between two semi-transparent metallic mirrors. These 'polaritons have an energy distinct from that of the exciton and photon, and can be tuned in situ via the microcavity length. This results in real-time, non-invasive control over the relative energy levels within the bacteria.'[10]

To check whether the bacteria are alive during strong exciton-photon coupling, a cell viability stain known as trypan blue is used. Trypan blue permeates through compromised membranes of dead cells, binding to intracellular proteins, thus staining the bacteria. It was shown afterwards that the cells of the bacteria remained unstained during the experiment. While the cavity acts to restrict the intensity of light reaching the bacteria, the species used is known to be capable of surviving in extremely low light environments, and even displays low mortality rates in the presence of no light. The bacteria under investigation remained unstained for the duration of the experiment, which lasted for several hours.[10]

The results of the paper were further analysed by a research team based at the University of Oxford. The results of the analysis, published in 2018 in a paper titled *Entanglement between living bacteria and quantized light witnessed by Rabi splitting*, have revealed some evidence for quantum entanglement, indicated by strong coupling between the excitons in the chlorosomes and the photons in the microcavity. According to the researchers, the coupling is strong if the leakage of light trapped in the microcavity is slow compared to the energy exchange rate between light and the bacteria. This results in a modification of the energy spectrum of the exciton and cavity modes by the introduction of two new energy levels corresponding to the aforementioned polaritons.[12]

The two resulting peaks representing the polariton branches have higher and lower energies in comparison to the uncoupled exciton energies. The energy difference between the two peaks when the uncoupled cavity and exciton modes have the same energy is called Rabi splitting and is used as an 'entanglement witness', a physical observable that 'reacts' differently to entangled and disentangled states. The coupling is strong if the Rabi splitting is greater than the sum of uncoupled photon and exciton energies. According to the analysis, this condition has been met in the experiment, which demonstrates that the bacteria and the light are entangled, or more specifically, the excitons in the bacteria and the photons in the cavity.[12]

The researches point out that the same results (including the observed Rabi splitting) can be modelled completely classically, which is not a contradiction because the entanglement witness they use works under the assumption that both systems (i.e. the bacteria and the light) are quantum and checks whether the subsystems are quantum as well. The classical result that is obtained is identical to the result of the quantum analysis shown in the paper.[12]

The researchers further discuss the possibility of using a semi-classical model, wherein the bacteria are modelled as a classical system and the light as a quantum system, or vice versa. A semi-classical model appears to be incapable of obtaining the Rabi splitting. It is noted in the text that it is just a specific case of the general fact that such models cannot fully reproduce quantum effects.[12]

The conclusion inferred from the discussion about theoretical modelling of the experiment implies some intriguing possibilities:

'Light is known to be a quantum field from other independent experimental evidence, so a non-approximative model for light would require it to be quantum. As soon as light is treated as quantum, since the Rabi splitting is observed in the experiment, the bacteria (more precisely, whatever degree of freedom within bacteria couples to light) would also have to be quantum—in the sense that they must be described by a model with at least two non-commuting observables.'[12]

According to the researchers, Rabi splitting is not enough to rule out hidden-variable models, which are deterministic physical models that posit that all observables have defined values fixed by unknown variables [see 13]. Other physicists also point out that in order to demonstrate entanglement one has to analyse the two observed systems independently, unlike in the experiment mentioned beforehand.[14] Further experiments need to be conducted, and Farrow, a co-author of the study, and his colleagues are already planning to attempt entangling two bacteria to one another to verify the results of the experiment.[12, 14]

Although the rigorous nature of science demands corroboration and confirmation of the discussed experimental results, the Rabi splitting entanglement witness and the fact that only a quantum model can properly describe the experiment is just about enough evidence to reach a tentative conclusion that microorganisms can and do entangle with subatomic particles like photons. Considering that quantum physicists of the past considered experiments like these improbable, if not impossible, makes this find is particularly fascinating. One also has to contemplate the possibility that living organisms might gain an important place in the fields of quantum computing and cryptography, since they are capable of quantum entanglement. Still, one has to wait for the results of future experiments, whether they lend more credibility to the hidden variable theories, or reveal other quantum phenomena that can occur in living entities.

References

[1] Tamoor M. *Quantum Physics Applications*. http://scivenue.com/2018/03/08/quantum-physics-applications/. Consulted 23/8/19

[2] Vutha A. *Remote connections? Detangling entanglement in quantum physics*. https://theconversation.com/remote-connections-detangling-entanglement-in-quantum-physics-104885. Consulted: 22/8/19

[3] Wilczek F. *Entanglement Made Simple*. https://www.quantamagazine.org/entanglement-made-simple-20160428/. Consulted: 22/8/19

[4] Feynman R. *The Feynman Lectures on Physics Vol. I, Ch. 49: Modes*. http://www.feynmanlectures.caltech.edu/I_49.html. Consulted 22/8/19

[5] Vahala K. (2003) 'Optical microcavities', *Nature* 424: 839-846

[6] Paschotta R. *Optical resonators*. https://www.rp-photonics.com/optical_resonators.html. Consulted: 22/8/19

[7] Beenakker C. *Electron-hole entanglement in the Fermi sea*. https://arxiv.org/pdf/cond-mat/0508488.pdf. Consulted 22/8/19

[8] Weisstein E. *Degree of Freedom*. http://scienceworld.wolfram.com/physics/DegreeofFreedom.html. Consulted 23/8/19

[9] Bohr N. (1933) 'Light and Life', *Nature* 131: 421-423

[10] Coles T. et al. *Polaritons in Living Systems: Modifying Energy Landscapes in Photosynthetic Organisms Using a Photonic Structure*. https://arxiv.org/pdf/1702.01705.pdf. Consulted: 21/8/19

[11] Overmann J. et al. (2006) *The Prokaryotes*, 3rd edition, vol. 7, New York

[12] Marletto C. et al. *Entanglement between living bacteria and quantized light witnessed by Rabi splitting*. https://iopscience.iop.org/article/10.1088/2399-6528/aae224/meta. Consulted: 19/8/19

[13] Genovese M. *Research on Hidden Variable Theories: A Review of Recent Progresses*. https://arxiv.org/pdf/quant-ph/0701071.pdf. Consulted 22/8/19

[14] O'Callaghan J. *'Schrödinger's Bacterium' Could Be a Quantum Biology Milestone*. https://www.scientificamerican.com/article/schroedingers-bacterium-could-be-a-quantum-biology-milestone/. Consulted: 22/8/19

Is the law inextricably bound with morality?

Daniel Junsang Park

It is often taken for granted that one 'ought to' obey the law, on the basis of some underlying moral principle – and the same goes for whether a law is 'valid' or not. Philosophers have attempted for centuries to provide a clear jurisprudential theory on what constitutes such concepts of legal validity and of obligation, and many of the traditional theories explained such concepts in relation to moral and political theories (i.e. natural law). On the other hand, many modern philosophers have abandoned the classic view that morality and law are perpetually intertwined, instead advocating the positivist argument that law and morality are distinct concepts which do not necessitate each other. Yet the inherent normativity of concepts like 'obligation' and 'standards' cause doubt as to whether such a stance is possible, or whether moral considerations are indeed a part of law's nature.

The jurisprudential debate on the nature of law begins with the classic natural law theorists, who sought to delineate an overlap between morality and law. Such theories generally stemmed from Aristotelian political and moral philosophy, where the nature of law is a question of how the law acts as a cause or condition of a flourishing society. Aristotle sought to understand what is good for human beings, and what counts as human flourishing – and in traditional virtue ethics, he concluded that to be the fulfilment of an individual's function within the mechanisms of society, and the cultivation of certain virtues of excellence (*arete*) in one's character. Such human 'goods' can therefore only be realized in a community or society of humans. Given that a community requires some coordination of human conduct, however, it is necessary to have laws that are established and enforced by authority; ultimately, then, he argues that the law must serve the common good. Similarly, Thomas Aquinas grounded his theory of natural law on precepts of 'eternal law'; law that governs the behaviour of all beings possessing reason and free will, especially the primary imperative to do good and avoid evil. Aquinas argued that the universality and objectivity of natural law, having been dictated by God himself, establishes its superiority over human law – therefore, as elaborated later by William Blackstone, there can be no legally valid standards that conflict with natural law, and all 'valid' human laws derive their coercive power and authority from the natural law itself. Though they do not deny the extent of human discretion involved in creating law, they argue that such discretion is necessarily limited by moral principles and norms, and thus valid human laws are by extension required to be consistent with morality. Ultimately, classic natural law theorists agree that the law necessarily entails from certain moral principles and considerations preceding it.

However, the rise in popularity of Hobbesian social contract theory during post-Reformation Europe brought doubt to the integrity of traditional conceptual naturalism.

A growing distinction was created between the realm of ethics (virtue, excellence and 'good') and the juridical realm (of justice and rights), and Thomas Hobbes' contractarian theory demonstrated this separation - by avoiding a reliance on some shared notion of 'excellence' or the 'good', which he argued could not provide a satisfactory account of political authority. Hobbes argued that people in their 'state of nature' would be driven purely by primitive and asocial self-interest – a state lacking any sovereign leadership or civil society. Regarding rights in particular, he believed that everybody in the state of

nature would have a right to everything, making rights inherently conflicting. As a result, a social contract was made between individuals, wherein they would agree to concede some of their individual right so that a state of social order can be established. Within this state, a sovereign entity would have absolute law-making authority to establish laws that regulate social interactions; hence, while Hobbes believed the law to be necessary to make social order possible, he didn't believe that the law served to fulfil the requirements of any underlying structure of (natural) rights. Rather, they simply served to restrict or abrogate rights, in order to maintain social order. It is this belief in particular which led him to become the originator of legal positivism – the view that the law and morality are not necessarily entailed by one another, contrary to traditional conceptual naturalism. Though Hobbes himself incorporated natural law into his social contract theory, his belief that the ultimate source of law came from the sovereign of the new state, whose decisions did not have to be grounded in morality, was substantial in the development of later jurisprudential arguments.

In particular, Jeremy Bentham and John Austin's reductionist theories were crucial to the development of modern legal positivism. Whereas Hobbes' theory saw legal propositions as prescriptive statements on conduct, Bentham and Austin argued that they were purely descriptive statements of social fact. Bentham in particular criticized the classic conceptual naturalists like Blackstone, arguing that to base the nature of law on a theory of natural rights was to inevitably attempt to morally justify the law. Instead, he drew a clear distinction between 'expository' jurisprudence and 'censorial' jurisprudence; setting out the law as it is, as a matter of social fact (expository), and subjecting the law to moral scrutiny and evaluation (censorial). Moreover, traditional approaches tended to conflate the issue of law-making authority as a matter of moral or political legitimacy – usually, like Hobbes, appealing to some social contract theory to explain the authority of legislators to enact laws. Again, both Bentham and Austin argued that they were confusing factual issues about what exactly the law is, with moral questions about whether it ought to be obeyed; law-making authority should simply be treated as a matter of social fact. Specifically, they believed that laws were a body of commands laid down by a sovereign entity (a supreme legislative body) in each particular legal system, and sovereignty was to be described as a social fact; of the regular tendency of the majority of a population to obey the commands of a legislative body. Ultimately, they regarded legal concepts as referring to structures of human behaviour, distinct from morality; Austin saw 'sovereignty' as a statement about regular patterns of human obedience, and 'legal obligation' as the likelihood of suffering a sanction in the case of non-compliance.

Similarly, H.L.A. Hart also believed that it was necessary to distinguish between law and morality, though both may coexist. However, he saw the reductionist theories of Bentham and Austin as inadequate in explaining the nature of law. To begin with, he argued that one can't establish a separation of the law and morality by just reducing legal propositions to straightforward, factual descriptions of regular patterns of behaviour – this fails to accommodate notions of justification, obligation, right and entitlement. For instance, while Austin saw legal obligation as simply a likelihood of sovereign-backed sanction (in the case of non-compliance), this view fails to account for a situation where a judge uses legal obligation as a reason, in of itself, for sanctions. Here, the judge is justifying the sanction with a rule, and not just predicting the likely application of a sanction. Instead, Hart develops the concept of an 'accepted rule' as a basis for legal validity. An accepted rule exists in the case of two aspects: the 'external' aspect, regarding regular patterns of conforming behaviour; and the 'internal' aspect or point of view, where such regular patterns of conduct are regarded as a *standard* that

ought to be complied with, serving as the basis of evaluation and criticism of conduct. By introducing the 'internal' aspect, rules are treated not just as an observable regularity (as reductionism argues), but as a prescription that guides our conduct. By extension, Hart argued that the basis of law-making authority also lies in the acceptance of a basic rule or standard that authorizes the enactment of new legal rules, and not in habits of obedience (as Austin argued).

Moreover, Hart disputed Bentham and Austin's claim that all laws are duty-imposing, arguing that this reduction ignores the differing social functions of different laws. For instance, Bentham believed that every law is a restriction on one's liberty in one way or another; hence, every law is an evil which needs to be justified by reference to its utilitarian value (i.e. whether or not it maximizes the utility of a consequence). But not all laws restrict conduct by imposing duties. Some intend to provide facilities or confer power (like laws the confer the power to make a will) without restricting our conduct in any way, and are thus fundamentally different to those that reductionism offer. Hart offers a distinction between such rules: on the one hand, there are 'primary rules' about conduct (e.g. do not kill); on the other hand, 'secondary rules' confer powers (e.g. the right to make a will), or are rules about other rules – how to alter, interpret and enact other rules and recognize them as valid. Of the 'secondary rules' in a legal system, Hart argued that the most important one was the *rule of recognition*: a body of fixed rules which enable legislators to determine which laws are valid and can guide our conduct. For Hart, every legal system contains a basic rule of recognition by reference to which we can identify fundamental sources of law (such as statutes and precedents in the UK). He believes we can find the content of such a rule through empirical observation of the officials as they decide legal disputes: their regular patterns of conduct (the external aspect) in deciding disputes by reference to rules emanating from certain sources (e.g. statutes), in addition to their acceptance of this 'method' of deciding cases as a standard that should be complied with (the internal aspect). Through reference to this rule of recognition, we can thus factually determine the content of existing, valid laws without reference to morality (i.e. regardless of whether a law is perceived as morally 'just' or 'right').

But despite Hart's attempts at intellectual clarification, there is still much doubt over whether or not the authority of a law-making body might be a matter of the morally binding force of that body's decrees, which legal positivism aims to deny. Though Hart might dismiss Austin and Bentham's reductionist attempts to explain law-making authority as facts of obedience, because they neglect the internal/normative aspect of law, the question still remains for Hart over how a legal positivist can conclude that legal propositions are a type of moral or normative judgement – without reducing them to predictive or fact-stating propositions. Legal positivist Hans Kelsen attempted to solve this by treating legal order as a body of 'valid' norms, and that we must adopt the 'basic norm' (*grundnorm*) that authorities in effective control must be obeyed. This answers the question of why rules like the rule of recognition are themselves valid; and because they are valid, they ought to be obeyed. Hart may criticize Kelsen's theory: that it returns to a Kantian line of natural law theory, of a basic natural law establishing the authority of the legislator (which goes against legal positivism) – or that the rule of recognition need no 'reason' for validity as it is a criterion for validity. But while these are strong criticisms of Kelsen's logically flawed argument, it misses the fundamental point of Kelsen's theory. Hart continually advocates for the importance of the 'internal point of view' – accepting a law as a standard that we ought to comply with. Hart's view also argues that a legal system's existence requires at least the officials to regard the rule of recognition from such an internal point of view. Does it not, therefore, follow that propositions about legal rights, duties, and validity are about what *ought* to be

done? Aren't legal propositions then just a type of moral judgement? Indeed, philosopher Joseph Raz argued that judges who speak of law as imposing *obligations* are assuming that the law is, in fact, morally binding. Overall, legal positivism's claim that the law is morally neutral seems inherently in conflict with Hart's assertion that normativity and the internal aspect have a substantive role in the nature of law.

Ultimately, while we might argue that conceptual naturalism and reductionist positivism lie at their respective extremes in the spectrum of debate around the nature of law, Hart's attempt to create a middle ground that incorporates both concepts of morality and law, whilst also asserting a clear distinction between them, seems inherently contradictory. Instead, we might conclude that the law is morally non-conclusive (as opposed to neutral); though we may disapprove of its content, we still see the law as generally morally binding, and yet conflicting obligations may in any situation override our moral obligations – hence, we are able to maintain the practical merits of positivism (that legal validity is non-conclusive to the question of obedience), while avoiding the difficult claim that legal obligation and moral obligation are independent.

What makes nitroglycerin so dangerous?

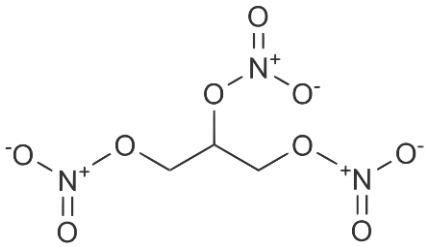
Henry Hall

First synthesized in 1847 Italy, nitroglycerin was the first 'practical' explosive more powerful than the black powder being used in small arms at the time. However, it proved so unstable and energetic that it was not until twenty years later, when Alfred Nobel invented dynamite, that it became safe be put to practical use on a large scale. Indeed, even today nitroglycerin is among the most powerful explosives used industrially;[1] more destructive than TNT and comparable to modern explosives such as RDX, which is used in products such as C4. What is it then that gives nitroglycerin such destructive properties?

To answer this question, first we must discuss what constitutes an explosive. There are two main forms of explosive: high and low explosives. Low explosives were first invented in the form of black powder, a primitive gunpowder. They consist of fuel mixed with a source of oxygen, which allows the combustion to occur at a much faster rate than if it relied on atmospheric oxygen alone. In the case of black powder, sulphur and charcoal serve as fuels, while potassium nitrate is used as an oxygen source, decomposing upon heating to release oxygen, resulting in rapid conflagration of the fuels. A low explosive 'deflagrates,' meaning that the fuels burn as the reaction front spreads throughout the explosive. This reaction front proceeds at a subsonic speed, hence no shockwave is produced, and the reaction can be described as simply a rapid form of combustion. A large volume of gaseous products is produced through combustion, which when in a confined space can result in extreme build-up of pressure, and consequently result in an explosion.[2]

In contrast, a high explosive 'detonates,' meaning the molecule does not release energy through combustion, but decomposes and in doing so releases a great deal of gas and heat. This rapid release of huge amount of energy into a small volume results in the formation of a supersonic shock wave which propagates throughout the explosive material, causing adjacent molecules to decompose in a similar fashion. This will continue until all explosive material has been detonated. This decomposition occurs much faster than the deflagration seen in low explosives, and in the case of nitroglycerin, the shock wave can travel through the material at around 7.7 km/s.[3]

But to understand why nitroglycerin is so sensitive and powerful even compared other high explosives, we must look closer at what it is that allows detonation to occur as opposed to deflagration. When looking at the display formulas of any explosive compounds, one of the most striking features is the abundance of functional groups containing nitrogen and oxygen present in the molecules, and it is primarily the presence of nitrogen that results in the huge amount of energy released upon detonation. When the molecule undergoes decomposition, nitrogen atoms can recombine to form N_2 molecules, in



Skeletal formula of nitroglycerin

Image Source: Wikipedia *Nitroglycerin*

[1] See Encyclopaedia Britannica, *Nitroglycerin*.

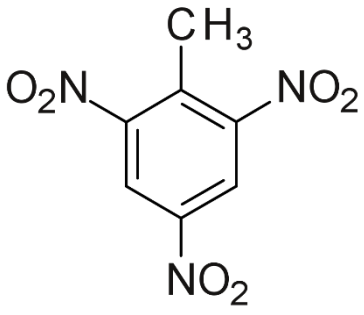
[2] See Los Alamos National Laboratory, *What is a high explosive*?

[3] See Encyclopaedia Britannica, *Nitroglycerin*.

which the two atoms are held together by an extremely strong triple covalent bond. In addition, the oxygen also reacts with the carbon and hydrogen present to form water and carbon dioxide. The enthalpies of formation of these products are far lower than that of the original molecule, and subsequently the decomposition of an explosive is an exothermic process which releases a great deal of energy. This energy excites the surrounding air and the gases produced through decomposition to form a destructive blast wave, which is the cause of the majority of the damage done by explosives.[4]

Although the compounds formed by oxygen as a result of decomposition are not responsible for as great a release in energy as the N_2 formed, they do, however, play a particularly important role. This is primarily because, owing to having such a negative enthalpy of formation, all nitrogen released reacts to form N_2, leaving only oxygen to react with the carbon and hydrogen. Therefore, enough oxygen must be present in the molecule to oxidize the carbon and hydrogen, and ensure that the energy released in the explosion is maximized. Nearly every commonly used high explosive contains oxygen for this reason. However, many do not contain enough to fully oxidize all of the products of decomposition. The ability of the oxygen atoms contained within a molecule to fully oxidize all these products is known as a compound's 'oxygen balance,' and is given in the form of a percentage.

An explosive's oxygen balance plays a large role in determining the power of the shockwave it produces, and hence its destructiveness. Many common explosives have negative oxygen balances, which means there is insufficient oxygen contained within the molecule to fully oxidize the products of decomposition, and hence the energy released through decomposition is limited. Conversely, those compounds with oxygen balances around or above 0 tend to be more powerful upon detonation.[5] To understand nitroglycerin's oxygen balance in relation to those of other explosives, we will introduce two commonly used explosives with which to compare it to: firstly trinitrotoluene ('TNT'), an explosive widely used in both military and civil applications, which is also used as the standard measure against which the destructive power of all other explosives are measured (known as the relative effectiveness factor, or 'RFE,' where the RFE of TNT is 1.00):



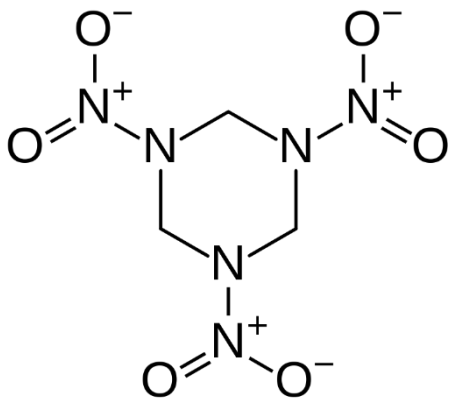
Skeletal formula of TNT

Image Source: Sigma-Aldrich *2,4,6 – Trinitrotoluene solution*

[4] See Federation of American Scientists, *Chemical Explosives*.

[5] See Federation of American Scientists, *Chemical Explosives*.

The second compound we shall use in comparison is hexogen (known as 'RDX,' standing for 'Research Department Explosive'), more powerful than TNT and widely used in military applications:



Skeletal formula of RDX

Image Source: Wikipedia *RDX*

A compound's oxygen balance is obtained through the following formula:[6]

$$Oxygen\ Balance(\%) = \frac{-1600}{Mr\ of\ Compound} \times (2X + \left(\frac{Y}{2}\right) + M - Z)$$

Where X is the number of atoms of carbon, Y is the number of atoms of hydrogen, M is the number of atoms of metal, and Z is the number of atoms of oxygen. The formula 'works' because $(2X + \left(\frac{Y}{2}\right) + M - Z)$ determines the number of oxygen atoms which are either deficient or in excess for converting all carbon to CO_2, all hydrogen to H_2O, and all metal atoms to a metal oxide. This number is then multiplied by the percentage value of the mass one atom of oxygen takes up in the molecular mass of the compound. Hence, we find the number of excess atoms of oxygen liberated from the molecule, expressed as a percentage of the mass of the molecule.

Now let's see how the oxygen balance of nitroglycerin compares to those of other molecules, starting with TNT. TNT has the chemical formula $C_7H_5N_3O_6$ and a relative molecular mass of 227, and so we can calculate its oxygen balance as follows:

$$\frac{-1600}{227} \times \left(2(7) + \left(\frac{5}{2}\right) - 6\right) = -74.0\%$$

This indicates that there is insufficient oxygen for the complete oxidation of the decomposition products, and as a result, less energy will be released in the explosion than would be released if more oxygen were present in the molecule. It is for this reason that TNT is rarely used on its own, but is often mixed with an oxidizer such as ammonium nitrate, which helps to ensure complete oxidation and reduce smoke and toxic by-products. The specific mixture of TNT and ammonium nitrate is known as Amatol; this was widely used during the Second World War.[7]

[6] See S2S *Oxygen Balance*.

[7] See Encyclopaedia Britannica *Detonating Cord*.

Now, let us compare the oxygen balance of TNT with that of RDX, which has the chemical formula $C_3H_6N_6O_6$, and subsequently a relative molecular mass of 222:

$$\frac{-1600}{222} \times \left(2(3) + \left(\frac{6}{2}\right) - 6\right) = -21.6\%$$

Here, we can see that RDX is far less oxygen deficient than TNT, which corresponds to the fact that, although exact figures depend on the techniques used in measurement, RDX has an RFE of around 1.6 compared to TNT.[8]

Finally, we will calculate the oxygen balance of nitroglycerin, which has the formula $C_3H_5N_3O_9$, and a relative molecular mass of 227:

$$\frac{-1600}{227} \times \left(2(3) + \left(\frac{5}{2}\right) - 9\right) = 3.52\%$$

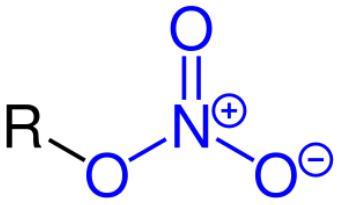
This shows that, unlike TNT and RDX, nitroglycerin in fact has a positive oxygen balance, and so is capable of fully oxidising all its products of decomposition. However, despite having a far superior oxygen balance to RDX, it too only has an RFE of around 1.6.[9] This is because, besides oxygen balance, there are several other factors which determine an explosive's properties.

Among these properties, some of those which have the most significant impact on an explosive's performance are physical rather than chemical. One of the most influential of these properties is the material's density, for fairly obvious reasons – the denser an explosive is, the more you can pack into a given volume. As a result, it will take less time for the shockwave to propagate throughout the entire material, leading to complete detonation and release of energy in a shorter time-span, and hence a more powerful shockwave. In addition, a greater mass of explosive can be packed into a given volume, which is useful for applications such as the filling of artillery shells. Differences in densities can help explain why, despite having a much higher oxygen balance, nitroglycerin has a similar relative explosive factor to RDX:[10]

Compound	TNT	RDX	Nitroglycerin
Density (g/ml)	1.60	1.78	1.60
Oxygen Balance (%)	-74.0	-21.6	3.52
Relative Effectiveness Factor	1	~1.6	~1.6

As we can see in this table, nitroglycerin has a density similar to that of TNT, as well as a significantly higher oxygen balance, which helps explain why, as an explosive, it's around 1.6 times more effective. RDX on the other hand has an oxygen balance lower than that of nitroglycerin, but this is offset by its higher density.

[8, 9, 10] See Wikipedia *TNT Equivalent*.



Display formula of nitrate ester functional group

Image Source: Wikidata *Nitrate ester*

Yet there is still one factor which makes nitroglycerin significantly more dangerous to work with than TNT and RDX – its sensitivity to shock and temperature, which is far greater than the sensitivities of the other two compounds. Unfortunately, no mechanism for detonation is precisely known, and consequently it is unclear as to what makes a molecule predisposed towards sensitivity. One possible explanation for nitroglycerin's comparative sensitivity is based on the fact that it is a nitrate ester, which are particularly sensitive to shock and heat, although the reasons for this are currently unknown.[11] This is supported by the fact that similar sensitivities to that of nitroglycerin are seen among other nitrate esters such as pentaerythritol tetranitrate ('PETN'),[12] a major component in the plastic explosive Semtex. However, although some correlations between a compound's sensitivity and its composition have been found, the details are not well understood.

In conclusion, we have explored the factors that cause an explosive to be explosive, and shown how nitroglycerin meets these criteria, principally through its almost neutral oxygen balance, as well as with its high nitrogen content. We have also seen how these factors compare to those of other common explosives, and thereby why nitroglycerin is unusually powerful. However, in order to better understand these conclusions, and especially the reason for nitroglycerin's high sensitivity, further research into the subject is required.

Bibliography

Encyclopaedia Britannica. *Detonating Cord*. https://www.britannica.com/technology/explosive/Detonating-cord#ref82389. Consulted 23/08/19

Encyclopaedia Britannica. *Nitroglycerin*. https://www.britannica.com/science/nitroglycerin. Consulted 23/08/19

Federation of American Scientists. *Chemical Explosives*. https://fas.org/man/dod-101/navy/docs/es310/chemstry/chemstry.htm. Consulted 22/08/19

Los Alamos National Laboratory. *What is a high explosive?* https://www.lanl.gov/museum/news/newsletter/2017/2017-04/high-explosives.php. Consulted 22/08/19

Manner, V. (09/03/2018) 'Examining the chemical and structural properties that influence the sensitivity of energetic nitrate esters', *Chemical Science* 9: 3649-3663

Sigma-Aldrich. *2,4,6–Trinitrotoluene solution*. https://www.sigmaaldrich.com/catalog/product/cerillian/ert022s?lang=en&region=GB. Consulted 23/08/19

[11,12] See Manner, V. 'Examining the chemical and structural properties that influence the sensitivity of energetic nitrate esters'

S2S. *Oxygen Balance*. http://www.safety-s2s.eu/modules.php?name=s2s_wp4&op=v&idp=728. Consulted 22/08/19

Wikipedia. *TNT Equivalent*. https://en.wikipedia.org/wiki/TNT_equivalent. Consulted 22/08/19

Wikidata. *Nitrate Ester*. https://www.wikidata.org/wiki/Q4321642. Consulted 23/08/19

Wikipedia. *RDX*. https://en.wikipedia.org/wiki/RDX. Consulted 23/08/19

Wikipedia. *Nitroglycerin*. https://en.wikipedia.org/wiki/Nitroglycerin. Consulted 23/08/19

Genetic editing and the law

Hakan Digby

The current UK Parliamentary Office of Science and Technology regulation on embryotic genome editing states, 'Human therapies – UK law prohibits the implantation of an embryo that has been genetically altered in any way (with the single exception of mitochondrial transfer)'.[1]

This means that any zygote, a fertilized egg, diagnosed with a genetic disorder through the use of genome sequencing is unable to be altered. The zygote has to be aborted or remain until birth according to the parents' wishes. This highly controversial topic is at the forefront of medicine with new breakthroughs developing weekly. This essay will aim to highlight the key arguments for and against the genome editing procedure and how the procedure works.

The procedure of genome editing, in its infant stage, involves the fertilization of a maternal egg to form a zygote, and then for this zygote to be injected with CRISPR-cas9, 'which is short for clustered regularly interspaced short palindromic repeats and CRISPR – associated protein 9'.[2] The procedure involves using an extremely thin needle to puncture the cell surface membrane without damaging the zygote. The cas9 enzyme is bound with an RNA (Ribonucleic acid) marker, which ensures that it locates and removes the part of the genome that has caused the mutation. Once the mutated gene has been spliced out of the DNA sequence, nitrogenous bases, building blocks of a gene, are activated. Subsequently, they bind onto their complementary pairing, using hydrogen bonding, to rebuild the gene without a mutation. The complementary base pairings consist of Adenine to Thymine and Cytosine to Guanine. Once bound, an enzyme called DNA polymerase catalyses the reaction for the formation of phosphodiester bonds between the new base pairings and rest of the DNA molecule. After the mutation has been corrected the zygote is able to be left to divide by mitosis, a process in which the single fertilized cell divides into genetically identical daughter cells, repeating until an embryo is formed. This process of mitosis continues until the embryo grows into a fully developed child with none of its bodily cells carrying the original mutation in the zygote.

This technology has a tremendous power to help the lives of millions of children. 'It is estimated that 1 in 25 children is affected by a genetic disorder'[3] in the UK. This is an estimation, as many children with neurological disorders, may not have had their genomes sequenced. This highlights the size of the population of children born into a life of disadvantage and the substantial number of families who have to take special care of them.

From personal experience, I understand the pain and frustration children with genetic disorders face and the difficulties that come with looking after these children. Over a dozen years, my family and I

[1] http://webcache.googleusercontent.com/search?q=cache:asibx4vZ-S8J:researchbriefings.files.parliament.uk/documents/POST-PN-0541/POST-PN-0541.pdf+&cd=11&hl=en&ct=clnk&gl=uk&client=safari (page 3) [accessed 1/7/19].
[2] https://ghr.nlm.nih.gov/primer/genomicresearch/genomeediting [accessed 4/7/19].
[3] https://www.geneticdisordersuk.org/about-us [accessed 4/7/19].

have visited many specialists across the span of paediatric medicine seeking a diagnosis for my sister. It was not until recently that the cost of a full genome sequence was economically viable, the cost of this test has reduced from approximately 1 million dollars in 2007 to 1000 dollars in 2017.[4] Following this test it was established that my sister has a de novo (not inherited) Shank3 point mutation causing Phelan McDermid syndrome. It is a rare disorder with only '2.5 – 10 per million births'[5] having this condition. This condition has varied impacts on different children. In my sister's case, when she is on a flare, a period of time lasting for a month or longer, she has an adrenaline spike. It causes a severe lack of sleep, a maximum of 3 hours a night, with a continuous need for movement. This movement is combined with additional sensory needs such as, repetitive loud noises and an urge to taste inedible objects. This condition causes my sister to need continuous adult supervision while she is awake. If genome sequencing and editing were prevalent before my sister was born, my parents would have had the option of a treatment and she would have had the chance of living a life without disadvantage.

The financial cost to the government, to care for people with rare genetic disorders, is substantial and split across a number of government departments, which makes it difficult to quantify. In a feasibility study conducted in 2016 by Genetics Alliance, it was quoted 'The true costs of rare conditions are unknown.'[6] It was also quoted 'The current budget for specialized services (including highly specialized services) is £15 billion, which accounts for 10% of NHS spending.'[7] This funding is only the budget given to the NHS by the government. It covers the cost of care for the NHS, which may include, a consultant's clinical diagnosis, continuous supervision from doctors or nurses, expensive medication, and in some cases life support.

In addition to this NHS expenditure, the burden is borne by local councils who have to provide schooling with support or a placement in a specialist school, which is funded from the education budget. In more severe cases homecare may be required and this is funded from the local council's social care budget. From the age of 25 all related costs are also funded through the social care budget. If these patients were genetically altered using CRISPR-cas9, it would eliminate the need for this lifelong care at the cost of a full genome sequence and a single correcting procedure.

The Guardian quoted in 2018 that 'The NHS in England overspent by £4.3bn last year, while the 240 NHS trusts owe the Department of Health and Social Care £7.4bn in outstanding historic loans.'[8] In total having a deficit of £11.7 billion. The potential savings from genetic editing can be one of the options to help reduce or eliminate this large debt. Alternatively, these savings can lead to improvements in the working conditions of NHS staff and help decrease waiting times for patients in need of desperate attention. Funding the NHS will benefit the entire population.

Conversely, the safety of genome editing has not been established, as there have not been enough clinical trials on humans. While intended to cure genetic disorders, there is a risk that it may lead to

[4] https://www.genome.gov/about-genomics/fact-sheets/Sequencing-Human-Genome-cost [accessed 30/7/19].
[5] https://rarediseases.org/rare-diseases/phelan-mcdermid-syndrome/ [accessed 5/7/19].
[6] https://www.geneticalliance.org.uk/media/2502/hidden-costs-full-report_21916-v2-1.pdf [accessed 23/7/19].
[7] https://www.geneticalliance.org.uk/media/2502/hidden-costs-full-report_21916-v2-1.pdf [accessed 23/7/19].
[8] https://www.theguardian.com/society/2018/oct/21/nhs-20bn-cash-risks-paying-off-debts [accessed 6/7/19].

more severe mutations. This may cause children to be born with a more disadvantageous condition, further impacting their wellbeing. Parents who made this decision on the behalf of their future children will have to suffer from the consequences both emotionally and physically. Additionally, this potential adverse result will increase the financial burden on the state, as the cost of care for these children will rise.

Before the legality of this technology can be argued, regulatory measures have to be put in place to ensure its ethical use. He Jiankui, the rogue scientist behind the He lab incident, was able to perform the genome editing procedure through the lack of regulation in China. He, allegedly, genetically edited two zygotes in order for them to be immune to HIV. Without regulation, genome editing can be used for human enhancement, rather than curing genetic disorders. This may cause increased inequality, with wealthy families able to finance the procedure, in order to enhance their children genetically. These genetically enhanced children would perform better in both academics and sports, through their predetermined genetic make-up. The inability for unmodified children to compete with 'designer' children will further increase the inequality and change the course of evolution in favour of the wealthy.

To those with a religious persuasion, this change in the course of evolution, begs the question: will we be playing God? At *Genesis* 1:26 God said: 'Let us make man in our image, according to our likeness.' By using genome editing technology, humans will be changing God's work. As, Christians believe, God created man in his own image and likeness, for anyone to alter the image of man is a direct defiance of God's will. Christian stewards have the responsibility to care for others and they will argue that genome editing may have the risk of causing detrimental harm onto future generations. Christians are also concerned about justice and equality; this technology – when abused – has the risk of causing greater inequality, which is not condoned by Christian teachings.

However, if genetic editing technology is implemented in an ethical manner, in order to cure life-ruining genetic disorders, Christians may support this technology. The bible says, 'And Jesus went about all Galilee … healing all manner of sickness and all manner of disease among the people' (Matthew 4:23). This technology, when used to cure genetic disorders, can be interpreted as God-given knowledge, just as God gave Jesus the power to heal disease among the people. God intended man to discover this treatment, to help the lives of anyone suffering from genetic diseases.

In conclusion, I believe that genome editing technology, when applied in an ethical manner, has an immense potential to cure children, who were once destined to have genetic disorders. Furthermore, regulation would allow this technology to be used to cure diseases, rather than be abused for personal gain. It is essential that human trials are performed before the technology can be deemed safe, legalized and become a mainstream treatment. Human trials will ensure that genome editing does not have any unforeseen consequences such as increasing the severity of genetic disorders. Once regulation has been put in place and human trials have been successful, this technology should be legalized and used to help cure genetic disorders within zygotes. Implementing genome editing should be the priority for the UK government and the NHS, as it has the potential to cure all genetic disorders and reduce the cost of treatment for sufferers of genetic diseases.

I am confident that the next stage in genome editing development, beyond treating mutations within a zygote, is to change the genes of a person born with a genetic disorder. The current thinking is that a virus can be used to infect all the bodily cells, carrying the mutation, with CRISPR-cas9, correcting the genes and removing the mutation entirely. This would be an incredible feat in the history of medicine and mankind, in which no child, born or unborn, has to live a life of handicap and disadvantage, due to a mutation caused by chance or through inheritance. Every child should be given the opportunity to flourish and enjoy the pleasures most of us take for granted.

Polymers and chemistry: where do we go from here?

Nicholas Field

Over the past hundred years, humans have become utterly reliant upon synthetic polymers. As first proposed by Hermann Staudinger in 1920, they are considered conventionally to be macromolecules, consisting of many monomers covalently bonded in long, polymeric chains.[1] The material properties of such polymers are dependent on the nature of outer groups attached to the central chain, and on polymer morphology and interactions. Crystalline polymers have ordered chains and tend to be rigid and opaque, whereas amorphous polymers have tangled chains and tend to be more flexible and transparent. Thermoset plastics have crystalline structures with cross-linked chains, whereas thermoplastics, which are not cross-linked, assume amorphous or semi-crystalline structure, depending on temperature.

These covalent polymers have been joined more recently by supramolecular polymers, comprising assemblies of monomers held in place by non-covalent, reversible and highly directional secondary interactions. Supramolecular polymer chemistry advanced rapidly after the description by E.W. Meijer and colleagues in 1997 of strong dimerization between ureidopyrimidinone (UPy) groups. This occurs through the formation of long-lived, self-complementary arrays of four hydrogen bonds, allowing stable supramolecular polymers to be formed for the first time.[2] Through fine-tuning the direction and strength of these interactions, the resulting material can be made to behave similarly to conventional polymers. However, the reversibility of non-covalent bonding results in self-assembly under thermodynamic equilibrium, with chain length and mechanical properties determined by the strength of interactions, the concentration of monomers, and temperature. This results in some peculiar properties which are the subject of current research.

One promising field concerns the development of supramolecular polymers that undergo conformational changes through host-guest interactions with metal ions. A variety of applications are possible. For example, monomers comprising thiopene and imidazophenazine, which fluoresces under UV light, self-assemble into supramolecular polymers through intermolecular pi-pi stacking. These interactions are disrupted by the presence of Ag+ ions, causing a reduction in charge transfer between monomers that reduces intensity of UV fluorescence and changes visible absorption. This property provides a sensitive, specific indicator for the presence of Ag+ ions.[3] Such sensitive indicators might be particularly useful when very low-level contamination is hazardous, for instance, in the nuclear industry. In this scenario, however, conformational changes would ideally result in capture of harmful ions. To this end, a mixture of melamine and trimesic acid in aqueous solution has been shown to self-assemble into a hydrogen-bonded supramolecular organic framework that selectively removes

[1] Staudinger, H. (1920) 'Über Polymerisation', *Berichte der deutschen chemischen Gesellschaft* 53: 1073–85.

[2] Sijbesma, R. *et al*. (1997) 'Reversible polymers formed from self-complementary monomers using quadruple hydrogen bonding', *Science* 278: 1601–4.

[3] Shi, H. *et al*. (2017) 'A novel self-assembled supramolecular sensor based on thiophene-functionalized imidazophenazine for dual-channel detection of Ag^{+} in an aqueous solution', *RSC Advances* 7: 53439–44.

uranium, in the form of uranyl ions, via solid-phase extraction.[4] Scanning electron microscopy shows a spontaneous change from nanowire morphology to uniform nanosheets as uranyl ions are accommodated into the lattice. The resulting yellow solid may be removed, providing an easy and efficient process for extracting, and potentially recycling, uranium. As supramolecular polymers are developed with specificity for other ions, copolymers might follow that detect, or extract, a variety of ions, either simultaneously or in step-wise fashion. Such materials might be applied as supramolecular polymer coatings to vessels, changing colour if filled with contaminated solutions, or perhaps used to safely transport harmful materials in a stable, self-healing structure.

Another promising field concerns the interface between supramolecular polymers and biology. One application is the shielding of molecules within polymer structures, with release occurring only when conformational change is induced. This could be exploited to control drug delivery in the body. Proof of concept has been demonstrated with fluorescent proteins held within supramolecular vesicles, formed by self-assembly of ternary complexes that comprise equimolar proportions of cucurbit[8]uril, alkyl-substituted methyl viologen and azobenzene bearing substitutions of oligo(ethylene glycol) and Arg-Gly-Asp peptide, an integrin receptor ligand.[5] The vesicles target tumour cells that over-express integrin receptors, leading to selective delivery of fluorescent protein. Another application for supramolecular polymers is in enhancing biocompatibility of vascular grafts through incorporation of bioactive groups. Cell-free vascular grafts formed from UPy-modified polymer scaffolds, including UPy-facilitated stromal cell derived factor 1α (SDF1α) peptides, have been shown to induce rapid population of the polymer structure by progenitor cells.[6] A future can therefore be envisaged in which damaged body parts are easily replaced, and chemotherapy or other drugs are delivered more precisely than is possible at present, potentially decreasing dose requirements and side-effects.

These examples barely scratch the surface of the vast array of applications envisaged for supramolecular polymers. In recent years, supramolecular inks, carbon fibre, self-healing coatings, organic electronics and hydrogel bone templates have all been developed, with potentially significant advantages over the products they might replace. Increasing sophistication of computer modelling will enable more varied and imaginative routes of synthesis, and cross-discipline collaboration will introduce new and ingenious applications. Furthermore, materials have been developed that combine covalent polymers with supramolecular end-groups. These hybrids may be more durable than purely covalent polymers, while also being simpler to recycle, satisfying consumer demand for high quality products with reduced environmental impact.

In summary, supramolecular polymers are likely to play increasingly important roles in an extraordinarily wide range of applications. The likes of self-assembling eye-drop contact lenses, surface coatings that prevent the spread of disease by capturing pathogens, and glucose-sensitive insulin delivery mechanisms, are appealing depictions of the bright future that supramolecular polymers will

[4] Li, B. *et al*. (2017) 'Conversion of supramolecular organic framework to uranyl-organic coordination complex: a new 'matrix-free' strategy for highly efficient capture of uranium', *RSC Advances* 7: 8985–93.

[5] Cavatorta, E. *et al*. (2017) 'Targeting protein-loaded CB[8]-mediated supramolecular nanocarriers to cells', *RSC Advances* 7: 54341–6.

[6] Muylaert, D. *et al*. (2016) 'Early in-situ cellularization of a supramolecular vascular graft is modified by synthetic stromal cell-derived factor-1α derived peptides', *Biomaterials* 76: 187–95.

bring. The field will advance through hard work, in conceptualising and designing new molecules, in creating efficient routes of synthesis and purification, and, finally, in investigating their properties with scientific rigour. The beauty of such work is its ability to respond to new demands. It is, by its very nature, open-ended.

Where is everybody?

William Brilliant

'Where is everybody?' exclaimed Enrico Fermi to his lunch companions one summer's day in 1950. He wasn't referring to the empty restaurant. Instead, he was referring to one of the greatest, most perplexing, and—as of yet—still unanswered questions of astronomy, a question that has since been dubbed the Fermi paradox: where are all the aliens? More specifically, where are all the intelligent alien species with whom we could hold a conversation? Despite broadcasting our location into space via radio waves for nearly a century, despite scouring every inch of the night sky with radio telescopes in the hopes of receiving a response, we have not heard a single peep from any galactic neighbours. This essay will attempt to explain why this is so perplexing and offer just a few of the many possible explanations that people have put forward for the paradox.

Firstly, it is important to understand why there is a paradox at all. One could reasonably assume that if we haven't found any intelligent alien life then it is simply because there isn't any. What's so hard to understand about that? Enter Frank Drake. In 1961, he developed an equation to estimate the number of intelligent alien civilizations that should exist and be broadcasting their location to us,[1] wittingly or not. The Drake equation is beautifully simple, merely multiplying a series of numbers and probabilities together. The numbers Drake used are: the number of new stars born in our galaxy each year; the fraction of those stars with planets around them; the average number of habitable planets around these stars; the fraction of those habitable planets that end up developing life; the fraction that end up developing *intelligent* life; the fraction of those intelligent species that create technology that would send out detectable signals; and the length of time for which those signals are being sent out. Unfortunately, Drake didn't know the exact value of most of his numbers, yet with his best estimations he calculated that there should be anywhere between 1,000 and 100,000,000 alien civilizations which have the technology to communicate with us. Even if we take the lower estimate, that means there should be 1,000 other alien species that we should be able to detect. So why haven't we found them yet?

Many possible answers have been offered for the Fermi paradox, but I shall focus on three. The first is the possibility that there really are no aliens out there. This would suggest that at least one (although probably several) of Drake's parameters are incorrect. Interestingly, with the advancement of telescopes and astronomical observation, we can now estimate some of those parameters to a higher degree of accuracy. Current estimates from NASA and ESA put the rate of stellar creation at 1.5 to 3 new stars per year,[2] whilst we now know that most stars have planets, with as many as 22% of sun-like stars having habitable Earth-like planets,[3] leading to at least 4 billion planets that should be capable of supporting life.[4]

[1] Robitzski 2018.
[2] Kennicutt and Evans 2012.
[3] Petigura 2013: 19273
[4] Plait 2013.

So we know that there are lots of potentially habitable planets out there, but now we come onto the last four parameters of the Drake equation, which can really be shortened to two factors: what percentage of habitable planets will develop intelligent life that can communicate with us, and how long do these civilizations last? If we are assuming that there is no intelligent alien life out there, then there are three things that could be preventing it: either life never starts, life never develops to intelligence, or intelligent life doesn't exist for long enough for us to have found it. Drake initially assumed that so long as a planet was habitable, it was inevitable that not only life, but intelligence would eventually arise, yet perhaps both these assumptions are wrong. It is possible that there are certain barriers that all lifeforms have to get through in order to advance towards intelligence, and that many of these alien species (indeed, maybe all of them) have been unable to pass through, either hitting evolutionary dead-ends or going extinct. This is called the Great Filter theory,[5] but just where these filters are is the topic of much debate. Perhaps the very emergence of living matter from non-living matter (called abiogenesis) is a filter: it is simply too difficult for life to even begin, and thus no other living organism has emerged on any other planet, despite them being hospitable to life. Other potential filters could include the evolution from simple prokaryotic cells to complex eukaryotic cells, the jump from single-celled to multicellular life, or even the emergence of intelligence itself. However, there is a much more worrying possibility, which is that the Great Filter is in fact ahead of our species, not behind as in the previous examples. It might be that all advanced species are destined to wipe themselves out, be it through weapons of mass destruction, runaway nanobot technology, malevolent AI, self-made super viruses... the list of events that could wipe us out is certainly very extensive. Even if humanity is not destined to destroy itself, it's possible that events out of our control—super volcanoes, gamma ray bursts, solar flares and more—wipe out every advanced species before they're able to survive long enough to interact with other civilizations. In a strange twist, it would be better for humanity if we never found any alien lifeforms, as this would suggest that we have already passed the Great Filter, being the first (and potentially last) species to do so.

A second explanation for the Fermi paradox is that there is alien life out there, but they are simply not interested in communicating with us. Consider, for example, what happens when you see an anthill. At best, you marvel for a moment at how much these tiny, simple creatures have accomplished, before continuing home to your skyscraper-filled city. At worst, you kick the hill over. But at no point do you stop to discuss Mozart's finest symphony or attempt to explain general relativity. Similarly, perhaps there are advanced alien empires out there who have received our calls, considered for a moment how endearing it is that the apes have finally cracked radio waves, before returning home to derive the entirety of quantum gravity from scratch. Even if the aliens are not dismissive of our efforts to communicate, they might be intentionally isolating the Earth to allow it to develop naturally, or to allow us to grow out of our violent ways before communicating with us. However, this theory—called the zoo hypothesis—seems unlikely in my opinion, as it requires every single alien individual to never reach out to us, which seems improbable in a civilization of billions or even trillions of beings.

A final possibility as to why we have found no evidence of aliens is that they do exist but cannot communicate with us. Humans tend to view the universe with us as the central characters, and thus when we imagine alien lifeforms, we naturally think of vaguely humanoid creatures with similar

[5] Davis 2018.

technology and an intelligence like ours. Whilst there is evidence that alien chemistry, if not culture, is likely similar to life on Earth (for example, carbon is the most diverse element, able to form more molecules than every other element combined,[6] meaning aliens will likely also be carbon-based), there is nothing that necessitates aliens having to look, think or communicate anything like us. The anthropomorphism in all of us could very well be nothing more than wishful thinking; alien life could be so alien that it is absolutely impossible to converse.

Even if aliens weren't so different to us, the biggest barrier to two-way communication could simply be technology. Consider this: homo sapiens emerged in Africa about 200,000 years ago, yet it was only about 100 years ago that we discovered radio waves and began to send detectable signals into space. If any alien lifeform had attempted to send us a radio signal any time in our existence before this discovery, even though we would have considered ourselves an advanced, intelligent, civilized species, we would have been completely ignorant of it. Now consider what will become of our technology in the next few millennia. Anyone who has seen *Back to the Future* will know that predicting the future is an incredibly difficult challenge, yet do you really imagine that we will still be using the exact same method of communication as we do now? It might be that we are currently occupying the tiniest slice of our existence where we can send and receive radio waves, and thus only other species who occupy this exact same window will be able to communicate with us. Any species even slightly more or less advanced will be deaf to us, and we deaf to them. Thus, there may be aliens out there, but we are simply looking for them at the wrong time.

In fact, time might just be the biggest factor in our fruitless search for extra-terrestrial life. The simple truth of the matter is that at most we've been sending out radio waves for a century or so, and because of the finite speed of light, this means that our radio-bubble (the distance into space that our radio waves have penetrated) has a diameter of only 200 light-years, making up just 0.2% the length of the Milky Way galaxy![7] Perhaps there are alien species, but they are simply too far away to have heard us yet. This could explain why we haven't heard from younger civilizations like our own, but still doesn't explain why we haven't heard from older species which should presumably have been broadcasting signals for millennia.

In conclusion, the lack of observation of any extra-terrestrial life is both perplexing and worrying. Either there are no intelligent aliens, implying that humanity and Earth is exceptionally lucky, unique, or heading towards almost certain doom; or there are aliens, but they are unable or unwilling to communicate with us. Personally, I find it unlikely that there are large, highly advanced civilizations spanning the galaxy unbeknownst to us, as such a civilization ought to be emitting all sorts of signals (even unintentional ones) into space that we should be able to pick up. Even if their technology has advanced beyond the use of radio waves, evidence of their civilization, such as Dyson spheres (massive structures that surround stars and harvest their energy) should be visible. That raises the question of why there are no advanced civilizations, despite there being a little less than 13.8 billion years for them to arise (humanity arose on a planet just 4.5 billion years old, for context). This makes me believe that the Great Filter theory is to blame here, and intriguingly, we may be able to narrow down where those filters are as we search for life in our solar system; if we find that life has developed to a certain stage

[6] *Information today*. (11/04/18) 'Neil deGrasse Tyson - Mind-Blowing Facts About The Universe - Top Speech'.
[7] Lakdawalla 2012.

twice in one solar system, then we can be relatively sure that the Great Filter is still ahead of that stage of development. Unfortunately, given the challenges we face today with climate change, nuclear weapons, and the many possible extinction events that could hit our planet and wipe us all out, I believe that there is a good chance that the Great Filter is still ahead of us.

So, will we find intelligent alien life in our galaxy? I believe there is a good chance we will, but only if we survive long enough for our radio signals to reach them. So all we need to do to find alien life and form a galactic inter-species alliance trading technology and knowledge for the betterment of both parties is to protect the Earth from a whole host of life-ending catastrophes, prevent the collapse of our ecosystem due to man-made climate change, overcome the divisions of the world to become a unified, peaceful civilization, and not kill each other in the meantime.

How hard can it be?

Bibliography

Al-Khalili, J. (2012) *Paradox: The Nine Greatest Enigmas in Physics*. Broadway Books

Brennan, P. (2019) *How many exoplanets are there?* https://exoplanets.nasa.gov/faq/6/how-many-exoplanets-are-there/. Consulted: 22/07/19

Davis, M. (2018) *Is the universe a graveyard? This theory suggests humanity may be alone*. https://bigthink.com/matt-davis/is-the-universe-a-graveyard-the-great-filter-theory-explains-why-we-havent-found-alien-life. Consulted: 22/07/19

Drake equation. (2019) https://en.wikipedia.org/wiki/Drake_equation. Consulted: 22/07/19

Fermi paradox. (2019) https://en.wikipedia.org/wiki/Fermi_paradox. Consulted: 22/07/19

Hawking, S. (1988) *A brief history of time: From the Big Bang to Black Holes*. Bantam Books

Information today. (11/04/18) 'Neil deGrasse Tyson - Mind-Blowing Facts About The Universe- Top Speech'. https://www.youtube.com/watch?v=PuCuw3c6ga4

Kennicutt, R. and Evans, N. (2012) 'Star Formation in the Milky Way and Nearby Galaxies', *Annual Review of Astronomy and Astrophysics* 50(1): 531–608

Lakdawalla, E. (2012) *This is how far human radio broadcasts have reached into the galaxy*. http://www.planetary.org/blogs/emily-lakdawalla/2012/3390.html. Consulted: 23/07/19

Petigura, E. Howard, A. Marcy, G. (2013) 'Prevalence of Earth-size planets orbiting Sun-like stars' *Proceedings of the National Academy of Sciences. Vol 110, (48)*: 19273–19278

Plait, P. (2013) *The Sky May Be Filled with Earth-like Planets*. https://slate.com/technology/2013/11/earth-like-exoplanets-planets-like-ours-may-be-very-common.html. Consulted: 22/07/19

Robert, C. Kennicutt, Jr. Evans, N. (2012) 'Star Formation in the Milky Way and Nearby Galaxies' *Annual Review of Astronomy and Astrophysics*. Vol 50, (1), p. 531–608

Robitzski, D. (2018) *The Scientist Who Reevaluated The Drake Equation Still Thinks Alien Life is Out There*. https://futurism.com/life-universe-scientist-drake-equation-study. Consulted: 09/08/19

Scalzi, J. (2003) *The rough guide to the universe*. Rough Guides

Shostak, S. (2019) *'Zoo hypothesis' may explain why we haven't seen any space aliens*. https://www.seti.org/zoo-hypothesis-may-explain-why-we-havent-seen-any-space-aliens. Consulted: 23/07/19

The Fermi Paradox – Where Are All The Aliens? (1/2). (06/05/15) Kurzgesagt – in a nutshell. https://www.youtube.com/watch?v=sNhhvQGsMEc. Consulted 23/07/19

The Fermi Paradox II – Solutions and Ideas – Where Are All The Aliens? (04/06/15) Kurzgesagt – in a nutshell. https://www.youtube.com/watch?v=1fQkVqno-uI. Consulted 23/07/19

Wall, M. (2012) *160 billion alien planets may exist in our Milky Way galaxy*. https://www.space.com/14200-160-billion-alien-planets-milky-galaxy.html. Consulted: 22/07/19

Where be aliens? (19/11/16) exurb1a. https://www.youtube.com/watch?v=7cidUaUCb5M. Consulted: 24/07/19

Why Alien Life Would be our Doom - The Great Filter. (01/02/18) Kurzgesagt – in a nutshell. https://www.youtube.com/watch?v=UjtOGPJ0URM. Consulted: 23/07/19

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