

**THE
POSTNORMAL
TIMES
READER**

VOLUME 2

EDITED BY
**ZIAUDDIN SARDAR
SHAMIM MIAH
C SCOTT JORDAN**

The World has changed rapidly and dramatically since the publication of *The Postnormal Times Reader* in 2019. We have moved from 'climate emergency' to an era of 'global boiling'. 'Climate refugees' has become a recognised term. Open AI has metamorphized into ChatGPT. The revolutionary gene editing technology CRISPR has been replaced with even more revolutionary CRISPR-Cas3 which can 'chew up DNA like Pac-Man'. Insects started appearing on the menus of posh restaurants. Fascism became a global phenomenon, with democracy under pressure everywhere. We had hardly recovered from the Covid-19 pandemic when the Ukraine-Russia war created yet another world-wide 'cost of living' crisis, adding to our apparent state of permanent crisis. Our ways of learning and knowing – our very cultures and worldviews – are now being crafted by postnormal times.

The Postnormal Times Reader Volume 2 demonstrates that the time for preparation is over. We must now navigate the storm from within. Postnormal times are no longer about anticipating something that is lurking over the horizon. Postnormal times are already here – with their attended consequences of contradictions, complexity, and chaos. It presents an expanded and updated version of the postnormal times theory, which is now being employed in a wide range of disciplines – from political science and policy studies to science education, museology and drama and theatre education. This volume also throws light on how we can move beyond the transition of postnormal times into sane and sustainable mutually assured futures, through transformative creativity and bold imagination.

Understanding and learning to navigate postnormal times has now become crucial for our own existence, as well as the ecological survival of the abode of our terrestrial journey – the planet.

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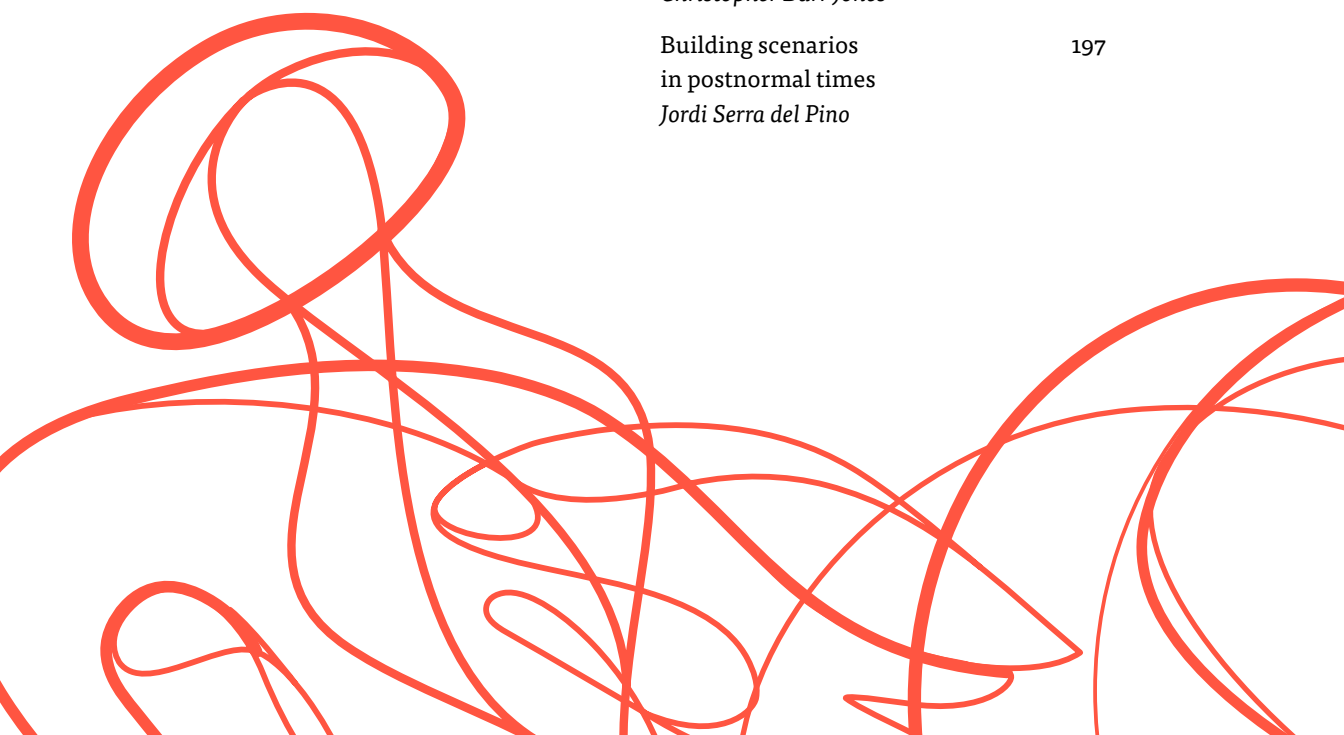
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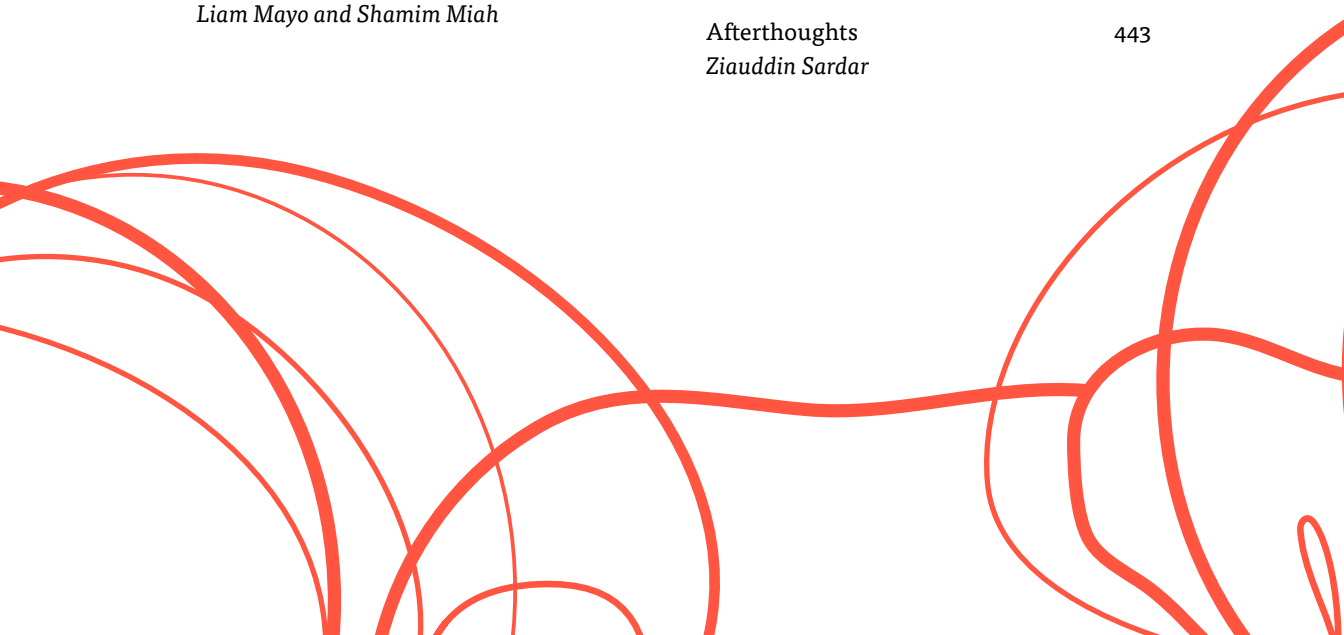


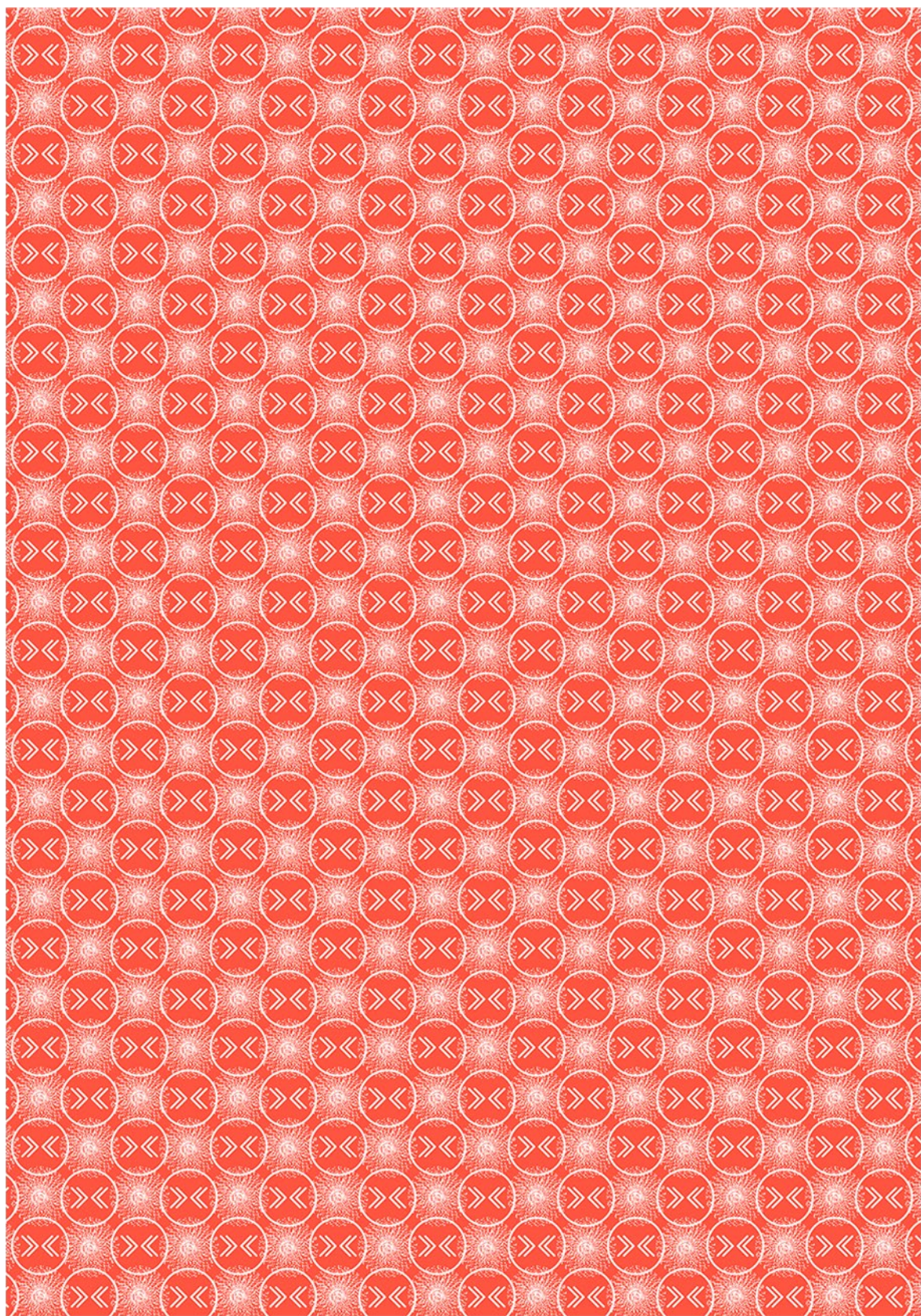
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INTRODUCTION

WHAT IS HAPPENING NOW?

Ziauddin Sardar and Shamim Miah

The world has faced some drastic changes since the publication of *The Postnormal Times Reader* in 2019.

There was, of course, the Covid-19 pandemic which brought the globe to a grinding halt. Russia invaded Ukraine, leading to disruptions of supply chains, energy deficits, and the cost of living crisis. The world finally realised just how interconnected and interdependent the planet had become. The Far Right came to power, or edged closer to political control, in Israel, Hungary, Poland, Czech Republic, Italy, and the Scandinavian states. Latin America moved Left. NATO withdrew in disgrace from Afghanistan; and the Taliban returned to power in the country. Pakistan became unstable (again). Muslims declared *persona non grata* in India. Climate change became climate emergency; and the World Meteorological Organisation declared that temperatures are likely to rise more than 1.5°C above pre-industrial levels by 2027. Scores and scores of hurricanes and storms appeared. Parts of Italy drowned. Climate refugees became a recognised term. Cybercurrency collapsed as some noted banks went into liquidation. Inflation returned worldwide. The revolutionary gene editing technology CRISPR was succeeded by CRISPR-Cas3 which can 'chew up DNA like Pac-Man'. Insects started appearing on the menus of posh restaurants.

Just as we are experiencing climate emergency in real time, we are now actually living through postnormal times. Postnormal times are no longer about anticipating something that is lurking over the horizon. Postnormal times are already here – with their attended consequences of contradictions, complexity, and chaos.

Consider the fact that we are rapidly transitioning from the development of basic artificial intelligence algorithms to generative AI, and even machine superintelligence. These game changing technologies will have a serious impact on every aspect of our lives from jobs to education, from economies, medicine, to knowledge production, and could even pose a threat to human survival. Open AI, which was only set up seven years ago by venture capitalists and investors, including Peter Tiel of PayPal and Elon Musk of Tesla, SpaceX, and Twitter, has now metamorphized into ChatGPT. It is a chatbot with the ability to provide answers to complex questions, create songs, write codes, and compose haikus and limericks in an instant. It even wrote and developed a horror movie titled *Oil and Darkness* – the director only had to provide a title, basic content, plot details, key characters, and simply ask the AI chatbot to write a script about a 'horror film set on an oil rig.' But apart from writing scripts, ChatGPT will also put the future of education, journalism,

and related professions into question. The public discourses surrounding ChatGPT has been conflicting; some have applauded the use of technology in responding to social challenge, while others have described AI text generated models as 'fluent bullshit'.

'Bullshit' is one of the many words that have moved from the domain of profanities and expletives to a highly conceptual category. In *On Bullshit* Harvard professor Harry G. Frankfurt captured the ubiquitous feature of this cultural phenomena in contemporary society. He sees bullshit as being distinct from lying, because it places little value in truth; instead, it deliberately makes false claims about what is truth. [1] So given the nature and the context of post-truth, many have rightly questioned the impacts of AI generated responses and the future of the quality of data that chatbots are trained on. Amit Katwala writing in *Wired* argued that ChatGPT relies upon existing data created by humans in an era of post-truth. The quality, and as such, the substance of the outcome would be deeply suspicious. He notes, 'in the end, Chat GPT's bullshit is a reminder that language is a poor substitute for thought and understanding. No matter how fluent and coherent a sentence may seem, it will always be subject to interpretation and misunderstanding'. [2]

**IN A WORLD WHICH HAS LITTLE REGARD FOR ANY TRUTH, CHATGPT'S
HIGH PROBABILITY OF INCORRECT ANSWERS IS LITTLE OR NO CONCERN
FOR THE PUBLIC. YET, IT IS A DISTINCTIVELY POSTNORMAL
PHENOMENON WITH MINDBOGGLING CONSEQUENCES FOR OUR EPOCH.**

'Epochs', argues the noted sociologist Goran Therborn, 'turn according to their own temporality, rather than following the Gregorian calendar; yet for those living them, the calendar can still provide a handy tool on which to mark historical ruptures and transitions'. [3] More and more scholars, academics and thinkers are now trying to pin down just what is so different about the current epoch. For Therborn, the twenty-first century can be described as a dialectical century; whereby changes are brought not through innovation and growth but through contradictions, conflicts, and unintended consequences. For Nancy Fraser, American philosopher and cultural critic, the zeitgeist can be summed up by the title of her little book, *The Old Is Dying and the New Cannot Be Born*. It is, as though, Fraser suggests, the authority of the established order has suddenly evaporated. At the centre of the 'crisis complex' we face are the contradictions of the capitalist economy which 'consumes its own background conditions of possibility. It is like a tiger that eats its own tail. While social life as such is increasingly economised, the unfettered pursuit of profit destabilises the very forms of social reproduction, ecological sustainability, and public power on which it depends' – all of which makes financialised capitalism 'an inherently crisis-prone social formation'. [4] For Indian economists Pranab Bardhan, the problem is financial and cultural insecurity

– ‘from ecological distress, wars and civil wars, terrorism and crime, to cyberattacks against crucial infrastructures’ as well as ‘the possibility of nuclear destruction, climate collapse, engineered pandemics and rouge or what is called unaligned (as in unaligned with human values) artificial intelligence’ – which has led to the rise of undemocratic movements. In *A World of Insecurity*, says Bardhan, the temptation to authoritarianism is difficult to resist, and majoritarianism and nationalism spread like wildfire. [5] British biologist and writer, Colin Tudge, suggests that with the world warming and waters rising, ‘we will be lucky to survive the present century in a tolerable state’ because ‘the oligarchy of governments, corporations and their attendant intellectual who now dominate the world have largely lost touch with the moral and ecological realities of life’. [6] For others, the ‘crisis complex’ is a result of the demands we are making on nature by living in cities which are leading us towards ‘terminal consumption’. [7] Or a product of the hybridisation of space and self, where the ‘old’ world is becoming virtualised leading to contradictions and confusion. [8]

The postnormal condition is coming into sharper focus as the destructive aspects of accelerating change become more and more apparent. But the change equation also has the other side where entrenched facets of our world do not change; or rather, continue in their established trajectories. As the French proverb puts it, ‘the more things change the more they stay the same’. Or, as Bon Jovi sang,

Yesterday keeps comin’ round, it’s just reality
It’s the same damn song with a different melody
The market keeps on crashin’ [9]

According to the World Inequality Report 2022, ‘contemporary global inequalities are close to early twentieth century levels, at the peak of Western imperialism’:

the top 1% took 38% of all additional wealth accumulated since the mid-1990s, whereas the bottom 50% captured just 2% of it. This inequality stems from serious inequality in growth rates between the top and the bottom segments of the wealth distribution. The wealth of richest individuals on earth has grown at 6 to 9% per year since 1995, whereas average wealth has grown at 3.2% per year. Since 1995, the share of global wealth possessed by billionaires has risen from 1% to over 3%. This increase was exacerbated during the COVID pandemic. In fact, 2020 marked the steepest increase in global billionaires’ share of wealth on record. [10]

There was great hope that Covid-19 pandemic would lead to creatively rethinking existing socio-political models and lifestyles. But the repackaging of antiquated modes of thinking and epistemologies to solve problems which they themselves created is one of the greatest ironies of our epoch. By returning to the old

normal, which as graffiti around the world and the Twittersphere pointed out, was the problem in the first place, we have only aggravated the tribulations of postnormal times.

But as the globe went into complete lockdown, it forced many people to re-evaluate time in the lived present of Covid-19. In fact, understanding the nature and the consequence of time took on a collective endeavour. In doing so it embodied many elements of postnormal times, especially through introducing the idea of corona-time as a lived reality. Corona-time, or 'blurs day', unsettled and ruptured the nature of fixed time with days and weeks, weekdays and weekends, and morning and days all rolled into one. The opening essay of *The Postnormal Reader Volume 2* discusses the nature of time within postnormal times.

Ziauddin Sardar shows how the 'distinction between the present and the future has become so porous and diffused that it is now difficult to discern when the present ends and the future begins'. Postnormal times marks a crucial turning point, which arises from the combined experiences of modernity and postmodernism; and creates a whirlwind of complexity, contradictions, and chaos. In postnormal times, the future constantly interacts with and determines the present, and, consequently, time is experienced simultaneously as linear and cyclic. Thus, the future is either eclipsed or is feared – a fear, as Bardhan also suggests, associated with shifts in global power, breakdown of paradigms, and the collapse of society and civilisation from climate change and ecological disasters. Sardar argues that time in our epoch is epistemologically and ontologically broken; and speed – moving ever so fast and breaking things – is linked to 'implicit fascism'. He suggests that in postnormal times future should not be seen as a time horizon but as 'an ever-present garden to be cultivated by all for all times.'

The notion of time in postnormal times is further explored by Liam Mayo in his article 'Sea Glass.' Mayo starts with a personal anecdote of collecting shells on an Australian beach with his son to exemplify how artificiality is 'manufactured by humanity to replicate that which occurs in nature'. He goes on to look at the different ways modernity constructs the notions of time as apolitical and value neutral; and debunks the 'myth of modernist progress' by deconstructing the modernist construction of time as it seeks to overcome the patterns of change by capturing, owning, and controlling through technological notions of time. Mayo's examination of the relationship between reality and society with symbols of culture, and especially the role it plays in shaping shared existence, touches several important strands within sociology and philosophy, in particularly the ideas around Simulacra and Simulation as developed by the late French sociologist and philosopher Jean Baudrillard.

The pull of modernity, especially with its emphasis on ontological security, is a recurring theme throughout this collection. In *Modernity and Self-Identity*, Anthony Giddens argued that modernity plays a critical role in shaping self-identity, especially in directing society towards a sense of order and continuity to individual life experiences. [11] The process adds meaning to people's life, and the emotions

help guide and structure positive views of self, society, and above all the future. Thus, it was not surprising to observe the ubiquitous yearning of going back to a sense of ‘normality’ because the sense of normality gives a (false) sense of security, order, and meaning in people’s lives. Elizabeth Stephens, co-author with Peter Cryle of *Normality: A Critical Genealogy*, focuses on the media discourse of ‘return to the normal’ in her article ‘The End of the Ordinary’. Stephens points out that the normal is seldom explicitly described; its meaning is taken for granted. [12] The fixation with a return to normality during the Covid 19 pandemic seem to be ubiquitous, with plethora of self-help guru’s providing their own advice on returning to a sense of normality. It wasn’t only the fringe element of the podcasting world that would offer advice, the UK, National Health Service (NHS), was also quick to offer 10-Tips of going back to normal, following the relaxing of Covid-lockdown rules. Part of the advice includes healthy eating, regular exercise and supporting local businesses. Stephens points that many things that have happened in recent times are not normal – such as the election of President Trump, climate change, the 2019 Australian bush fires, and the pandemic itself. She raises a number of pertinent questions. Did normal actually fail us? Would any attempt to return to normal be inhuman? Whose normality are we expected to return to?

The discourse surrounding the return to normality is a little more than an attempt to maintain the status quo of excessive consumerism, deepening global social inequality, and worsening climate crisis. In an article written for the *Financial Times* during the peak of the Covid-19 pandemic, the Booker Prize winning novelist Arundhati Roy argues

‘OUR MINDS ARE STILL RACING BACK AND FORTH, LONGING FOR A RETURN TO “NORMALITY”, TRYING TO STITCH OUR FUTURE TO OUR PAST AND REFUSING TO ACKNOWLEDGE THE RUPTURE. BUT THE RUPTURE EXISTS.’

The rupture is the tragedy unfolding itself as an overwhelming series of events is occurring simultaneously with unprecedented speed: it is ‘the wreckage of a train that has been creaking down the track for years’; and it ‘is immediate, real, epic’. [13] And it is a rupture that established forms of theoretical, explicit, implicit, procedural and disciplinary knowledge systems can longer help us navigate.

But is postnormal times itself a theoretical idea suitable only for academic musing and philosophical discussion? Christopher Burr Jones attempts to answer the question by examining the challenges faced by emergency first time responders and public administrators due to accelerated warming and global weirding. He looks at the impacts on government departments, international organisations, and non-governmental organisations to implement their sustainable development goals. By drawing upon key principles within PNT, Jones shows the importance of polylogue

between public leaders and public administrators to develop plans for worst case scenarios. It's critical to think through multiple collapse scenarios and accelerated change, Jones argues, whilst engaging with community activists to envisage their preferred futures and sustainable cities. He wants to go beyond the defeatism and escapism as possible options advocated by many, especially given the worsening situation with global warming and weirding. Instead, he locates hope and optimism in futures literacy and consciousness through envisioning preferred futures and sees the fruits in the labour of such organisations as Teach the Future and World Futures Studies Federation, in children and activist leaders throughout the world. Jones demonstrates the importance of nurturing more responsible leaders of the future with a strong grounding in planetary ethics and wisdom.

THIS CAN ONLY BE ACHIEVED IF NECESSARY INFRASTRUCTURAL INVESTMENT IS MADE IN THE LONG-TERM FUTURE THAT WILL MAKE IT POSSIBLE AND EASY FOR COMING GENERATIONS TO ENVISAGE AND BUILD SUSTAINABLE FUTURES.

A great deal of hope is placed on science both to navigate us out of postnormal times and take us towards sustainable futures. During the Covid-19 pandemic, science was often projected as *the* problem-solving strategy. Politicians were often heard repeating the same mantra of 'we are following science.' In early March 2023 after a WhatsApp leak to the *Daily Telegraph*, it was revealed that the UK government's Covid-19 policy was motivated by political expediency rather than following hard science. In his recent book, *The Covid-19 Catastrophe: What's Gone Wrong and How to Stop It Happening Again*, Richard Horton, the editor of the prestigious medical journal *The Lancet*, suggests that we should acknowledge and deal constructively with ambiguity, ignorance, and complexity within science. [14] In other words, both scientists and politicians should acknowledge that science has gone postnormal.

The philosopher and historian of science, Jerry Ravetz, first introduced the notion of postnormal science (with his long-time collaborator Silvo Funtowicz); and has been championing it for decades. Ravetz has argued that the received wisdom which sees science as beneficent, benevolent, and infallible, 'creating a fountain of facts for human welfare' has over the years been fractured. Scientific knowledge simultaneously transformed the world by creating scientific problems which natural science is finding difficult to solve. By drawing upon ibn Khaldun's principle of 'thinking historically,' he aims to 'understand the conflicts within science, in the present through the unresolved contradictions inherited from the past.' During the Covid lockdown people were able to see the politicisation of science when the symbols of science were enlisted in policy discourse to promote political and ideological agendas. Ravetz develops his early ideas by demonstrating

how the principles of postnormal science were translated into a growing movement with the aim of reforming science; and offers many insights into the intellectual relationship between postnormal science and postnormal times.

The methodology of postnormal times theory has been stress tested during the past few years. An early opportunity to use postnormal times as a methodology emerged with the Covid-19 pandemic. The article by CPPFS Deputy Director Jordi Serra del Pino and Senior Fellows Christopher Burr Jones and Liam Mayo, shows how a global pandemic is best understood through the speed, scope, scale, and simultaneity of change. Covid-19 became 'The Perfect Postnormal Storm' through the overlapping of the 3Cs – complexity, contradictions, and chaos. The pandemic, argue the authors, illustrated all the key features and functions of postnormal times. The article also provides a framework and conceptual tools for governments and the third sector for creative and imaginative visioning of preferred futures. The theoretical ideas explored in this article are further developed by Philip Spies and Chris Jones (no relation to Christopher Burr Jones). 'The Postnormal Landscape' was originally written in *Afrikaans* and re-written and revised for this edition of the *Reader*. Spies and Jones examine the impact of Covid-19 on South Africa and illustrate the complex, systemic, and disruptive nature of the pandemic. They argue that conventional disciplines with their emphasis on normative modes of thinking are incapable of understanding Covid-19. Instead, they point to new ways of thinking, such as the postnormal times theory, to transcend the disciplinary silos, and shed light on emerging postnormal phenomena.

Such impediments transcended and with a clear sight on the postnormal, we can ask: what is the relationship between postnormal times as a theoretical idea and public policy? How can the principles of PNT be used by community practitioner or indeed people developing public policy? The question is addressed by Liam Mayo and his team of futures and community leaders through a partnership research initiative between The Sunshine Coast Council and the University of Sunshine Coast, South East Queensland, Australia. This research project aimed to investigate multi-modal approaches to community engagement that grows social capital and increases local capacity to address complex world challenges. The focus here is the notion of polylogues, which as Ziauddin Sardar says, is much more than about contemporary philosophy escaping its western 'solitude' or arid 'texts' dynamically engaging with each other. Polylogues are about ushering positive change, 'creating new physical and mental spaces where diversity, pluralism, and contending perspectives are present on their own terms but also deeply invested in engaging others in creating and sharing information and knowledge'. In postnormal times, polylogues that appreciate and cope with complexity, help us transcend contradictions, and bring us back from the edge of chaos. They generate new synthesis and knowledge. Mayo and his colleagues use polylogues as a way of thinking and understanding, based on meaningful and structured exchange of ideas from multiple perspectives, and which transcend competing and contradictory viewpoints. The Australian research project explores the utility of postnormal times as a navigational tool for our

transformational epoch and as a socio-cultural political theory that contextualises change in the present. More critically, the authors mobilise polylogues around local solutions to complex problems, and in doing so investigate emergent manifestations of subjectivity.

Postnormal times can be characterised as a constant tension between the old world and the one yet to emerge. Perhaps the key area which makes this tension more pronounced is the conflict between humans and nature. Hidden within this conflict, argues Christopher Burr Jones in his article 'Four Scenarios for the Third Rock from the Sun', 'is the ominous contradiction between humanity's dependence on natural resources and their neglect and misuse of the Earth's goods.' Jones uses postnormal times theory to develop four alternative futures, while tackling posthumanism, transhumanism, and other related paradigms. The first alternative future sees society moving back in time as opposed to moving forward. In this scenario, life will continue as it returns to 'normality' as characterized by human existence for most of the million years before the dawn of agriculture. The second scenario, which draws inspirations from dystopic fiction and other reoccurring images of the future, 'predict' the total collapse of the earth. The Third, Hybrid Gaia is a highly artificial world, inspired by literature around critical posthumanism, where human-centred ethics and mythology are replaced by respect and cooperation with other species rather than dominance and exploitation. Finally, Jones presents a utopic alternative future governed by Dyson's Children where all the dreams of techno-optimists and posthumanists come true. In this image of the future, 'human science achieves godlike control over medicine through molecular and nanite robot prevention, repair, and disease defence. Cancer is effectively cured, and longevity increases dramatically, with the likelihood that genetic flushing technology can extend lifespan.'

Scenarios are further explored by Jordi Serra del Pino who develops an approach for 'Building Scenarios in Postnormal Times'. This is a three-stage process where scenarios are constructed within the framework of the Extended Present, Familiar Futures, and Unthought Futures – the three tomorrows. Each stage provides 'an epistemological framework that allows us to select the most suitable methods in accordance with both the object and each tomorrow's logic'. Serra contends that his approach not only 'help us to understand why our scenarios will go in particular directions' but also 'how we can acquire a deeper understanding of the future. In a typical postnormal dynamic, the three tomorrows require us to examine both our perception of reality and the cognitive processes we use to comprehend this reality'.

Our understanding of reality and our futures is made all the more difficult as postnormal times has had a major impact on knowledge production, which is actually changing the nature of knowledge itself. By most accounts, knowledge is not purely an ontological reality, rather it is, to some extent, socially constructed and imbedded through structures of society. As such, it often changes with socio-political trends. The rise of Big Data, for example, now informs much research and is also used for commercial and political ends. Global corporations, such as

Microsoft, Apple, Google, Facebook, and Amazon, use Big Data to inform Artificial Intelligence, not only to influence human behaviour but also to transform the course of human history. [15] The era of fake-news, alternative facts, and deep fakes as it merges with Big Data have further compounded some of the many concerns and fear. 'In an Age of Information, our information ecosystem has become polluted and dangerous', argues Nina Schick in *Deep Fakes and the Infocolapse*. Schick warns that we are facing an unprecedented and immense crisis of an increasingly dangerous and untrustworthy ecosystem otherwise known as *Infocolapse*. [16] In a much cited paper, 'The Smog of Ignorance', published before Schick's book, Ziauddin Sardar argues that

KNOWLEDGE HAS BECOME TRIGOXIC – THAT IS, EMERGENT KNOWLEDGE INCORPORATES, BOTH CONSCIOUSLY AND UNCONSCIOUSLY, THREE TOXIC ELEMENTS: PLAIN IGNORANCE (SUCH AS FAKE NEWS), VINCIBLE IGNORANCE (THAT IS AN IMPLICIT PRODUCT OF THE FUTURE DIMENSION OF MANY, CONTEMPORARY COMPLEX PROBLEMS) AND INVINCIBLE IGNORANCE (WHICH PREVENT US FROM IMAGINING ALTERNATIVES BECAUSE THEY ARE LOCATED OUTSIDE THE PRINCIPLES AND AXIOMS OF THE DOMINANT PARADIGMS AND WORLDVIEW).

These critical changes in knowledge production will have an overpowering impact on education, especially given that the fundamental essence of what constitutes 'knowledge' is rapidly undergoing profound and significant transformations. Sardar argues for a radical shift 'away from the notion of wisdom as a repository of individual quality, the prerogative of sagely (mostly) men, to a more profound understanding: wisdom as a collective, communal, enterprise; a social and cultural quest for life we are losing in postnormal times'.

In 'Zombie Disciplines', Liam Mayo and Shamim Miah also deconstructs the ways of knowing and being in a rapidly transforming world. The tools that we once used to navigate complexity and change, they argue, have become all but obsolete. Considering these fundamental changes in society, especially through the decline in the grand narratives around science, technology, and politics, there seems to be great uncertainty around Western constructions of the *future* (in the singular). By drawing and expanding upon Ulrich Beck's 'Zombie categories,' they argue that it is indeed 'zombie disciplines', concomitant with the erosion of knowledge, that leave us ill-equipped to effectively navigate current epochal changes. The zombie metaphor provides a deeper critique of knowledge in postnormal times as an occupying space between both the living and the dead, embodying the paradox of our transitional age.

In these circumstances, expertise also comes into question. In 'Reimagining Expertise for Postnormal Times', Maru Mormina, Julia Schönebergand, and Lata Narayanaswamy use the global pandemic as sociopolitical backdrop to examine the epistemological assumptions behind the ubiquitous phraseology of 'we are following the science' as used by many national governments to justify their pandemic and post-pandemic policies. They show that the declaration is nothing more than a political slogan to reassure the public and justify government policy – more critically, they demonstrate how this mantra is devoid of any real commitment to positivist epistemic endeavour. The paper provides a critique of the assumed neutrality of science while highlighting the process involved in the social construction of scientific knowledge. Mormina, Schönebergand, and Narayanaswamy further offer several important insights into the role of science within postnormal times through revisiting and elaborating the key ideas of postnormal science; and concludes by questioning the monolithic claim to 'one science' and 'evidence'. Rather, they suggest, that the scientific enterprise must encourage diversity of experiences and knowledge by widening the purview of scientific expertise. Several salient points implicit in the works of Mormina, Schönebergand, and Narayanaswamy are fleshed out by Jane Gilbert in her contribution to this volume. In 'Education for the Anthropocene', Gilbert highlights the disciplinary 'blind spots' within science education. She discusses many 'unacknowledged assumptions that obstruct its development and make it immune to change.' For example, most of science education within the Western world is rooted within the logic of 'carbonised modernity' and a new dynamic science education is desperately needed to fit the demands of a post carbon Anthropocene era. Considering the recent trends associated with postnormal conditions 'it is now imperative that we see these blind spots and think differently about what science education is for,' argues Gilbert. In their paper on 'Postnormal Science and Mathematics Education', Kjellrun Hiis Hauge and Richard Barwell argues that the category of 'the scientist' as 'the expert' confined within elite universities and often linked to industry funding is becoming obsolete. By examining some of the pedagogical challenges in interpreting and negotiating values, choices, and interest within complex mathematical models, Hauge and Barwell show that mathematic education based on uncertainty that characterises postnormal situations can prepare students to participate in extended peer communities. The function of critical mathematics education should be to prepare citizens to be able to deal with the different ways in which uncertainty matters in postnormal times.

It is not just science and mathematics that the postnormal condition is rapidly changing. Arts must transform too. Michael Anderson examines the challenges of postnormality to drama education and applied theatre – and demonstrates just how many diverse disciplines postnormal times theory has touched. Anderson sees postnormal times as an opportunity for 'transformational power' through the revitalisation of creative arts and education. He reminds us of the importance and power of creative imagination in these chaotic, complex, and confused

times. ‘Drama education and applied theatre’, suggests Anderson, does ‘have a contribution to make in a postnormal world by re-imagining itself to make a difference.’ Like drama and theatre, museums too serve both as entertainment and as instruments of education and preservation of cultural heritage. Olga Vanoust, from the Flemish Institute of Cultural Heritage, shows that the emergence of movements like Black Lives Matter have turned museums into contested sites where past is being used to shape the future. Vanoust argues that public pedagogy must recognise the importance of informal education beyond formal schools, colleges, and universities; and illustrates how Black Lives Matter has impacted political culture of museums at all levels including collecting, preserving, and researching to educating and responding to issues of ethics. She leaves the reader with an important question: what form should museums take in postnormal times, especially given the complex, chaotic, and contradictory nature of society?

The genre that is ‘performing the past to claim the future’, to use the words of Daniel Kreiss, is Afrofuturism, now being popularised by Hollywood to the socio-political backdrop of the Black Lives Matter. [17] The antecedents of Afrofutures can be traced back to the works of Sun Ra during the early 1950’s in Chicago, with his lifelong project of merging music and technology with African American identity. Carli Coetzi in *Afro-Superheroes: Preposing the Future* uses the concept of *emerging present* [18] – akin to the notion of ‘extended present’ in postnormal times theory – to understand the ways in which the ideas of Afro-superheroes (or Super Black, a term popularised by Adilifu Nama [19]) are embedded in socio-political contexts with the merging together of the science fiction genres. C Scott Jordan explores this long and complex history of Afrofuturism, interrogating the complex interrelationships between tradition and Afro-hypermodernity.

BY EXAMINING THE AMERICAN SUPERHERO FILM BLACK PANTHER, JORDAN REFLECTS UPON THE MANY INCONSISTENCIES IN THE MARVEL FRANCHISE ESPECIALLY RELATING TO THE WAYS IN WHICH FUTURES ARE CONSTRUCTED, DEPICTED, AND NAVIGATED IN POPULAR CULTURE.

And, Jordan argues further in his article ‘Postnormal Times & Minced Words’, popular culture and its attendant politics is also changing the meaning of the words we use to describe ideas, concepts, things, giving them a postnormal twist. Take the term freedom: ‘It is a most curious contradiction. Worse yet, it is a seductive contradiction. Like capital, it is never just satisfied with a unit or two of itself, it must always be more. Insatiable, freedom fights for itself even at the consumption of the freedom of others’. Words such as Trump, Brexit, Fake News, Social Media, Big Data seem to have little intellectual value. However, ‘definitions must be held accountable’, Jordan contends, as this is ‘the first step towards owning the future’.

In a multicivilisational world, argues Yelena Muzykina in 'Confronting Postnormal Times', each civilisation needs to own its own future. Each civilisation – Western, Islamic, Indian, Chinese – must rediscover itself 'according to its own criteria and concepts and have its own dynamic, thriving way of knowledge, governance, democratic autonomy, and civilisational identity. And all will enrich each other with mutual respect, cooperation, and syntheses'. Muzykina sees this as a basic source of variety which provides a counterweight to complexity; and helps us understand that 'the world is of different sizes, shapes, colours, forms, contents, meanings, and cannot be ruled by a single notion of truth'. Creativity is a sibling of variety. But it cannot be enhanced without moving forward from the increasingly problematic logic of modernity that creates an artificial conflict with creativity. Muzykina argues that creative solutions are achieved 'through the system of humanitarian education, through teaching students music, philosophy, and the art'. Liam Mayo takes the argument further by positing a 'postnormal creativity' that 'seeks to do away with the Western ontological constructs of subject/object, in favour of a flat ontology; a universal ontology where all are objects and are given equivalent credence'. It is based on polylogues which, 'in and of themselves, are a distinctly creative process, providing conceptual spaces and opportunities for the diversity of agendas to come together to negotiate outcomes toward unthought futures'.

AS SUCH, 'POSTNORMAL CREATIVITY' HAS THE CAPACITY TO ENTIRELY REFORMULATE THE NOTION OF THE FUTURE BY UNLOCKING HUMAN AGENCY THROUGH NURTURING 'ANTICIPATORY IMAGININGS.'

Moreover, Mayo argues, postnormal futures inherently revolve around ecological awareness and liberation which is predicated upon an intimate relationship between human and nonhuman biosphere. Thus, compelling 'us to consider the vastness of reality (the real), on time and space scales far beyond our very being'. Emergent ideas of unthought futures are turned into reality by postnormal creativity. 'Thus, postnormal culture is borne. What we have then is a shift from asking, "how do we plan for the future?" to the question, "what do we do now?"

Exactly. What do we do *now*?

It should not come as a surprise, given the literature and academic thought devoted to our turbulent epoch, that suggestions for moving forward are aplenty. For Nancy Fraser, the 'present interregnum' of uncertainty and ignorance can only be overcome with 'a decidedly antineoliberal project'. In contrast, Pranab Bardhan argues for universal basic income and empowerment of workers, but still believes in the liberal project. However, the liberals must show some grudging respect for tradition and the local attachments of their fellow citizens. More thoughtful and detailed suggestions are provided by Gordon Brown in *Seven Ways to Change the World*. Brown argues that 'moments of crisis create opportunities'. He shows how

the crisis of the Second World War led to the establishment of the welfare state in Britain and the creation of World Health Organisation, United Nations, and the World Bank. [20] While there are valid criticisms associated with each of these organisations from a postcolonial perspective, Brown still has considerable faith in them. They provide agency and collective action that is required to meet the global challenges. His recipe for moving forward includes a global green deal, abolishing tax havens, eliminating nuclear weapons, meeting sustainable development goals, reforming education and a new growth economy based on early warning systems, and global financial safety nets.

But for others growth is a serious cause for concern; indeed, an existential problem. In *Cities Demanding the Earth*, Peter Taylor and his colleagues from University of Bristol suggest that we need root and branch 'unthinking' – in other words, we need to get away as far as possible from the growth agenda and conventional ways of thinking. Unthinking is needed because the problem of anthropogenic climate change is both 'a complexity duet' and 'existential'. The international organisations that give Brown some hope are 'not fit for purpose'. Neither is much 'scientific work that disregards its anthropogenic component'. Or 'the state-centrism of the social sciences'. So not much is left of the old order! Taylor and his colleagues suggest we need a new social knowledge that can help us 'unthink considerations of our current existential predicament'. [21] Colin Tudge echoes these sentiments:

to turn things around we, humanity, need to rethink everything that we do and take for granted from first principles: what we aspire to – what we are trying to achieve?; how we do things; how we organise our affairs; what we think is good and bad; what we value. Where necessary...we need to restructure and rebuild. Overall, we – the world – need transformation, metamorphosis and metanoia. [22]

Tudge offers a very detailed 'preliminary agenda' – from how and what we grow to how we cook and eat, to the economy and methods of governance, to the unknowable aspects of science and metaphysics. He seeks nothing less than a radical new synthesis of physics and metaphysics.

The thoughtful itinerary for a forward journey – which, according to Tudge is never-ending and perpetual – offered by Taylor and his colleagues, Tudge and others, takes us back to the original contention of postnormal times theory: we need creativity and bold imagination to navigate our way to a different worldview. Alfonso Montuori tells us that creativity, a well-established and conventional term, is itself being transformed, from an atomistic view of modernity towards a more collaborative, complex approach. It is through a participatory and creative approach which invests in new epistemologies, pedagogies, and imaginations that we can proceed beyond the current impasse to something better. The radical nature of the postnormal times, says Montuori, 'demands thinking that embraces

complexity and contradictions, does not recoil from chaos, and a willingness to envision alternative futures'. In short, creativity has moved beyond the mythology of genius and inspiration to inform philosophy, ethics, and action.

But there is a trap: creativity needs imagination, and imagination is itself colonised by modernity. Even with all the creativity in the world, colonised imagination would take us back to the status quo ante – the much vaunted 'new normal', with a few extra appendages. Or, as Bon Jovi would say:

Ah, is it just me or does anybody see
The new improved tomorrow isn't what it used to be

Imagination, as Ziauddin Sardar has said elsewhere, needs to do more than simply transform experience and thought and generate new knowledge. It must also produce new visions of the future. But it cannot do that if it is trapped in the extended present – which is simply an extrapolation of modernity – or constrained by familiar futures, which are almost exclusively based on the images and metaphors of the dominant culture and its worldview. Imagination must move to the domain of the unthought; and to do that it must overcome invincible ignorance, which is rooted in the axioms, assumptions, and principles of the dominant paradigms. So:

what we need then, is a kind of imagination that reveals the awareness of our trapped and colonized imagination, shifts our attention towards the unthought imagination, and then generates the values and resources that deepen our engagement with the chaotic, complex, and contradictory and uncertain world of postnormal times.

This cannot be done by a single culture or intellectual tradition. It becomes crucial for us to nourish our imagination from a wide range of cultures, artifacts, modes of knowing and being, non-Western, Indigenous, even otherworldly. We urgently need an imagination that can construct new meanings, give a new sense of direction to individuals and communities, develop holistic outlooks, and ultimately reorient the narrative of greed and despair into narratives of sharing and hope. [23]

Imagination and creativity thus must work simultaneously in unthought paradigms. Sardar suggests working in the domain of the transnormal: over and beyond capitalism and neoliberalism, modernity, and postmodernism, almost most of what we can possibly conceive as normal or 'the new normal'. Transnormal is also a process of systematic movement leading to transposition: acts of changing relationships, structures and values that interactively and collectively relocate humanity to a trans, or stable, state, or realm of existence. Transnormal is conceived as a dynamic paradigm that looks at cultural diversity 'on the move' based on the

assumption that future is located in the interactions of cultures; and aims to produce a *trans* discourse of knowledge which gives equal importance to knowledge systems of non-Western civilisations and cultures, including indigenous cultures, tacit and intuitive methods; and promotes the realisation that in a diverse and dynamic world, there are many ways to be human.

Sardar combines the concepts of transnormal with the paradigm of 'mutually assured diversity' as tools to navigate towards the transnormal and our way out of postnormal times. Mutually assured diversity is 'the acceptance that all cultures are equally important, that culture is the source of identity for everyone, and that identity provides a hand and eye to manipulate the kaleidoscope of diversity, both within culture and between cultures'. Sardar argues that the human condition is a cultural condition and that 'culture is an essential relational attribute, an enabling feature of knowing, being and doing'. The 'assured' aspect of mutually assured diversity

is the universal acceptance of the continuity of cultural identity for everyone on the planet as a negotiated, adaptive, and meaningful space. It is the acknowledgment that for difference to exist as difference, it needs cultural space to be different. It is the proposition that all cultures have the right to know themselves, to understand and interact with their cultural self, and to do this within their own cultural space. In other words, all cultures have a right to enhance their cultural power and to represent their cultures with their own concepts and categories.

Mutually assured diversity is not a linear concept focussed on a single issue or arena. Sardar postulates it as a holistic notion operating simultaneously in twelve dimensions: mutually assured definitions, dissent, discourse, demarcations, democracy, degrowth, dematerialisation, defence, dependence, desires, dignity, and destinies.

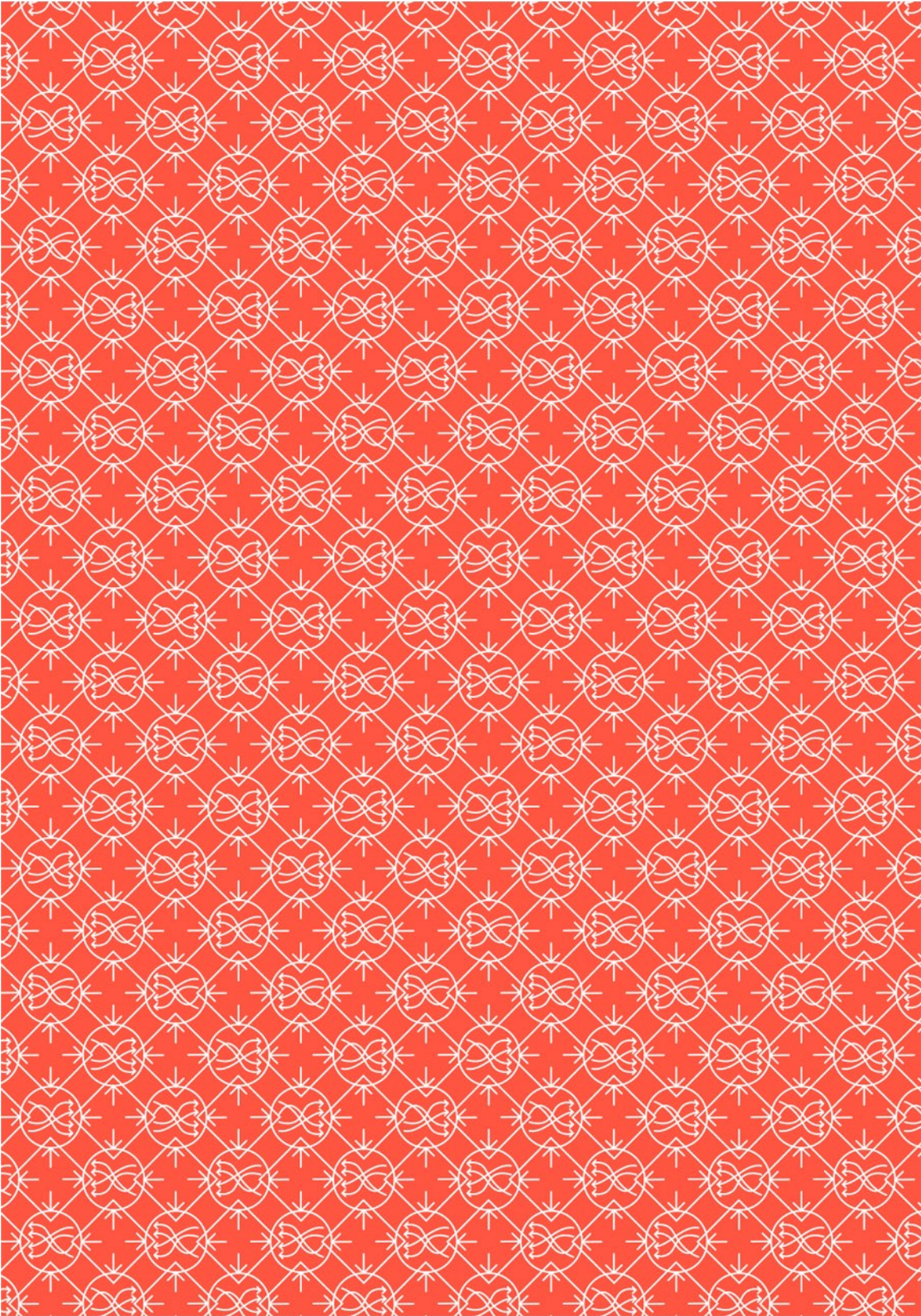
As suggested by Sardar, Tudge, and Taylor and his colleagues, the transformations required to meet the challenges of postnormal times – accelerating change, increasing uncertainty and complexity, astounding contradictions, and cumulative chaos – are truly overwhelming. We are required to abandon most of our established notions, what we consider as normal and *a priori* given. It is not just *The Great Re-Think* but perhaps the greatest rethink in history.

This is a very tall order. But who said navigating our way out of postnormal time was going to be easy?

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The background is a solid red color with a repeating white pattern. The pattern consists of a grid of diamond shapes. Each diamond contains a stylized, four-petaled flower or bow-like motif. Between the diamonds, there are small arrows pointing towards the center of each diamond.

OVERVIEWS

TIME IN POSTNORMAL TIMES

Ziauddin Sardar

Where is the future? And how long does it take to arrive?

These eternal, simple questions have acquired new dimensions in postnormal times. The distinction between the present and the future has become so porous and diffused that it is now difficult to discern when the present ends and the future begins. Indeed, the future seems to be omnipresent. Consequently, 'the category of the future is losing much of its attractiveness'. [1] Indeed, why bother with the future when the future is already here as so many advertisements for new and emerging technologies tell us? A point well-illustrated by an advertisement for Toyota cars. [2] 'Dear future', it begins in a mocking tone, 'so good to see you'. Apparently, the car has all 'the goods' the future could possibly offer. If the future is already here, then what is the point in talking about alternative futures, the fundamental idea of futures studies? Perhaps it is time, says Richard Slaughter, to say 'farewell to alternative futures'? [3] There are, he suggests, no alternative macro futures out there, even though multiple micro future options may exist at all other levels. Poor future! It has lost much of its shine.

The subtitle of Jorg Friedrichs' *The Future is Not What it Used to Be* provides us with part of the reason: 'Climate Change and Energy Scarcity'. [4] Climate change, however, is only one of four, out of a total of nine planetary boundaries we have breached. [5] The other eight planetary boundaries that regulate the stability and resilience of the Earth system are: change in biosphere integrity (biodiversity loss and species extinction), stratospheric ozone depletion, ocean acidification, biogeochemical flows (phosphorus and nitrogen cycles), land-system change (for example deforestation), freshwater use, atmospheric aerosol loading (microscopic particles in the atmosphere that affect climate and living organisms) and the introduction of novel entities (for example, organic pollutants, radioactive materials, nanomaterials, and micro-plastics). Of these losses of biosphere integrity, land-system change, altered biogeochemical cycles as well as climate change have been breached, increasing the risk of severe damage to the environment and the planet. This is what Slaughter refers to as 'global system change'. His other reasons for discounting alternative futures include the rise of the post-truth fraternity, the increasing role of the repressed and suppressed history, changes in future studies itself and the shift in the geological age from the Holocene to the Anthropocene. [6]

All these global changes are markers for postnormal times, where 'much of what we have taken as normal, conventional and orthodox just does not work

anymore. Indeed, normality itself is revealed to be the roots of all our ills.' [7] Postnormal times is theorised as an in-between period: the old paradigms are collapsing and new ones struggling to be born. An age characterised by increasing contradictions, complexity, and chaos (3Cs), with the accent on accelerating change, and snowballing uncertainties and ignorances of different varieties. Just as climate change is not merely an issue or an event but also, as Jeff Goodell notes, 'an era, and it is just beginning', [8] postnormal times too is a new epoch.

However, how long is an epoch?

Conventionally geological eras or epochs are measured in millions of years; minimum they last around three million years. However, the Holocene epoch just lasted 11,500 years before we entered the Anthropocene, an epoch in which human activities became the defining force in the Earth's geological and ecological processes. [9] When the scale of geological time was established in the nineteenth century, the boundaries were placed between eras, which corresponded to empirically observed evidence of mass extinctions in the fossil archives. It is, therefore, reasonable to assume, given climate change, violations of planetary limits and mass extinction of insects, that in the times to come, we will be able to observe a clear boundary between the Holocene and Anthropocene epochs in the rock layers of the Earth.

POSTNORMAL TIMES, HOWEVER, IS NOT AN EPOCH IN THE GEOLOGICAL SENSE. WE ARE NOT TALKING ABOUT DEEP TIMES OF GEOLOGY OR COSMOLOGY. RATHER, IT IS MORE AKIN TO HISTORICAL EPOCHS.

History is often related as stories; and there is no single grand story to incorporate all of world history. So, the general narration of world history is divided into neat, digestible chunks, such as the feudal epoch or the epoch of exploration, to aid chronicle uniformity. Epochs are periods of time when there is some sort of consistency, peoples' social and cultural experience have some commonality and coherence, dominant power structures and paradigms are entrenched, and history seems to be moving in a given direction. Elsewhere, I divided what we may call the 'contemporary period', the twentieth century and the first decades of the twenty-first, into four divisions: classic, modern, postmodern, and postnormal. [10] Each division can be seen as an epoch, which changes when social, cultural, and power structures of society change. Postnormal times mark a turning point from the combined epochs of modernity and postmodernism to something different that has yet to emerge. It is strange in that it is an intermediate epoch; and instead of social and cultural cohesion, it is a period characterised by contradictions and chaos. But like other epochs, it has a beginning and should have an end.

Like most periods of transitions, postnormal times is an epoch of deep ambiguity, uncertainty, and rapid change. Moreover, quite naturally, it generates fear of the future – significantly when the future is associated with the loss of

power, paradigmatic angst, and potential collapse of society, civilisation, and the ecosystems of the Earth. Part of the fear comes from the fact of the epochal shift itself and the realisation that return to 'normal' is not a viable option. 'If the epoch has changed', says Isabelle Stengers, 'one can thus begin by affirming that we are as badly prepared as possible to produce the type of response that, we feel, the situation requires of us. It is not a matter of observation of impotence, but rather of a point of departure.' [11] Stengers fears the 'Coming Barbarism', the decline of society into the world of the *Lord of the Flies*: a particularly Western notion of humanity which degenerates into savagery the moment civilisational parameters and controls are removed. A theme of countless Hollywood movies.

Part of the fear stems from the sheer incompetence and corruption of our leaders. As Stengers puts it:

If there is nothing much to expect on the part of our guardians, those who concern and responsibility is that we behave in conformity with the virtues of (good) governance, perhaps more interesting is what they have the task of preventing and that they dread. They dread the moment when the rudder will be lost, when people will obstinately pose them questions that they cannot answer, when they will feel that the old refrains no longer work, that people judge them on their answers, that what they thought was stable is slipping away. [12]

The fear of the future is also generated by the real possibility of collapse as a result of planetary transgressions, often seen as unavoidable and inevitable – an a priori given destiny. Slaughter's writing-off of macro, alternative futures is a product of this actual dread. Indeed, according to one reckoning, 'Our Civilization Will Collapse' within three decades; 'the next three of five decades are going to be apocalyptic'; and 'the 2050s will be the decade of the Final Goodbye'. [13] Bill McKibben concurs. It is indeed 'the end of the world as we know it'. [14] Not surprisingly, one is paralysed with fear; and the future becomes devoid of hope and optimism. If the imminent Collapse, the Apocalypse (to which we shall turn shortly), is only three decades away then postnormal times will also end within this period.

What if we work seriously to avoid the coming collapses, return to planetary boundaries, make peace with nature, abandon vengeful capitalism for a more equitable economic system, change our lifestyles, transcend our myriads of contradictions, become adept at dealing with uncertainty, and embrace complexity – that is, learn to navigate postnormal times? It is a big ask. But not an impossible one given the extent of our creativity and imagination. Clearly, such major transformations are not within the ability of a single generation. If we follow ibn Khaldun's 1377 argument, it will require four generations to create a new order of things. In which case, the postnormal period of transition would last a number of generations.

We know that as a general rule, aspirations of the future, dismal or alluring, speak mostly to our own time as well as reflect our own internal angst and concerns.

Future is about time: it is about how we perceive time in our lived present, it is about memory and anticipation, it is about how time is presented in our worldviews, it is about how we give meaning and a sense of direction to our lives, and it is about collective undertakings. Time itself is, of course, all about change. As Felipe Fernandez-Armesto suggests, 'no change, no time. You approach or reflect a sense of time whenever you calculate the possible effect of connected processes of change.' [15] Moreover, the rate of change itself shapes your perception of time, and hence, your notion of the future.

Tomorrow Is Another Day

So, to the age-old question: Is time linear with a single, unrepeatable trajectory, or is it cyclical without an ending? There are advocates for both options. In monotheistic religions – Judaism, Christianity, and Islam – time is seen as unidirectional and linear. The past, present and future follow the straight 'arrow of time'. There is a beginning and an end. God began the Creation and will bring the cosmic story to an end. On the whole, Western thought also sees time as linear but without bringing God into the equation. Hinduism, on the other hand, presents time as a cycle that goes through four stages, or the ages of yugas. We are now living in Kali Yuga, the age of destruction, and trapped in an irremediable process. Buddhism, to a certain extent, and ancient Greece too, opt for the cyclic version. Some historians, from Ibn Khaldun in the fourteenth century to Arnold Toynbee in the twentieth century, and a few in between, also subscribe to the cyclic theory of time. History can repeat itself but, as Marx was said to have noted, the second time it often arrives as farce.

Ostensibly, these two perceptions of time appear to clash. But, as Johan Galtung and Sohail Inayatullah have argued, genuine microhistories see time as linear as well as cyclic and transcendental. The function of microhistory is not just to find meaning in the past but to generate a new potential for meaning in the future. [16] However, it is one thing to look at broad sweeps of history and quite another to experience time simultaneously as linear and cyclic in the present – the proficiency of postnormal times. This is why in postnormal times theory the future is represented as three tomorrows, which are simultaneously distinct and diffused: extended present, familiar futures and unthought futures. [17] Time in the framework of three tomorrows is complex and contradictory, characterised simultaneously in the singular as well as plural – time and times.

The extended present is a future that is not a future at all in the sense that it is simply an extension, and overlaying, of the present on to the future. It is a product of embedded trends and proliferating emerging issues of the present – some cannot be averted, some are foreseeable, some have gone postnormal. The future in extended present is mostly a colonised future. Familiar futures bring history and geography, memory and metaphors, images and imaginings of the future(s) into play. It is largely a domain of 'used futures'. [18] The third tomorrow, unthought futures, takes us outside the box of the dominant, and crumbling, paradigms into a thought horizon of genuinely alternative possibilities, astonishing creativity and ingenuity,

and ethical imaginations. Unthought futures are not unthinkable. Neither are they things we cannot expect or anticipate. Rather, they are located outside the framework of our current and conventional modes of thought; they question our given assumptions and concepts, ideas, principles, axioms, norms, actions, and behaviour we have always taken for granted. [19]

If treated in isolation from the other tomorrows, the extended present can be viewed as linear time. After all, rooted trends and emerging issues do expand and continue towards the coming years. We know how a particular technology, for example 3-D printing or synthetic biology, could develop in the near future. Or, as epidemiologists tell us, how a virus may spread. Simple extrapolation of trends, including megatrends, are how 'predictions' about the future are made; basically, suggesting that the extended present will continue to extend. However, this analysis overlooks a vital point: the 'now' is not static; the present is itself dynamic and constantly changing. The extended present is constantly interacting with familiar futures which are located both in the present and the future. Familiar futures, both singular and plural, make the 'now' dynamic and changing, and by constantly transforming the extended present change the nature of present time. Present and future become suffused and time becomes simultaneously linear and cyclic. 'The extended present', writes Helga Nowotny, 'tries to diminish the uncertainty of the future by recalling cyclicity and seeking to combine it with linearity. The present is no longer interpreted merely as a part of the way on the straight line leading to the future open to progress, but as part of a cyclic movement.' [20] The present, fluctuating with accelerating change, thus constantly devours the future. The process is enhanced by current and emerging technologies – such as Artificial Intelligence, human machine merger, and Space exploration – that shrink the time-boundary between present and future.

This is a deterministic process. The conventional notion of determinism is that all events in the present are a product of historically existing causes. Or, to put it another way, the past determines the present.

BUT IN POSTNORMAL TIMES, IT IS EQUALLY TRUE TO SUGGEST THAT THE FUTURE ALSO DETERMINES THE PRESENT. IN FACT, THE FUTURE CAN HAVE MORE IMPACT ON THE PRESENT THAN THE PAST.

Thus, the continuous merging of extended present and familiar futures, linear and cyclic time, adds another layer to the colonisation of the future. There is a double whammy: the future is colonised not just through extended present but also through familiar futures which incessantly feed the extended present to boost the colonising process.

Unthought futures provide an antidote to this deterministic and colonising process. The function of the unthought futures is to provide genuine micro and

macro alternative futures external to the dominant and orthodox modes of being, doing, living, and knowing. Unthought futures are not time-bound: they can occur in extended present as well as familiar futures and represent the realm of other structures, other values, and other actions. They can be triggered by ideas and notions as well as manoeuvres and movements that question and seek to transcend dominant modes and paradigms. And the unthought futures can also arrive as events. A pandemic such as Covid-19 was widely predicted. But no one imagined that a virus, that most biologists do not even consider as a viable form of life, would stop the twenty-first century, high technology, world in its tracks: stop travel, stop physical contact, stop economic activities, stop growth, stop progress – indeed, stop time itself.

**COVID-19 DEMONSTRATED THAT IT IS ONLY WHEN WE FIND OURSELVES
IN AN UNTHOUGHT FUTURE, THAT WE ARE FORCED TO CONFRONT ITS
FULL IMPLICATIONS.**

The unthought futures provide us with a mechanism for reclaiming agency that the extended present and familiar futures deny. A product of creativity, imagination, and transformative leadership they are our basic tool for transcending the complexities, contradictions, and chaotic events of postnormal times. [21] Unthought futures are about opening up the wealth of possibilities outside the current framework of thought and action, opportunities so uncommon that they appear distant and unapproachable, and render them into present realities. They are meant to move us from wallowing in the pessimism of coming collapse(s), as foretold by current trends, and becoming something other than who we are in the present to usher more viable, sustainable, and humane futures. Unthought futures ought to raise epochal consciousness; and mark ‘the death of time, a poetic and philosophical expression of the superseding of an epoch by another one’. [22]

In postnormal times, both positive and negative changes can appear rapidly, as though from nowhere. In terms of positive changes, think of the #MeToo or Black Live Matter movements. Unthought futures can have similar impact, leading to profound transformations. Indeed, given the will and appropriate actions, major transformations can occur within a generation. This suggests the possibility that postnormal times can be concluded, given the will and determination, in about a generation.

Time and Implicit Fascism

Postnormal times have had a profound impact on how we experience personal, lived time. The world functions twenty-four hours a day, seven days a week. The global financial markets, from New York to London, Shanghai to Tokyo, Bombay to Singapore, are connected right round the clock. Global news channels broadcast twenty-four hours. Social media communicates issues, developments, grievances,

and nuisances instantly. Supermarkets and shops are open twenty-four hours a day, on Sundays, even on religious and other festivals. 'Time is money'; and our own time is harvested and monetised by corporations and big technology companies. All this, 'creates McTime, a permanent present, obliterating time distinction, cancelling closed-times, night-times, off-times, odd-times, and nodding-off-time'. [23] The consequent impact on our lives and bodies is quite overwhelming.

Historically, we have lived within structured time, most notably through religious rituals. Muslims, for example, structure time according to five daily prayers: dawn, early afternoon, late afternoon, sunset and the night prayer; and the weekly congregational prayer that also marks the day of rest. Judaism teaches us about the importance of the Sabbath, a day set aside for rest and worship; and emphasises the importance of yearlong observances every seventh year, when the earth rests along with the devotees. We are told in the Bible that God 'rested on the seventh day from all His work which He had done'. [24] This was not because God needed to rest. Rather, to emphasise that rest is required for what He has created in His own image. Chinese cultures also have designated days for rest and relaxation, many in the form of traditional festivals related to chronology and the Chinese calendar. Postnormal times takes a sledgehammer to such structures of times.

People, much like plants and fruit flies, have biological and mental in-built timers. In postnormal times, our internal timers are seriously distressed by four key drivers of postnormal change: speed, scope, scale, and simultaneity, representing a radical departure from the conventional notion of change. Each driver has an impact on how we as individuals and communities experience time.

Speed plays havoc with how we function as human beings. It affects everything from how we interact with other people, our relationships, how we keep track of what is happening in our lives and within our communities, and how we process information and knowledge. The faster we move, the more difficult it becomes for us to keep track of the world around us, to grasp the profound changes that are taking place, to react sensibly and adjust appropriately to these changes. We experience time as rapid twists and buckles, leading to confusion, frustration, and rage.

Speed can conquer the world and bring instant, unimaginable wealth: tech oligarchs can make '\$18 billion in just 24 hours'. [25] But speed is also the nemesis of the environment. Fast capitalism, fast travel, fast cars, fast food, fast fashion, fast trees, fast animal husbandry, fast holidays – all have a devastating impact on the environment and ecology of the earth. If you *Move Fast and Break Things* [26] you not only debase culture but also debase time. Moreover, speed forces you to innovate perpetually, even if it means producing a slight variation of the same product year after year. You may call it 'creative destruction', but as Nowotny notes, it 'leads to another problem of civilization: that of obsolescence, the ageing of technologies, the production of waste. The past cannot absorb the waste fast enough. Through the creation of more and more new things, there is an inevitable increase of that which has to be disposed of. Both processes require a change of balance – in an extended present.' [27]

Speed is also the enemy of history and tradition; it seeks to perpetually create things anew, innovation at a breakneck pace is the ultimate goal. This means, notes Griffith, that 'there is a nasty, steely connection between speed and fascism. The Nazis took power and they gave the German proletariat transport (the Volkswagen). The Nazis also put money into land-speed record attempts. Henry Ford was awarded a medal by Hitler, who admired his anti-Semitic politics, his speed-products, and his mono-principle processes.' [28]

The connection between speed and fascism is best illustrated by the early twentieth century Italian artistic and social movement that was the first to fetishize 'the beauty of speed'. The movement wanted to create the world anew, with its foundations firmly anchored to technology, and rejected art, literature, music, and architecture of the period. The movement described itself as 'Futurism'; and its members came to be known as 'Futurists'. The Italian futurists desired a future where speed and technology represented the absolute triumph of man over nature. They glorified electricity, the car, airplane, machines, and the industrial city. They despised the human body, peaceful coexistence and particularly women and anything that could be seen as famine and glorified war, nationalism and white supremacy. 'Accelerated movement', they argued, 'makes it seem that the traversed environment advances upon the traveller, rather than the other way round'. In other words, the future folds back on to the present in 'a thrilling onrush of visual, tactile, and aural sensation' creating an 'intoxicating sublimity of the moment'. [29]

The godfather of Futurism was writer and poet Filippo Tommaso Marinetti (1876-1944), who published his 'The Founding and Manifesto of Futurism' in 1909. Marinetti wanted to erase history, destroy museums, architecture, archaeologists, antiquarians, libraries. Attack the cities with pickaxes he urged his followers. He wanted to replace it all with technology that moved with striking speed, banished work, and enabled 'crops and forests to spring up with lightning speed.' [30] In their painting, the fascist futurists, such as Umberto Boccioni, Antonio Sant'Elia and Luigi Fillia emphasised speed, energy, flight, industrial landscapes and destructive war and violence. The original Marinetti manifesto was followed by a host of others on almost everything from clothing, food, smells, wars, and lust – all enveloped in fascist trappings.

It is only a quick (goose, or in the case of Italian fascists, roman) step, suggests Griffith, from Marinetti's futurist manifesto and our current obsession with speed:

Today, the ideology of speed, particularly in its aspect of overtaking competitiveness, is behind the phenomenon of multinationals, today's most fascistic force. Theirs is a politics which brooks no ideological opposition, a totalitarianism whereby one market leader seeks - by competition - to destroy competitors, leading to global domination, demanding uniformity, as speed always does, as fascism always does, and destroying environments or people who get in the way [31].

Where speed enhances uncertainty and confusion, scope seeks the reduction and variety of time. Different time zones collapse and we are forced to move in relation to a single global time. Multinationals work across time zones doing research and design in one place, manufacturing in another, providing support and services in yet another, cutting costs and wages, and selling their products across the globe 24 hours.

THE DISTINCTION BETWEEN OFFICE AND HOMES, WORK, AND LEISURE TIME, ARE DISSOLVED, WITH AN ACCENT ON EFFICIENCY, WHICH EVENTUALLY REACHES A POINT OF DIMINISHING RETURNS. PRIVATE AND PUBLIC TIME BLUR. CONSTANT ADAPTATION TO GLOBAL TIME TRAPS US IN A SPIRAL OF MONOTONY; BOTH THE RHYTHM OF THE BODY AND OUR PATTERNS OF THOUGHT BECOME PATCHY. WE BECOME SOCIALLY AND MENTALLY ROOTLESS AS THERE IS NO TIME FOR OUR SOCIAL OR MENTAL STRUCTURES TO HANG ON TO. INDEED, WE ARE BEING FORCED TO INCREASINGLY LIVE IN A SINGLE TIME ZONE.

There have even been attempts to standardise ‘internet time’ – for example, with Swatch ‘beat time’ which divides the day into ‘1000 beats’, each beat equal to one decimal minute (86.4 seconds). Fortunately, neither the concept nor the watch associated with it travelled very far.

All of this has an overpowering impact on the scale of the individual. Throughout history, human beings have proved quite adaptable. When we fly to a different time zone, for example, we adjust to the new time, overcome our ‘jet lag’, in a few days. On the whole, evolution has been slow enough to provide our bodies with relevant mechanisms to develop responses to changing circumstances. But moving at great speed with global scope is a very recent phenomenon; there has been no time for evolution to catch and genetically establish the necessary mechanism for adjustment.

In postnormal times, the passage of natural time – day and night, the tempo of the week with demarcated time for rest, the cycles of the seasons, the phases of the moon, the annual motion of the sun through the constellation, the movements of the star across the heavens, and our connection with the environment and the cosmos – is replaced with digital time. We lose all connection to our environment and the cosmos; and imagine the course of life only through speed. As Bodil Jonsson notes, ‘digital clocks are symptomatic of a drive for precision that is relevant in both micro and macro cosmos, but tell us nothing about *our* cosmos’ [32]. Digital time drains us of all our being; our personal time is no longer ours.

The result is that the effects become overwhelming, since neither you nor I can function in exponential mode. On the contrary, we are very much attached to habits, ie steady states. In spite of this, we are becoming increasingly involved in exponentially changing processes, and these in turn tend to lead to profound alternations in our attitude to time. Either we feel that time is running out of control, or else that the amount of change must have taken longer than it has. [33]

Our sense of time is fragmented and displaced, leading to alienation from ourselves, our families and communities, as well as nature and the cosmos.

This brings us to simultaneity, which gives time a qualitatively new dimension. We are forced to react to a number of different, often contradictory demands – all at once. The now consists of all the events and developments that are happening simultaneously and demanding our attention. Crises emerge in clusters requiring us to deal with them simultaneously. There is a limit to our capabilities for multitasking; and anxiety, frustration and anger emerge when we cannot cope. As we learn from relativity, simultaneity is relative. As such, different observers have different perspectives and perceptions of now. Differences and contradictions are thus proliferated.

But simultaneity also presents us with an opportunity. As we cannot deal with simultaneous occurrences on our own, we are obliged to collaborate rather than compete. A good example is provided by global efforts to develop a vaccine for Covid-19. Despite entrenched political differences, governments and scientists across the world worked together – simultaneously – to produce a viable vaccine. Typically, a vaccine would take several years, if not a decade or so, to be researched, tested, and approved. However, the short time required to produce the vaccine also led to research based on simultaneity: phases of research, requiring testing at different levels, were conducted in parallel. The end results were not only astonishing but a clear demonstration of what can be achieved through collaboration at the global level.

Speed and scope are also essential for tackling wicked problems of postnormal times – from the prevention of planetary collapse to solving the issues of climate change, from dealing with rampant inequalities to implementing policies of social justice, from wallowing in decaying paradigms and disintegrating orthodoxies to creating new paradigms and genuine future alternatives. These urgent problems require global collaboration and timely approaches.

The End of Times?

Accelerating uncertainties come as standard in postnormal times. As such, time, as St Augustine feared, and for whom past and future only existed in the now as memory and expectation, becomes the site of insecurity. Those who find it difficult to cope with insecurity and uncertainties, look for an anchor: something secure and

firm to hold on to in times of turbulent change. We rely on our own beliefs and dogmas when we try to cope with our inner most insecurities; and where relevant dogmas do not exist, we invent them!

It is thus hardly surprising that there is a marked increase in eschatological beliefs and movements in postnormal times. A number of Christian sects, particularly American evangelicals, firmly hold to the dogma that we have reached 'end times', and Jesus will return to bring redemptive history to its ultimate conclusion. Those who believe in the rapture, Christian Zionists amongst them, cannot wait for the apocalyptic rapture when the faithful, dead or alive, will rise up to the heavens to meet the Lord. A similar number of Muslim sects eagerly await the reappearance of the Mehdi, the twelfth Imam of the Shia, who is said to have gone into occultation during the early phase of Islamic history. On his return, he will rule only for a handful of years to restore justice before the Day of Judgement and end of times. Other religious traditions have comparable dogmas.

It is easy to dismiss eschatology as irrational mumbo-jumbo. But its significance in an era of uncertainties and insecurities cannot be underestimated. American evangelicals provide the bulk of support for the Trump presidency in the US. Christian Zionists, who believe that the formation of the state of Israel is a prerequisite for the Second Coming of Jesus, have played a leading role in promoting the expansion of the settlement and the persecution of the Palestinians. Christian Zionists not only supported and sustained the Trump presidency, but played an active part in his administration; the most notable being Michael Pompeo, the Secretary of State. According to Simon Tisdall, Foreign Editor of the *Observer*, the support for 'Israel of Pompeo and fellow Christian Zionists is unconditional and uncompromising. He once told Israel, Trump was sent by God to save the Jews from the Persians. "I am confident the Lord is at work here"'. [35]

Apocalyptic thought also played a major role in the formation, and the atrocities, of the extremist group ISIS, who established an 'Islamic Caliphate' in Iraq and Syria. The former President of Iran, Mahmoud Ahmadinejad, organised a regular 'International Conference for the Preparation of the Arrival of the Mehdi' (I know, I was invited to one!); and conducted most of the state business on the anticipation of Mehdi's imminent arrival. Postnormal uncertainties will probably increase both the number and influence of such apocalyptic movements.

The same can be said about the rampant rise of supremacist nationalism and fascism in the US, Europe, India, Brazil, and elsewhere. Much of it is the product of the uncertainties, and the ignorances they generate, of seeping and shifting power – from the West to the East, from 'the White Men' to men and women of all shades and colour, from monolithic polities to multiculturalism, from the middle classes to the ultra-rich beneficiaries of globalisation and speedy capitalism, and from patriarchy and heterosexual normalcy to barging plurality. Those who cannot deal with the uncertainties of such power shifts seek to reduce the complex reality of postnormal times to one-dimensional racism, cult of manufactured tradition, fetishization of weapons and war, and distrust and hatred for all who are not 'us'.

‘We describe *ourselves*’, notes Griffiths, ‘when we think we describe *time*... Our image of time is totalitarian, because the totalitarianism is in us, but one writ so large we can hardly read it’. [35] One particular form of fascism we fail to read is that of technological determinism: the proponents of technological Singularity, the champions of Transhumanism. The dream here is that accelerating technological growth will inevitably lead, very soon, to the merging of man and machine, which will produce an explosion of intelligence, which will produce more intelligence more and more rapidly, eventually leading to Superintelligence – and Humanity 2.00. According to Ray Kurzweil, the Singularity will happen by 2045, [36] spelling the end time for Humanity 1.00. The resemblance here with apocalyptic religious thought is uncanny. Singularity is a form of rapture where God is simply replaced with technology in pursuit of bliss, perpetual happiness, and eternal life. Transhumanism, writes Maxwell Mehlman, seeks

to provide hope in the face of death, a measure of control over the savage aspects of nature, and meaning to its followers’ existence. No wonder that there is a Mormon Transhumanist Association according to whose creed transhumanism is a means of realising “diverse prophetic visions of transfiguration, immortality, resurrection, renewal of this world, and the discovery and creation of worlds without end. [37]

But the transhumanist dream of union of man and machine also has an established history in futurist thought going back to the Italian fascist Futurism movement, [38] which took different forms from 1900 to 1930s. (Notice that a popular American futures website, which is partnered with Singularity University, is called Futurism.com, unwittingly echoing a connection with the Italian futurism movement). Like the transhumanists, the Italian fascist futurists were obsessed with the infusion of man and machine. Its best delineation comes in Marinetti’s 1909 cyborg novel *Mafarka the Futurist*. Mafarka is an Arabian king with imperialist ambition who creates a mechanical son, Gazurmah, to be his immortal substitute. Gazurmah, born without a female vulva, is carved out of oak and modelled on an airplane. He looks dazzling in his enormous, orange cloth wings stretched over a lattice composed of steel, bamboo, and hippopotamus sinew. Mafarka finds his coarse skin, squared jaw, ribs of iron, and formidable metallic member alluring; and breathes life into his son with a lingering homoerotic kiss. But his creation devours him – a fate Mafarka has foreseen and desired so that he might be reborn in the immortal son. Gazurmah proceeds to rape and obliterate the earth. Gazurmah is not too far removed from *The Terminator* (1984). But while the Terminator is a dystopia, Marinetti’s *Mafarka the Futurist*, with its aspirations of autogenesis and immortality and demonization of women’s bodies, is presented as a distinctive utopia. Fellow traveller, Luigi Colombo Fillia’s 1929 painting, *Spirituality of Aviator*, portrays a similar utopia. The aviator is pictured as a fluid biomorphic shape embedded in a semi-transparent, tilted plane. Man and machine become one, permeable body with fluid boundaries. The aviator’s

mystical body seems to give birth to an industrial city indicated by smoke gushing through circular openings, carrying within their stream three small buildings. Fillia painted a number of other notable pictures where landscape and bodies merge with technology depicting a 'religion of velocity'. [39]

TIME AND HISTORY DO MOVE IN CYCLES! FEAR OF UNCERTAIN TIMES, TOTAL AND BLIND FAITH IN TECHNOLOGY AS A MECHANISM OF SALVATION, OFTEN SERVE AS A GLUE TO BIND THE FUTURE AND FASCISM TOGETHER.

Another commonly used weapon in the quest for fascist ideals is the notion of freedom, a cherished ideal of neoliberals and libertarians. As political theorist Wendy Brown notes, 'neoliberal rationality prepared the ground for the mobilization and legitimacy of ferocious antidemocratic forces in the second decade of the twenty-first century' through its unrelenting 'assaults on constitutional democracy, on racial, gender, and sexual equality, on public education, and on civil, nonviolent public sphere have all been carried out in the name of both freedom and morality' [40]. Freedom is a clarion call for libertarians fearful of losing their entitlements to the privileges of whiteness, raging against political correctness and everything else – from government support for the disfranchised, political equality to wearing face masks in a time of pandemic. 'This rage in turn becomes the consummate expression of freedom and Americanness, or freedom and Europeanness, or freedom and the West'. Hence: 'Nazis, Klansmen, and other white nationalists gather publicly in 'free speech rallies', why an authoritarian white male supremacist in the White House is identified with freedom by his supporters because of 'political incorrectness', and how decades of policies and principles of social inclusion, antidiscrimination, and racial, sexual, and gender equality come to be tarred as tyrannical norms and rules imposed by left-wing mobs'. This is 'what happens when freedom is reduced to naked assertion of power and entitlement'. [41]

Way back in 1980, the late American social scientist, and a friend of futurist Alvin Toffler, Bertram Gross, argued that the US was about to be taken over by a new brand of *Friendly Fascism*, 'far more sophisticated than the "Caesarism" of fascist Germany, Italy, and Japan. It would need no charismatic dictator nor even a titular head...It would require no one-party rule, no mass fascist party, no glorification of the State, no dissolution of legislatures, no denial of reason. Rather, it would come slowly as an outgrowth of present trends.' [42] In my 1995 paper, 'Cyberspace as the Darker Side of the West', I argued that the companies mining cyberspace would transform into new versions of colonial corporations such as the British East India Company and Dutch East India Company. [43] Gross was particularly concerned about 'new style technocrats', who during the past forty years have morphed into 'tech oligarchs'; cyberspace has turned out to be a

gold mine not just for the West but also for the East. With vast wealth, power, and control over technology, the tech oligarchs, suggests Joel Kotkin, are determined to impose a neo-feudal order on the world. Their visions are not simply to make money but ‘to “change the world”, replace the old physical and social structure with “electronically augmented environment” where everything is determined by digital code’. [44] This ‘technocratic despotism’, Kotkin argues, is not limited to the West – but is global. And its cutting edge can be found in China, where the ‘use of artificial intelligence to regulate society and public opinion’ has become the norm. ‘Sophisticated algorithms are employed to control everything from legal proceedings to permission for marriage...The regime is also using facial recognition technology and ‘social credit’ scoring, which includes everything from credit worthiness and work performance to political reliability. [45]

Postnormal times seem to be taking us back to the future of fascism. Speed, scope, scale can work simultaneously, to use the words of Jay Griffith, to ‘mould an implicit fascism’. [46] Notice how rapidly fascism emerged in Myanmar, spread at speed through social media, and led to the genocide and the flight of the Rohingyas from the country. Or how rapidly and effectively hatred against Muslims in India is spread via social media by the Hindu fascists. [47] Or how quickly since 2017, China has moved and held 1.8 million Uyghurs in ‘the largest incarceration of an ethno-religious minority since the Holocaust’. [48] Or how quickly the American radical right and evangelical Christianity became indistinguishable from each other. [49] In postnormal times, the far right, as Cas Mudde shows, has been ‘normalised’ and gone mainstream. It spreads its ‘pathological normalcy’ over the globe with great speed reaching in scale to individuals and communities so that no country is immune from far-right politics. Moreover, the boundaries between far-right and other ideologies and ideologues, such as the libertarians and neoliberals, are blurred. [50]

The Broken Arrow

Speed is also the enemy of thought and reflection, of considered knowledge – anything that takes time to reflect, think through, and mature. In postnormal times, conventional modes of production of knowledge are radically transformed. Big Data generates gargantuan information that contains not only Popperian *Objective Knowledge* [51] but also fake news, alternative facts, manufactured fake science, false history, conspiracy theories, the paranoia of anonymous on-line mobs, and ‘bullshit’ [52] – all of which are incorporated in knowledge. Furthermore, knowledge is also merged with different varieties of ignorances: vincible ignorance produced by racist algorithms, destructive advances such as development of autonomous weapons of mass destruction, and weaponised disciplines; and invincible ignorance, which is a product of our Unthought – things we never think about because they are outside the domain of dominant paradigms, disciplinary boundaries, theories, principles, assumptions, and axioms. Emergent knowledge is thus shrouded in the smog of ignorance that is not easy to negotiate. [53]

In conventional Western epistemology, ignorance is considered an outlier, a bad epistemic practice. But in postnormal times, ignorance is not just a partial shadow but the total eclipse: it covers, surrounds, obscures, and shrouds what could be regarded as knowledge. Ignorance thus emerges 'not as a feature of neglectful epistemic practice but as a substantive epistemic practice itself'. [54] Established paradigms, now overburdened with ignorance, failing and dying, are thus unable to produce coherent, inclusive, accounts of the past nor permit clear and viable visions of the future. We enter the domain of time-slice epistemology where evidence is based on self-rationalised beliefs and irrationality becomes the dominant theme. There is, writes philosopher Sarah Moss,

'NO CONNECTION BETWEEN YOUR PAST MENTAL STATES AND WHAT YOU CURRENTLY BELIEVE, OR BETWEEN YOUR FUTURE MENTAL STATES AND WHAT YOU ARE CURRENTLY DOING'. CONSEQUENTLY, TIME IS EPISTEMOLOGICALLY BROKEN.

But epistemologically broken time still has a tenuous connection between the past and the future in the here and now – albeit, based on fading paradigms, ignorance fuelled epistemology that sustains domination and exploitation, manufactured fields of normalcy that make us think that all is okay, and self-justified rationality. But in postnormal times, time is also ontologically broken, which makes the connection between the present – the now – and the future even more problematic. 'With the everyday idea of time', writes CK Raju, 'the idea of individual humans as the cause of events is the following. The future comes into existence, and the choices one makes now decides which future comes into existence. This coming into existence, and passing out of existence, is fundamental to the mundane notion of cause; this belief is the basis of action in everyday life.' [56] But in postnormal times, where complexity is the norm and we are often on the edge of chaos, there is seldom a direct cause and effect relationship. As Jordi Serra notes, 'nowadays phenomena are the result of complex networks of causality in which many causal factors are intermingled; in such cases, action on just one element is not only futile but often also quite dangerous. Action on A triggers myriads of reactions in B, C, D all the way to Z; and many of these reactions can acquire chaotic proportions at lightning speed.' [57] As an effect may not naturally follow the cause, the causal link between the past and the future breaks down – leading to ontologically broken time.

We are, however, not in the province of total indeterminism. In a completely indeterminate world, 'past and present would not decide the future. There would be no rational way to judge the future consequences of one's present actions', notes Raju. Thus, 'there would be no place at all for voluntary action', and 'it would be futile to speak about choosing rationally between different futures'. [58] While epistemologically and ontologically broken time destroys conventional notions

of rationality as well as the standard way of perceiving reality, it does not abolish free will or agency in postnormal times where the accent is firmly on complexity. In a complex system, each member of the system has the potentials of starting a chain reaction within the possibility of many different actions: a vegetable trader who sets himself on fire starts the Arab spring, a video of police abuse starts a movement, and a shy teenager can give new life to the climate change movement. Collectively, the set of individual potentials provide agency and create possible space for cooperative actions. This space is itself dynamic; individual members of the system come together, interact, learn, produce new learning, and construct new internal and external relations that lead to further change. Complex systems self-organise to create a new order. What it means is that we need to see the current reality as shifting and changing in a complex dynamic: the present is like a flock of birds moving in unison, in full flight!

But where is the flock of birds going? Without a causal relationship, the present does not provide us with a route, or guidance, for the future. Given that the future is unfolding on, and constantly interacting with, the extended present, it is ever-present; and ceases to be a destination. The future is entrenched in the now: not simply as trends and emerging issues, but more importantly as a complex, endlessly changing entity: a product of cyclic time overlapping linear time, an amalgam of extended present constantly being impacted by familiar and unthought futures, a compound of broken ontological and epistemological time, infused with knowledge and ignorance in equal measure, and a continuum of fluctuating contradictory and chaotic developments. This demands a fundamental rethink of how we view the future.

A useful metaphor is to think of the future as a garden: a purview to cultivate, a space to shape an appropriate and healthy environment, a place to cherish. [59] A garden heals broken time for once established, and continuously and adequately looked after, a garden has no 'end'. In the garden there is time for everything: when to plant, when to water the plants, when to cut the flowers, when to prune and remove weeds. You have to prepare the soil and make sure it is right for the kind of plants you want to grow. You have to remove dead plants, cut down a bush or tree when they begin to suffocate other plants. And when you are all done, you start all over again. There are linear time and cyclic time in the garden. It may all look tranquil, but a garden is boundlessly changing. And it has diversity – the essence of life. There are a variety of hardy perennials that flower year after year. There are the annuals and the biennials that have to be planted in season. Some plants that provide various colours of foliage, or hedges and borders, or climb up fences, or play architectural roles. There are fruit trees, trees that provide fragrant and colourful flowers and trees that fix the soil and provide shade. There are the grasses so essential for the lawns. The diversity and time dimension of the garden is beautifully captured in the poem, 'Time and the Garden', by Yvor Winters. The opening verses read:

The spring has darkened with activity.
 The future gathers in vine, bush, and tree:
 Persimmon, walnut, loquat, fig, and grape,
 Degrees and kinds of colour, taste, and shape.
 These will advance in their due series, space
 The season like a tranquil dwelling-place. [60]

And what would a garden be without the proverbial birds and the bees? And those worms and insects that both enrich the soil and require some form of pest control. And all those wonderful aquatic features with gently streaming water. The thing about a garden is that all this truly monumental variety of life exists in symbiosis: nourishing each other and ensuring the overall survival of the garden. But the garden is also under constant threat from proliferating weeds, pests and plant diseases, excessive use of pesticides, wildlife, aggressive non-native plants, drought and, of course, climate change. And new threats emerge all the time!

Like the garden, the future has to be continuously cultivated. And the cultivation has to be collective – we are all gardeners and protectors of all our futures. The garden we are talking about is a public garden – open to all, involving everyone. We all – people from all cultures and perspectives – have to clear the dead and dying paradigms, notions, ideas, principles and dogmas. New paradigms, notions and ideas need to be planted. The poisonous weeds of ignorances have to be removed – again and again. The diversity and plurality of the future has to be ensured and sustained. Crops for the future generations have to be planted. New and emerging threats have to be identified and tackled. The process is ongoing without an end state. And just as gardens retain memory, futures too need to preserve what is good and healthy in traditions, what provides us with our identity, and ensures our being.

Of course, the metaphor has its limits, and should not be stretched too far. A garden, even a public one is tamed and restricted in nature. In the garden, change is slow; postnormal futures, on the other hand, change rapidly and continuously. Unlike the future, a blooming garden is not subject to the unthought – unless, of course, the unthought comes as the complete destruction of the garden. But the essence of the metaphor is clear: futures, like gardens, have to be nurtured and cultivated constantly and continuously, even when there is a threat of environmental collapse.

Some of Our Tomorrows

Time is as much a part of the real world as it is a part of our mental constructions; and the dynamic of the real world often transforms our perceptions. In postnormal times, speed and accelerating change is distorting both our perception of reality and our perception of time. Consequently, the future is discounted. We are presented with potential futures as *The Inevitable*, [61] a priori given fate that cannot be escaped. Indeed, the future has been conquered to such an extent that even dreaming about the future seems futile, as an advertisement for a Honda

e-electric car makes clear. 'Dreams', it says, over images of a beatific woman chasing a speeding futuristic 'concept car', 'it all begins with a blank page'. 'Ask yourself', the advertisement urges, 'is a dream still even a dream if you can drive it?'. So why dream about the future when your dreams have already been realised; the future is foreclosed even before you have imagined an alternative. The fear of collapse, the real dangers posed by climate change and the violation of planetary boundaries, lead to similar perceptions of closure. After all, existence is the foremost axiom or piece of reality which shapes the structure of thinking; and the threats to our own existence leads to paralyses both in our thoughts and our actions.

WE ARE TERRIFIED WITH THE GIGANTIC NATURE OF OUR PROBLEMS, WITH POTENTIALLY LOOMING COLLAPSES, WITH THE DEVASTATING IMPACT OF CLIMATE CHANGE, AND FEEL IT IS IMPOSSIBLE TO DO ANYTHING ABOUT THEM. HENCE, THE WRITING-OFF OF MACRO ALTERNATIVE FUTURES.

When we see postnormal change moving in our direction, we triumphantly declare 'the end of history'; when it moves in the other direction, or when we cannot cope with the uncertainties that change usher, we announce 'the end of times'. The idea of obliteration is linked to the perception that we have sinned, made grave mistakes, and deserve collapse or end of times. 'It served us right', says Jean-Claude Carriere. 'A sense which acceleration obviously makes sharper, for any engine which goes faster and faster can only blow up in the end'. [62] It all amounts to either self-induced or scammed abandoning of agency and hope.

Postnormal times does not spell the end of times through potential collapses, even though the threats are real and urgent. Why? Because positive change can come at breakneck speed. Consider how much changed in just a few months with the arrival of Covid-19: time stopped even though the clocks ticked, the Earth rested for a short time, and the planet began to recover quickly. We have the agency to usher such timely changes. Indeed, a major function of postnormal times theory is to focus on agency and generate pathways for navigating our way out of postnormal times. We need the self-belief that we can actually change things. As for the end of times through allegedly divine prophecies – well, that will come when the sun starts its journey to become a supernova.

'We all want to have known the time of all times, the hinge of destiny, the real break with the past, the transition with no going back', says Umberto Eco. [63] Postnormal times mark that 'real break', it is a transition with no turning back. So, it should not be a surprise that it does mean the end of particular types of time. It is the end of time for dominant paradigms of modernity, capitalism, postmodernism, and many associated concepts and notions. Time is up for 'Western civilisation' as

we have known it, along with the speed-based life of excess it has globalised. Time is also coming to an end for neoliberalism, libertarianism, and all the other pernicious isms that the West has imposed on Others throughout recent history. It is the beginning of the end for obsessive individualism, self-centred notions of freedom, and 'the diabolical character of modern liberty' that seeks *Freedom from Reality*. [64] It is the beginning of the end of white privilege (despite the nihilism, fatalism, and resentment of some white folk). It is the middle of the end of patriarchy. And it is so utterly painful for some! In postnormal times, there are no unassailable – physical, conceptual or mental – structures: all can crumble in front of our eyes; and 'we have run out of time to build new things in old ways'. [65]

But the old ways continue. Not just in our thought patterns, in our, to use the words of David Andress, 'selfish wickedness', but also in the old ways of imposing power and values on others and thus exiling their futures to an arid fate. One effect of accelerating change in postnormal times is the loss of memory. Past and futures exist in the now as memory and expectation. But rapid change undermines time as memory. We lose our ability to understand and retain tradition or learn from history. The life-enhancing tradition of other cultures is either denigrated, suppressed, or written out of history. A sense of 'entitlement to greatness', based on colonisation and stolen wealth, is used to justify the status quo – not so much out of nostalgia but, as David Andress points out, from a distorted, demented version of the past. [66] Time, as a phenomenon of memory, is thus drained of expectation as well as anticipation.

'We wrote the script of our time', says Griffiths, 'in shorthand. Literally oo. And gave ourselves short shrift with this shorthand; sold ourselves short.' [67] To keep all futures, micro and macro, plural, inclusive, and open to all viable possibilities, we need to rewrite the script of time, by long hand, with creativity and imagination, in slow time. This process begins by replacing 'me' with 'us'. So that I, along with all others, can say: I have time, therefore I am.

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SEA GLASS

Liam Mayo

Have you ever walked along a beach collecting shells? In my home, this is one of our favourite activities. My sons, little buckets in hand, run down to where the water meets the sand, then, with the beautiful precision-in-chaos so endearing to children, carefully scour the sand for the shells that capture their attention. There are rules to this enterprise. We know the shells that are important to the local ecology need be left alone to replenish. However, those shells that are in abundance (in our place the pipi shell) are fair game. Oh yes, and any rubbish found must always go in the bin. Every now and then one of my sons will come across a colourful piece of glass, brilliantly distinguished, nestled against the white sand. 'Look Dad! Look!' How long the glass has been in the ocean, exposed to the gritty saltwater and the coarse sands of the seabed, will determine the shape it takes at the shoreline. Glass that has only recently found its way to the sea is still translucent, fine and sharp at the edges. Glass that has been in the sea longer is smooth to the touch, rounded and opaque; almost like a stone, but not quite a stone. Time, quite literally, shapes the glass. 'That's a funny looking shell.' The first time a piece of glass was uncovered we talked about it: 'it's not a shell, it's a piece of glass.' Glass that has been manufactured in a factory somewhere, by someone, used, then thrown away. So, is it rubbish? Well, it is rubbish. Then it should be put in the bin. Well, it may have already been thrown in the bin by someone, somewhere, but it still ended up back here on our beach. It is beautiful. The colour and the way the sun light reflects against the irregular contours of the surface. 'What is glass made of?' Glass is made from sand, sand that is heated at incredibly high temperatures and then as it cools it is shaped into objects that we can use, like bottles, windows, or mobile phones. 'So, we should leave the glass here on the beach then?' Well, I guess that depends on how you look at it.

To be artificial is to be not of nature, to be made by humans. More specifically, artificiality is to be manufactured by humanity as a means to replicate that which occurs in nature. Here, I seek to explore the epistemological and ontological artificialities that currently govern the human condition; the pieces of glass that have washed up onto the beach of our consciousness. In particular I look at Modernity's constructions of subjectivity and objectivity and how ubiquitous technologies are not only inadvertently undermining the long-held mythologies of Modernity but exposing the fragility of a society devoid of sanctity at the hands of secularism. What are we to make of all these objects that surround us? My endeavour is not to

add to the profound bodies of work that already exist in arenas of epistemology and ontology. Rather, my interest is change, and contemporary innovations in Western thought that make problematic the providences that govern our contemporary condition. My agenda is to pull on the threads of these interventions as a means to explore potentialities for a universalistic approach to studying the future. Indeed, this endeavour is couched in the very notion that humanity is undergoing significant transformative change – the very nature of change is changing. However, it is my hope that by corralling some of the epistemological and ontological assumptions that predicate our view of change, we may be better equipped to navigate this time of flux. I concede, and will leave you with, the ethical and moral implications of such a project; with a simple question, with an understanding of the artificiality of our world, from where do we source the fundamental foundations to compel humanity through change?

As time is experienced in a sensory matter, it is epistemologically conditioned. Time is relational and transcendent; we ebb and flow with the tides of change, we sense it, anticipate it and respond to it. These changes are rhythmic and have discernible patterns that hold powerful mythic narratives. With these patterns we may trace the manner with which reality is constructed from one epoch to the next. Modern time is framed by technology. Technology, for the modernist, has enabled our evolution out of superstition and irrationality to dominance and universal conquest: the hunter gather became the agrarian, who became industrialist, who became the capitalist. Modernist time is linear; as neat as an ice cube. Its foundations are set in the Enlightenment values of reason, rationality, anthropocentrism, and secularism.

**MODERNIST TIME, TECHNOLOGICAL TIME, DOES NOT SEEK TO
TRANSCEND THE PATTERNS OF CHANGE, IT SEEKS TO OVERCOME THEM.
WITH TECHNOLOGY, TIME CAN BE CAPTURED, OWNED, AND CONTROLLED.
THIS IS THE MYTH OF MODERNIST PROGRESS.**

Within this account, technology is value neutral, apolitical, and functional. Advanced technologies mean advancements in progress. Deconstructionists, with their variety of means for scuttling the epistemological ship, make these assumptions problematic, pointing out the potentiality for technologies to influence and subordinate portions of the community. Amongst them, Marxists, critical theorists, post-colonialist, and feminist scholars place power and the political firmly on the agenda of technology, articulating how technological determinism favours a particular worldview – usually that of Western men who preference empirical ways of knowing the world. Indeed, critiques of this nature gain currency in an epoch where the ubiquity of technologies means that existence can, for the first time, imagine itself immaterially socialised in an adjacent reality. This manifestation, while remaining true to our mythology of progress, implicates notions of selfhood,

knowledge, truth, and reality, that are intertwined in the Modernity myth; with technology those things we once held true grow more complex. This increasing complexity is powerfully linked to the manner with which we sense time, suddenly it feels as though time moves faster, decisions are more urgent, consequences more dire. For the media theorist and writer Douglas Rushkoff, we are experiencing a *narrative collapse* brought on by the media and culture all around us. Specifically, Rushkoff takes issue with the instantaneous and omnipresent forces of social media that are enabled through ever expanding digital technologies. [1] American academic Tom Nichols agrees, claiming that what we are witnessing the *death of the expert* – ‘a Google-fuelled, Wikipedia-based, blog-sodden collapse of any division between professionals and laypeople, teachers and students, knowers and wonderers – in other words, between those with achievement in their area and those with none’. [2]

The psychologist John Vervaeke locates Rushkoff’s narrative collapse and Nichols’ death of the expert, firmly within Western culture, rooted in the erosion of a unified identity once held together by ‘god’. [3] The divine, in Modernity’s worldview, has become something non-rational and arbitrary, almost absurd; the minds most secure and meaningful connection is no longer with the world but with itself. He calls this, the *meaning crisis*, the collective conditioned response of anxiety, alienation, disconnection, and disenfranchisement in the face of the emergent challenges owed to significant societal change. This is a loss of normative agency and emblematic of the estrangement of individuals from one another and the infertility of their ecology with the world. In these times of significant change, according to Vervaeke, we are surrounded by strangers, alone in our intent, acting with determined purpose in a world that fundamentally lacks it. We have thrown the glass out, but it has washed back up on our shore and we don’t know what to do with it.

Futurist and cultural critic Ziauddin Sardar’s postnormal times has provided me a point of departure in this space. By situating ours as a transitional age, Sardar has told a story of the failings of the myth of Modernity and, in doing so, speaks to the visceral uncertainty that captures the collective sense of – ‘what is going on?’ His litany is that of collapsing worldviews, poised eloquently between the simple symmetry of ‘post’ and ‘normal’, he articulates precisely that that which we are experiencing is not normal, or, at least what we expect as normal, but it is not exactly abnormal either. [4] With postnormal times, Sardar contends, we are suspended in an uncomfortable space between the no longer and the not yet. This experience, framed by poetic alliteration (chaos, complexity, and contradiction) is conceptually pleasing; it provides a frame within which to shade context. And it is these shadings that help us make sense of change. Globalisation enhances complexity, stock markets are chaotic, and policymaking is contradictory in the face of emergent challenges.

There is familiarity here; by emphasising the change of the present – ipso facto – potentialities of the future are opened. But there is risk too. If the future is both

the principle for action and the active space for the realization of potentialities, obligation is suspended. There is an unexplained cognitive dissonance between changing reality as experienced and change as imagined; the future always seems like something that is going to happen rather than something that is emergent. In this context, the future presents an epistemological obstacle to eliciting action in the present; it is a thing that is rationalised into existence, the secular bastion of hope that remains afar, an indicator by which we will progress, rather than a call to action in the present. This is using a modernist lens to fix the failings of Modernity; if I throw the glass out, it ceases to exist, a problem for someone else, somewhere else, to worry about, tomorrow. But, with this glass on our beach, in our hands, the question becomes – as my son prodded with curiosity – what do we do with it? Indeed, how are we to comprehend these postnormal times?

The cultural theorist Michel Foucault affords perspective here. He reads human history through the different ways cultures have developed knowledge about themselves; through economics, biology, psychiatry, medicine, and penology. [5] This work is built upon the historian of science Gaston Bachelard's proposition of the epistemological break and epistemological obstacle – *obstacle epistemologique* and *rupture epistemologique* – in *The Formation of the Scientific Mind*. Gaston connotes the rupture of epistemology as a sporadic moment where accepted norms are distinctively broken away from. [6] The academic A.T Kingsmith elaborates: 'the rupture is evasive, fleeting and interruptive, and makes problematic the epistemological systems of truth, reason, justice, and morality, a re-inscription of knowledge that branches off into different ways of being and thinking, theorizing and living'. [7] More than a rejection of the old, a rupture is a break away and a move beyond. Thus, the future does not arrive in a temporal sense, rather it arrives chiefly through social fragmentation. Certainly, this approach exposes the very nature of power and the role of traditional historians, as purveyors of their field in suppressing social mutations, displacements and transformations, in favour of the continuity of long-range historical connections. The prototypical example of the construction of continuity is the manner Western knowledge is constructed – giving us the neat dotted line from Plato to Descartes to Modernity. Conversely, Galileo, Newton, Lavoisier, Einstein, and Mendeleev exemplify the discontinuity between epistemic configuration from one epoch to the next.

This illustrates the nuance between American historian of science Thomas Kuhn's paradigmatic shift and the rupture. Kuhn locates the rupture at the edge of the next scientific paradigm, quarantined from irregularities, whereas the epistemological rupture wallows in, what Kingsmith calls, the 'sea of anomalies'. As such, with each rupture a new epistemological structure emerges, and a re-reading of reality is required. This is a shift in understanding from that which has been considered normal, to the discovery and familiarisation of a new normal. This re-reading of reality is a perpetual affair; it requires prudent, conscious, and recurring attention. As Paul Eisenstein and Todd McGowan argue in their book *Rupture: On the Emergence of The Political*, epistemologies can never be natural or complete, there is

no equilibrium waiting to be discovered, no totality that negates the processes of change. [8] Rather, what we have is Kingsmith's sea of anomalies; the tide that rises and falls, the river ebbs and flows;

**'FROM SITUATIONISM'S IMAGINING OF A WORLD OF RANDOM
MOVEMENTS AND STRUCTURES, TO DECONSTRUCTIONISM'S REALISING
OF THE PERPETUAL MOTION OF BODIES AND IDEAS, TO EMPIRICISM'S
ENVISAGING OF THE INVENTION OF BELIEFS AND HABITS – RUPTURE'S
SHARED POINT OF DEPARTURE IS A PROCESS OF CREATIVITY AND
IMAGINATION THAT BREAKS FROM WHAT IS ASSUMED TO BE TRUE.'**

The primary contention of the notion of rupture is that of process. This process involves memory – the non-linear ecosystems that drive our, personal and collective, conditioned responses that are evoked by our senses. As the historian and futurist Marcus Bussey states, by giving voice to the sense of memory we begin the emancipatory process of uncovering the manner in which culture and context has altered, manipulated or crafted our personal and collective sense of the present, and as such 'gain a modicum of control [and] become a little less governed by our environments'. [9] In this way, we frame postnormal times as rupture, rather than rapture, opening a space for transformation and optimism; this is the peeling back and opening of opportunities, to new ways of knowing, and indeed new ways of being. The challenge here is to find ways to inhabit the rupture without falling back into a secure sense of identity, or nostalgia. This means we have to get comfortable with being uncomfortable; sensing the rupture is the art of acculturating to flux, dancing with the dynamics of change. Certainly, even my four-year-old son has learned that glass should be recycled.

The rupture has ontological implications. Whilst it is the construction of knowledge in the virtual realm that stimulate the meaning crisis, our imminent rupture, it is digital technologies, the vast complexity of objects designed, built, and maintained that enable the transmission of virtuality, which alters the manner by which we perceive reality. Satellites, submarine cables, antennas, poles, cables, nodes, routers, desktop computer, laptops, tablets, mobile phones, and modems have become the access points by which we enter and explore an ever-expanding realm, stepping from a physical world, steeped in well-defined and predictable boundaries, into a new realm of pure communication, devoid of clear boundaries, where rules are continuing to evolve. These objects, the tools of our abstraction, imply new and frequently abnormal definitions of space, volume, surface, and distance where connection now defies the traditional meaning of community. The media theorist Rosanne Stone calls these our 'prosthetics', objects of industrial manifestation whose intimacy with our bodies alters our perception of reality.

A great deal of research and development, design and marketing go into ensuring users seamlessly transition into new objects – adopt their new prosthetics. Design choices are aimed to de-emphasise function and emphasise the aesthetic beauty of new technologies; all the while reaffirming essentiality for modern life. Capitalist mythology buoys us here, as digital technologies become objects of our desire. Hard, firm, slim, mysterious, curvaceous, spectacles of allure that yearn to be touched. The aesthetic experience merges with the act of interfacing. This puts an uncanny spin on the aesthetic experience and new forms of subjectivity emerge. As the film and media scholar, Kriss Ravetto-Biagioli points out, what characterizes the new personal and person mediating screens is uncertainty about what constitutes the screen: it is both a surface and a material infrastructure; a window and a shade; an interface marked by the presence of an image and an invisible set of processes that use this same image or interface to disguise its own presence. [10]

This places us in what Foucault called a ‘fictitious position’, where the viewer transforms the screen into an object, but the *mise-en-scene* installs the spectator in the non-place of pure representation of that essential absence, that never ceases to be inhabited. Thus, the aesthetic experience is altered with digital technologies; the body is now stripped of its modernist presuppositions as a locus of sensation, perception, and recollection.

**DIGITAL TECHNOLOGIES, OBJECTS, ARE TOOLS OF ABSTRACTION:
COMMUNITIES ARE MEDIATED BY TECHNOLOGICAL PROSTHETICS OF
PRESENCE, AND THE QUALITY OF OUR RELATIONSHIP WITH THESE
OBJECTS REMAINS QUANTIFIABLE THROUGH THE LENS OF MODERNIST
MYTHOLOGY. HOW ARE WE TO RATIONALISE OUR RELATIONSHIP
WITH OBJECTS THAT SEEMINGLY FRAGMENT THE BEDROCK OF OUR
UNDERSTANDINGS OF REALITY?**

In his 1919 essay, *The Uncanny*, Sigmund Freud seeks to conceptualise the uncanny as feelings of unpleasantness and repulsion, distinct from the traditional notion of the sublime as an ennobling experience. For Freud, his undertaking is to untangle the mind's relationship with the familiar and the manner with which rationalist claims to reality are undermined through the uncanny. Throughout, the distinction between the *real* and *fantastic* aspects of the uncanny becomes increasingly blurred; in the closing Freud denotes the uncanny as an explicitly real emotion that is nevertheless a response to the objective world, thus making it ungraspable through the clinical terms imbued through the empirical case studies of his broader canon of work; an acknowledgement that there are other forms of knowing and being outside empirical constructs. [11]

Back on the beach we examine the piece of glass; is it glass or a colourful shell? Was it part of a glass bottle or a windowpane? Or something else altogether? Where was it made and where did it come from? What was its purpose? How did it end up in the sea? How did it end up on our beach? Where did the sand that constitute its make-up come from? Where was it supposed to go? Why this colour as opposed to another colour? Did someone love it before it was discarded? Or did someone discard it because it was unloved?

Freud's uncanny is an embrace of the mysticism of the object, or the radical otherness of reality, bringing into focus the unknown to the knowable, the unreal to the real. The uncanny, like the epistemological rupture, provides an opening here, a crack in our conditioning, to pry open and explore deeper. It indicates an ever-growing awareness of the indistinguishability between fantastic and real stimulation and provides a conceptual vehicle to investigate our relationship with the world. The philosopher Timothy Morton argues strongly for the importance of uncanniness, for allowing space for strangeness in intimacy, in which other beings can be their strange selves, '*strange strangers*'. [12] For Morton these beings are everywhere and everything: people, animals, trees, chairs, desks, sports cars, skyscrapers, and microbes. His goal is to, philosophically, make the inanimate, animate. [13] [14]

Bussey argues, in parallel, for an anticipatory aesthetic, that generates the space that is open and co-evolving toward conditions of reciprocal materialisations. What he is describing here is not the process of *Being* but the process of *Becoming*. We should distinguish between the two. The Enlightenment enterprise was to universalise a hierarchy of Being: God/Man/Nature and human/animal/mineral. With this, the advancement of the sciences and the humanities, which, couched deeply in Kant's notion of *correlationism*, built ways of Being on the assumption that things cannot be realized until they are *correlated* by the *correlator*. This conceptually universalised human perception, from which sets of principles and values were developed and disseminated that not only affirmed human perception but reaffirmed the primacy of reality through human knowing alone. This advancement is perpetuated through the process of which Descartes terms 'the severing,'; whereby *reality* (the human-correlated world) and the *real* (ecological symbiosis of human and nonhuman parts of the biosphere) are dislocated and held at odds by an impermeable membrane quarantining the *correlator* and the *corralatee*. Being human, in this sense, is to sever ties between humans and non-humans through sophisticated instruments and scientific research of Modernity. This act of severing has moved us from Palaeolithic cultures through to Modernity, supporting our subordination of First Nations peoples and non-humans and providing us the landscape for the colonisation of cultures, ecologies, and futures. Thus, this way of Being has been domesticated through Modernity's civilising process.

Quite conversely, the process of *Becoming* is more closely aligned to what social theorist Dianne Coole calls new materialist ontology, 'a process of materialisation

in which matter literally matters itself ... this is not, then, the dead, inert, passive matter of the mechanist, which relied on an external agent – human or divine – to set it in motion. Rather, it is a materialisation that contains its own energies and forces of transformation. It is self-organising, *sui generis*. Matter is lively, vibrant, dynamic'. [15]

Further, and complimentary to my position on the epistemological rupture, Coole's materiality is not causally determined; forms are not as guaranteed, unassailable, or as stable as they might appear. Indeed, like the recurring nature of the rupture, they need always to be reappraised within any particular context, along with their underlying ontological assumptions, lest they become reified or taken for granted. The epistemological manoeuvre of new materialism is that object relations are thinkable because they are real, even if withdrawn and unknowable. Here, we are far from the Enlightenment ontologisation of the relationship between subject and object. The new materialist ontology seeks to animate the human relationship with matter, to expand our sense of agency so to involve the interplay of human-non-human in co-creative works of materialisation. If new materialism is moving to a process of becoming, then our notion of subjectivity too becomes a process: fluid, pores, open, and coexistent.

Indian social theorist, Ananta Kumar Giri, calls this weak ontology 'which urges us to realise that ontological cultivation is not only a cultivation of mastery of the self, but also cultivation of its humility, fragilities, weakness, and servanthood facilitating blossoming of non-sovereignty and shared sovereignties... Weak ontology helps us realise that both identities and differences have inbuilt limitations and they ought to realise their own weakness as a starting point for communication and sharing through cultivation of weak identities and weak differences'. [16] This weakness suggests new possibilities for subject formation. Morton's notion of the 'mesh' is relevant here, as it describes the interdependence and interconnectedness of all living and non-living things in a way which gives equal value to the holes in the network and the threading between actors within that network. In doing so, Morton keeps open a space for the uncanniness of our intimacy with the world and with other beings.

Morton's position is one of objective universality; 'the hard matter of home is also the surface of some star – at once right there and somewhere, anywhere else.' He posits that the mesh is 'vast yet intimate', it simultaneously extends outward and inward, with no centre, edges, order, or hierarchy. Morton points to the world of biology, applying this system of view to lifeforms; lifeforms are made up of other lifeforms, the theory of symbiosis and lifeforms derive from other life forms, the theory of evolution. With the mesh, Morton claims, any notions of 'inside' and 'outside', 'close' and 'far', 'large' and 'small' lose their meaning as relative terms. 'The world looks as it does because it has been shaped by life forms every bit as much as life forms have been shaped by their environmental conditions.' Thus, according to Morton, we need to find new ways of being together in the world – subject and object – that go beyond modernist constructs of the self and self-interest.

In the present context, we reflect on our relationship with digital technologies. I shift my thinking from seeing my mobile phone as a tool, as a device, as a piece of technology, rather as an object that shares the 'mesh' with me. It, along with my computer, my modem, indeed, every other part of technology that I come in contact with, all hold space and are part of my universe. They are designed in offices, crafted in studios, and constructed in factories; they have their own distinct subjectivity, and they have their own place in the coexistence of my reality; they exist as much as I exist. When I think of my mobile phone in such a way, its birth in the factory, its delivery to me in the shop, I am forced to conceive of its death; what happens to it in death. I may throw it in the bin, it may go into a land fill, indeed it may be recycled, but it continues to exist elsewhere, out of my purview. Its matter, its energy, its essence, although in a different embodiment, goes on in our shared universe. In reflecting upon this, I give voice to the object; the mobile phone exists both in present time, but also in past and in future time (the mercury in its battery will last up to 250,000 years).

Yet, object universality, within the confines of Modernity, poses problematic moral consequences. The synthesis of subject and object, human and object, whilst claiming equal ontological standing, may be misconstrued as the malevolent process of reification; the reduction of one entity to another's fantasy about it, for example. Critics of new materialism and object orientated ontology point out that, in this proposed framework, when executed through a quasi-religious and premodern discourse, human agency is reduced to thing agency. Personal and political responsibility is difficult to sustain with a flat ontology, they maintain, as agency cannot be located outside the human sphere, in the material, non-human world. The philosopher Slavoj Žižek, in his book *Absoute Recoil*, calls this 'a kind of spiritualism without gods'. [17]

However, this very critique fails to acknowledge the confines within which it operates; it is a criticism that continues to reinforce the frameworks that have been in place from the Enlightenment, and the frameworks that are now failing to respond to transformative change.

**OBJECT UNIVERSALITY IS A QUEST TO EXPERIENCE REALITY
UNMEDIATED BY SIGNIFIERS, TO DO AWAY WITH THE CONFINEMENTS OF
MODERNITY (AND POSTMODERNITY) – KICK OFF OUR SHOES AND RUN
OUR TOES THROUGH THE SANDS OF THE REAL WORLD.**

Where Modernity has created distance between us and the things of the world, new ontological approaches offer us the opportunity to regain intimacy with our world. Agency here becomes about how we qualify (and quantify) the value of our relationship with objects; the lens through which we examine ethics and morality shifts from the agent to the relationship's agents maintain within one another.

To achieve this however, I argue, requires a new mythological underpinning to guide our process of Becoming. We need to undo the rationalism that has sanitized our view of the world. That is, we should seek to re-mystify the world.

Vervaeke remarks that while it is necessary to feel that the world is consistently intelligible, it is also necessary to have our sense of the world pulled periodically from underneath us. 'Insights emerge from the wreckage of this experience. It allows our perspective to reframe itself around a fuller appreciation of reality, like stepping from behind a camera, or losing your footing only to regain it with more traction'. Without a doubt, the world view of Modernity is collapsing and leaving in its place a void yet to be filled. This is not to say that Modernity itself is collapsing. Of course, it may reimagine itself and grow through this period of change. But our current Modernist lens is becoming increasingly opaque; washed by the salt and sands of the sea. My endeavour here has been to highlight a variety of ways that contemporary innovations have sought to reconstitute our ways of knowing and being in the world.

The way we know and be in the world is artificial; it is made by humans. The ubiquitous technologies that support this way of being and knowing are also artificial. We share our world with objects, yet, whilst we approach them as tools, they will remain outside of us, othered in a manner that subjugates their existence. What is required is a shift from Being to Becoming. Understanding this, we may see the current epoch of transformational change as a crack – an opportunity – to pry open and explore deeper the epistemological and ontological artificialities that have long governed us. Moreover, it is my hope, that through this understanding, we may be better equipped to navigate these postnormal times, toward a universal approach to futures thinking. The question remains, however, understanding the artificiality of our world, from where do we source the fundamental foundations to compel humanity through change?

Back on the beach, crouched down in front of my four-year-old son, toes curled in the soft sand, he looks at the piece of glass laying in the palm of my hand, 'So, we should leave the glass here on the beach then?' I give it back to him, 'I don't know', I say, 'What do you want to do with it?'

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THE END OF THE ORDINARY

Elizabeth Stephens

Of all the unexpected things the arrival of the plague brought with it, the distortion of time was one of the strangest. At the beginning of 2020, as across the world, cities, and then entire countries, moved into lockdown. Hundreds of millions of people found themselves suddenly and unexpectedly isolating in their homes. One of the most remarked open experiences of the pandemic was the widespread sense that temporality itself had warped. Pandemic time seemed both radically accelerated and interminably slowed down: 'Something has happened to time', as Arielle Pardes noted in an article on 'coronatime' for *Wired*:

the virus has created its own clock, and in coronatime, there is less demarcation between a day and a week, a weekday and a weekend, the morning and night, the present and the recent past. The days blend together, the months lurch ahead. [1]

This distortion of time has been the subject of endless pandemic memes and jokes. Some of these play with tense, like the mock complaint: 'next week has been exhausting!' Others play with the disruption of temporality: calendars represented by celebrity portraits that age decades in months; or which, conversely, are presented by an identical static pose month after month after month. The instant and commonplace uptake of the terms *Before Times*, *Plague Times*, and *After Times* is a further reflection of the radicality of this temporal disruption, and the widespread sense of an epochal transformation it has brought with it.

In many ways, however, this widespread public perception of a profound disruption in temporality provides a cultural and discursive focal point for what is a much more generalised sense of strangeness and disorientation caused by the upheaval of the pandemic, and the deep sense of cultural unmooring to which it has given rise. As so many across the world found their lives knocked off-kilter, forced to adjust to new lives as full-time interonauts, pinwheeling through a virtual deep space of online meetings and classes, it became clear that the pandemic had produced a crisis not just in public health but in our very capacity to make sense of the world. The pandemic, then, must be approached as an experience as well as an event. This experience is one characterised for many by a pervasive and widely shared sense of strangeness, a much-remarked awareness of its lack of historical precedence, which has thrown not just ordinary life but the very idea of the ordinary into deep crisis.

In this article, I want to examine how this sense of weirdness and disorientation caused by the pandemic has given rise to a discursive explosion in both traditional and social media whose incidence and significance remain largely unrecognised, and which focuses on the return and the future of the 'normal'.

The word 'normal' occupies a place so ubiquitous in media discussions about the pandemic that it would be hard to overstate its discursive dominance. Headlines and articles speculating on whether things will or should go back to normal after the pandemic number in their hundreds of thousands (as of July 2020). As Siddhartha Mukherjee noted in the *New Yorker*, the future of the normal is the central question of the pandemic: 'everyone now asks: when will things get back to normal?' [2] Curiously, however, given this discursive centrality, the word normal itself is almost never described or defined in these articles. Instead, its meaning is simply taken for granted, as though everyone is so familiar with this word that its meaning requires no further elaboration. As a result, one of the most dominant discursive and conceptual frameworks through which the pandemic has been, and continues to be, discussed and understood remains remarkably vague and outside the sphere of public scrutiny. Given this, there is a critical value in turning to examine the specificity of this term and to ask what it exactly means in the various contexts in which it is being used. The aim of this article is thus to examine and make visible the work the word 'normal' is doing in media discussion about the pandemic, drawing on both traditional and social media examples. There is a strong link between the current sense of historical and temporal crises and the discursive proliferation of the normal in pandemic media commentary which can be best understood by recognising the particular context from which this current usage has emerged.

This is Not Normal

The current discursive dominance of the *normal* in media commentary about the pandemic has its roots in an earlier recent moment of crisis: that produced by the 2016 US Presidential Election. At a Democratic rally held during the final weeks of the election campaign, Michelle Obama responded to the then-recently publicised recordings of Trump boasting about sexually harassing the women with whom he had come into professional contact with a combination of outrage and dazed disbelief – a familiar emotion shared by those engaged in a discussions on the Trump Presidency: 'I can't believe that I'm saying that a candidate for President of the United States has bragged about sexually assaulting women', she told the crowd. 'Too many are treating this as just another day's headline. As if our outrage is overblown or unwarranted. As if this is normal. Just politics as usual'. She concluded, emphatically, 'This is *not* normal. This is *not* politics as usual. This is disgraceful, it is intolerable'. This angry rejection of Trumpian values, and the insistence that his candidacy represented an unprecedented break from the usual state of affairs in American politics, epitomised reactions to the 2016 election campaign in the left-leaning media publications and platforms. [3] It has continued to characterise reactions by the political left to the current US President in the years

since. In the run-up to the 2016 election, headlines and political analysis focused on whether the current state of affairs in American politics could be described as normal, not normal or evidence of a dangerous new normal: '2016 Isn't Normal', the US News website declared [4]; 'Don't Let Donald Trump Become the New Normal', the *Guardian* urged [5]; 'Welcome to Washington's New Normal: One Trump Drama After Another', *The Washington Post* warned [6]. Headlines such as these dominated the election coverage in the traditional media, while the hashtag #notnormal proliferated in social media commentary.

While the word 'normal' here is again rarely defined or described, despite its evident centrality to the public discussion that took place in traditional and social media outlets at this time, what was at stake here, as Michelle Obama's remarks indicated, was the question of what was, or should be, 'acceptable' or 'tolerable'.

THIS UNDERSTANDING OF THE NORMAL, AND ESPECIALLY ITS LINKING TO THE 'ACCEPTABLE', REPRESENTED SOMETHING NEW IN 2016. THE SEMANTIC NOVELTY OF THE NORMAL, AS IT WAS USED IN PUBLIC AND MEDIA COMMENTARY ABOUT THE 2016 ELECTION, PRODUCED A SIGNIFICANT DISCURSIVE LEGACY, INTRODUCING INTO THE AMERICAN VERNACULAR WHAT WAS THEN A NEW WORD: 'NORMALISATION'.

Writers for publications including *The Guardian*, *The New Yorker*, and the *Boston Globe* all identified 'normalisation' as their word of the year at the end of 2016, as did the Merriam-Webster dictionary website: 'It will sometimes happen that a word suddenly appears everywhere. In the wake of the 2016 presidential election, two such words are currently in the ether: the verb *normalise* and its related noun, *normalisation*'. While the word 'normalisation' was of course not new in 2016, as Mark Peters argued in the *Boston Globe*, the sudden and emphatic entrance of the word 'normalisation' into popular discourse at the end of 2016 represented a new and distinct meaning of the word. [7] Where previously the 'normalisation' had been primarily used to refer to the process of making something more normal, in 2016, it was overwhelmingly used to refer to the process of making the abnormal seem widely acceptable: 'these days, people are using *normalize* to mean "shift our perception of normal to include a thing previously seen as abnormal"', Peters explained, 'rather than "change an abnormal thing to make it conform to a norm"'. Emily Dreyfuss neatly summed up the conceptual dominance of the normal and normalisation in the election coverage in an article for *Wired* magazine, entitled 'The Normalization of "Normalize" Is a Sign of the New Normal', which noted that 'Americans are using [the word] in a different way than they normally do. The country is normalizing a new use of "normalize"'. [8] 'Normalisation' as used in the context of the 2016 US election thus provided a new word with which to name what

was widely perceived as a new dynamic, one that was causing a perceived status quo to undergo a rapid, radical, and unwelcome change.

The identification of Trump and the Trump presidency as ‘not normal’ and as something that should not be normalised provided a way to identify, and denounce, that presidency as ‘unacceptable’ or ‘intolerable’. The word ‘normal’ here thus named a state of affairs that was perceived to be under threat. As a result, the 2016 US election provoked a sustained and often heated debate about the state of American politics, in which the word ‘normal’ served as a flashpoint, the name of a cultural space that was understood to be endangered and under attack. What is particularly striking about the use of ‘normal’ in this context is the extent to which it is attributed with a positive value, identified as something to be protected and safeguarded: ‘we’re quite protective over the concept of normal’, as Jessica Brown noted of the election on the BBC website. ‘After a big life event, all we want is to go back to normal. It’s our default, our comfort zone’. [9] The normal as it is used here refers to something comforting and familiar; an ordinary time that preceded a current state of crisis and chaos. However, the ‘comfort zone’ named here, it should be recognised, is that of the political left.

**CONSERVATIVE VOICES AND THOSE TO THE HARD RIGHT WERE NOT TO
BE FOUND WRITING IN DEFENCE OF THE NORMAL DURING THE ELECTION
CAMPAIGN OR ITS AFTERMATH, NOR DID THEY APPARENTLY PERCEIVE
THE NORMAL AS SOMETHING UNDER ATTACK.**

One of the most striking things about this defence of the normal is that it is advanced largely by those on the political left, and that it does so immediately following decades of critique of this term by scholars who largely share this political affiliation. For until very recently, discussions about the normal, especially by those on the political left, focused almost exclusively on its negative meanings and effects. In contemporary critical and cultural theory, for instance, the normal has been the subject of sustained and detailed critique in recent years. Particularly in feminist and queer theory, as well as in disability and race studies, the terms ‘normal’ and ‘normativity’ have been widely critiqued as practices of enforced conformity and standardisation, which naturalise existing and harmful systems of privilege.³ In order to understand what this has to tell us about the status and significance of the normal itself in the present day, it is useful to contrast the calls to resist the normalisation of a Trump presidency cited above with the critiques of normativity articulated in these fields of contemporary critical theory. Both normalisation, as used in the media commentary above, and normativity, as used in contemporary critical theory, are understood as negative dynamics that impede or damage cultural diversity and inclusiveness. At the same time, however, critiques of normalisation and normativity are predicated on strikingly different understandings of the normal

itself. Calls to resist normalisation in the wake of the 2016 election were made in defence of the normal: normalisation must be resisted, it was claimed, in order to prevent damage being done to the normal. That is, the normal was understood to be harmed by normalisation, whereas normativity often understands norms themselves as harmful to those upon whom they are imposed. [10]

If, after decades of critique and announcements of its cultural redundancy, the word 'normal' can once again surge into popular use as a culturally central and vital concept, and if it can be so readily adopted by those on the political left as a cultural state that needs to be, and should be, protected against the rise of hard-right and authoritarian governments, then we are dealing with a word whose meaning is unusually volatile and metamorphic. In current usage, the idea of the normal and the not normal provide a conceptual spectrum within which to register a sense of affective and cognitive shock. To lose one's sense of the normal, to feel the normal dissipating or transforming around one, is to feel as though the world itself has gone mad. As David Remnick, editor of the *New Yorker*, marvelled to CNN immediately after the election: 'when I hear [Trump] described as not sexist, not racist, not playing on white fears, not arousing hate, when he's described in a kind of normalised way [. . .] I think I'm hallucinating'. [11] In the *New York Times Magazine*, essayist and critic Teju Cole compared the aftermath of the 2016 election to the Ionesco play *Rhinoceros*, in which a sighting of a rhinoceros elicits first outrage and disbelief among the townsfolk, then acceptance and, eventually, an epidemic of 'rhinocerotitis' as one by one all the characters transform into rhinoceroses. [12] Just as Ionesco's play, written in 1959, was widely taken as a commentary on the upsurge of fascism prior to the Second World War, so must contemporary Americans resist the normalisation of a new and dangerous authoritarianism embodied in the monstrous figure of Trump, Cole argued.

However, it is important to recognise that not all commentators agreed the 2016 election campaign *did* represent a break with the normal. We see this in the (much smaller) pool of commentary that questioned the perception that the Trump candidacy signalled a significant break or rupture with normal American political practice or social values, noting that the widespread disbelief in the face of Trump's stated views – regarding women, people of colour or people with disabilities – was mostly confined to a white, progressive, middle class. As Hua Hsu reminded readers of *The New Yorker*: 'racism, sexism, and the other hatreds and phobias lately on display.. have always been normal – for some of us'. [13] *The Washington Post*, too, acknowledged that while 'Donald Trump's election as president startled many Americans', the widespread perception that the 'illiberal values and policy positions' espoused during his campaign were 'far outside of the United States' political traditions' was incorrect: 'in many ways, Trump represents a return to the historical norm' and its 'set of commitments to hierarchies of race, nationality, and religion, among others'. [14] The perception that something new and dangerous was happening to the country, the fear that this represented an unprecedented break from historical norms or social reality, was thus largely confined to a fairly

privileged group. As Courtney Parker West wrote in the *Huffington Post*, the shocked reactions of white liberal Americans to the election campaign were itself a manifestation of white privilege:

spare me the advertisement of just how shocking it all is [. . .] because some of us - my little black and indigenous ass - [. . .] are not aghast that presidents who say bogus shit dance their way into office. We have seen this before. [. . .] I am devastated, but no, I am not shocked. [15]

These tensions remain in stark evidence in 2020, as the ongoing pandemic lockdowns have been intersected by the global Black Lives Matter and Indigenous Lives Matter protests taking place at the time of writing, and which constitute an important backdrop to the debate about the normal taking place in the context of media writing on the pandemic. The (re)emergence of the normal as discursively central to US political discourse in 2016, and the context of widespread cultural crisis in which this took place, can be directly traced into contemporary media commentary about the pandemic during 2020. Before doing so, however, it is worth pausing at an intermediary moment, which arose during the Australian bushfires that devastated the country at the end of 2019.

Welcome to the new normal, Australia

In July 2019, a series of bushfires began in Australia that would burn uncontrolled for the next nine months, impacting every state in the country, and causing widespread ecological devastation. In the months to come, the states of New South Wales, Victoria, and the Australian Capital Territory would all declare states of emergency. The summer of 2019–2020 became the most severe fire season on record. By its end, thirty-four people had died, millions of hectares of land had been incinerated and an estimated billion animals, including entire populations of endangered species, had perished with it. Regional areas were impacted most severely, with fires obliterating ancient sacred sites and destroying regional townships. However, coastal cities did not escape the effects. For months, the skies over the eastern coast of Australia were an eerie sunset red all day, an apocalyptically red sky from a science fiction movie, heralding a bleak future to come. The air was unbreathable, with air pollution levels ten times over the officially ‘hazardous’ levels. In a foreshadowing of a future Australians did not yet know what was to come, for many it became necessary to wear masks to go outdoors, while the medically vulnerable were forced to stay indoors. The last of the bushfires was extinguished in March 2020. This milestone went largely unremarked, however, as the country was then heading rapidly towards a full lockdown due to the pandemic just taking hold in the country.

Although extreme bushfire seasons have been common in Australia since – and because of – white settlement, and its forced cessation of indigenous cultural burning practices, the summer of 2019 and 2020 was nonetheless alarmingly far from normal,

as it was widely reported. Bushfires that tore through rainforest – rainforest that had never burned before – fire fronts that joined together across multiple state lines to produce megafires and extreme air pollution which were all recognised as something new. Dangerous signs, indeed, of a changing climate and another environmental tipping point. The phrase ‘climate grief’ entered the popular Australian vocabulary, as indigenous communities were forced to deal with yet another devastating effect of white settler culture: ‘It’s a particular grief, to lose forever what connects you to a place in the landscape’, Lorena Allam lamented in the *Guardian*:

our ancestors felt it, our elders felt it, and now we are feeling it all over again as we watch how the mistreatment and neglect of our land and waters for generations, and the pig-headed foolishness of coal-obsessed climate change denialists turn everything and everyone to ash. [16]

As a result of their extent and impact, the 2019 bushfires provoked an international debate about the rate and scale of climate change and of the role of government policy in mitigating this. In the midst of this debate, Australian Prime Minister Scott Morrison declared, in a widely reported announcement, that such fires were now the ‘new normal’ to which Australia would just have to adapt: ‘we have to prepare for the new normal’, he said, arguing that the government response needed to focus on ‘resilience and mitigation’ rather than the wider issue of climate change and environmental policy or regulation. [17] Morrison’s statements were widely reported internationally, as well as within Australia. While the phrase ‘the new normal’ is one that was in widespread popular use prior to the 2019 bushfire season. Its meaning in this context marked a pivotal moment in the coupling of looming crises with a re-evaluation of the normal. The ‘new’ part of this phrase referred to a set of conditions generally understood to be unpleasant at best and catastrophic at worst: increased fires and an increased level of environmental devastation in consequence. The ‘normal’ here referred to a continuation of a status quo in which Australia continued to enable and facilitate its fossil fuels industry at the expense of long-term economic and environmental sustainability. By announcing the fires as ‘normal’, albeit a new and disagreeable normal, government was widely understood to be rejecting any need for government action or intervention on the wider issue of climate change. The insistence that Australia would have to ‘adapt’ to climate crisis was simultaneously an assertion that it was possible to adapt to it. The severity and unpredictability of these fires was thus redefined as part of a new status quo requiring change and resilience on the part of the populace, rather than symptomatic of an environmental crisis that would need to be addressed in policy. This use of the phrase ‘new normal’ resonates with its use in the context of the 2016 US Presidential Election. The phrase became a subject of debate because the expectation that such fires were something to which the country or populace could adapt was widely taken to be an unacceptable or even intolerable response.

This can be seen in the way that, rather than reassuring the public with appeals to normality, Morrison's description of the fires as Australia's 'new normal' conversely served to provoke anger and anxiety about the scale and impact of climate change and concern about the government's denialism and intractability in addressing this. In the ensuing debate, echoes of the new meaning of 'normalisation' that emerged during the 2016 election could be heard again. What had formerly been recognised as extreme was now becoming common. The 'new normal,' for which Australia must prepare itself, was one in which the limits of the acceptable and endurable had been recalibrated. 'The recent seasons have firefighters rethinking what should be considered normal,' noted the ABC. Similarly, QFES acting deputy commissioner, Neil Gallant argued: 'we've got to be prepared for a different fire season, a different range of climate extremes. We'd be not doing our duty if we didn't at least consider that's now the new norm.' [18] The 'new normal', as it was used in this context, was largely understood to refer to a formative status quo, one whose novelty was primarily experienced as unpleasant.

THE 'NEW NORMAL' HERE NAMED A FAULT-LINE – THE DEBATED TERRITORY OF ADAPTABILITY. IT IS THIS UNDERSTANDING OF THE NORMAL, AS A CONTESTED ZONE OF ADAPTATION AND ADAPTABILITY, THAT WOULD COME TO UNDERLIE MUCH OF THE MEDIA COMMENTARY ON THE 2020 PANDEMIC.

Weird times – The Coronavirus Pandemic

By the time the novel coronavirus epidemic became a pandemic in March 2020, then, whatever passed for the normal in popular discourse and culture had been in serious trouble for some time: 'As we grapple with uncertainty and upheaval, it's clear that our old "normal" will never be recovered', reflect Milne, Hendriks, and Mahanty in an article in *The Conversation*, reflecting on the difficult Australian summer that was then giving way to the tumultuous year of the pandemic. [19] In consequence, while discussion about whether we can or should 'return to normal' remains ubiquitous in media commentary on the pandemic, and while the desire to 'feel normal' again continues to characterise self-representations of the pandemic experience, in recent months, a mounting critique of the normal has been steadily gaining traction: "'Normal" life failed us', John Harris declared in *The Guardian*. 'On a bad day, our national nightmare now appears so deep and complex as to feel not just depressing, but insurmountable. Any return to the "normal" that has so horrifically failed us is unthinkable.' [20] For Paul Carr, any attempt to 'return to normal' would be 'inhumane'. Increasingly, it is precisely what we once accepted as normal that has come to be identified as the very source of the problems that have

brought us to this point of calamity. As Ed Yong summarised in a recent and widely shared article for *The Atlantic*, 'How the Pandemic Defeated America':

the US cannot prepare for these inevitable crises if it returns to normal, as many of its people ache to do. Normal led to this. Normal was a world ever more prone to a pandemic but ever less ready for one. To avert another catastrophe, the US needs to grapple with all the ways normal failed us. [21]

Accordingly, a growing number of voices have recently argued that, instead of seeking to return to the normal, to an ordinary world familiar but toxic, we should seize this moment of crisis to do away with it entirely: 'crisis leads to a fork in the road', as Jack Halberstam argues. 'One way rights the balance and leads back to "normal life", the other moves in the opposite direction and leads elsewhere with outcomes that are unknown' [22]. The upheaval caused by the pandemic provides the opportunity to reimagine the world, to step into the unknown future by dismantling the systems of exploitation and extractive capitalism that have brought us to this moment. In one of the most widely shared early reflections on the pandemic, the writer Arundhati Roy captured the sense of the momentousness and promise of this moment for many:

what is this thing that has happened to us? It's a virus, yes. In and of itself it holds no moral brief. But it is definitely more than a virus. [. . .] Whatever it is, coronavirus has made the mighty kneel and brought the world to a halt like nothing else could. Our minds are still racing back and forth, longing for a return to 'normality', trying to stitch our future to our past and refusing to acknowledge the rupture. But the rupture exists. And in the midst of this terrible despair, it offers us a chance to rethink the doomsday machine we have built for ourselves. Nothing could be worse than a return to normality. Historically, pandemics have forced humans to break with the past and imagine their world anew. This one is no different. It is a portal, a gateway between one world and the next. We can choose to walk through it, dragging the carcasses of our prejudice and hatred, our avarice, our data banks and dead ideas, our dead rivers and smoky skies behind us. Or we can walk through lightly, with little luggage, ready to imagine another world. And ready to fight for it. [23]

At the end of a period that has seen a rapid move to the hard right politically in Australia as well as in the United States (along with many other regions of the world), while witnessing the increasingly extreme effects of climate change and ecosystem destruction, the normal has come to name a cadaverous status quo, a wasteland of dead ecosystems and extractive capitalism. Here, the positivity that accrued to

the term 'normal' during the turmoil of the Trump election has disappeared. The normal here is not to be defended or protected; it is instead the source of harm. Thus, while references to wanting things to get back to normal remain routine to the point of ubiquity in popular media commentary on the pandemic, where the word is subject to explicit discussion, it is increasingly understood in negative terms – as a status quo that is no longer sustainable or endurable.

It may seem, given this, that the concept of the normal is unlikely to survive the upheavals of the pandemic; that, as a word, it is now likely to fall into redundancy or disuse. However, it should be remembered that the normal, as a concept, has always been in trouble; indeed, as we have seen above, it most commonly and insistently appears not where the status quo is most stable or secure but on the contrary where it is most troubled and perceived to be in crisis. More than twenty years after the publication of Michael Warner's landmark book, titled *The Trouble with Normal*, the idea of the *normal* remains as problematic as ever, [24] yet also as resilient. Indeed, it is often immediately after the normal has been most subject to sustained critique and pronounced discursively dead that it surges most forcefully in its frequency of use and cultural centrality. This can be seen in its abrupt readoption in criticism of the Trump election campaign and presidency, starting in 2016, and it can also be seen in current media commentary on the pandemic. That the normal can be so widely used in both positive and negative ways perfectly exemplifies its semantic capaciousness and changeability.

**THE NORMAL IS A TERM THAT TENDS TO COME TO THE FORE, AND
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In our long history of the normal, *Normality: A Critical Genealogy* Peter Cryle and I discovered this to be a consistent characteristic of the normal across the modern period. It is a term that has long been subject to periodic denunciations and a concept that has often been assumed to be culturally moribund. Yet, it continues to return to a position of cultural centrality and discursive dominance time after time. [25] There is an especially strong recourse to the idea of the normal in times of crisis. The normal provides a conceptual framework in which such crises can be identified and examined.

Accordingly, this article has sought not to evaluate or adjudicate the merits of the normal but to examine its use and meaning. It is designed neither to celebrate nor condemn, but to attend to the conditions of its cultural persistence and conceptual resilience. What is at stake in this is recognition of the unspoken terms and assumptions embedded in these debates about the crises caused by the pandemic, including the uneven racial distribution and effects highlighted during

the ongoing Black Lives Matter and Indigenous Lives Matter marches. The sense of crisis and disruption felt by so many in the present moment, and which is seen to mark such a definitive break with the past, is not a new experience for many. Yet the normal remains a weathervane for many, and naming its absence is a way of marking the limits of what one can cope with or adjust to.

The normal names an ordinary state that has been superseded by a constant state of emergency and disaster. Especially during moments of crisis, the normal names a state of comforting familiarity to which many become more attuned when faced with its absence. In such a context, recognising the centrality of this term, and attending to the specific dynamics it names in each instance, can help us unpack the terms in which the current crises caused by the pandemic are being understood and the extent to which that conceptual infrastructure might come to shape the, as yet, uncertain futures to which it will give rise.

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AS THINGS FALL APART

Christopher Burr Jones

Broadly, a tension exists between the forces of positive evolution of our species and planet and the entropic forces of chaos and uncertainty. It draws on the work of futures studies and assessments of the state of play in the building, maintenance, and stability of physical infrastructure. Infrastructure is a key indicator of social commitment to economic and social development in the medium-term future, so it has emerged as a concern in the research literature [1] and its resilience in the face of climate change. [2] With some few exceptions, futurists have been reluctant to consider the consequences of broader societal collapse. [3] While there may be resistance to take a doom and gloom view, it may be time to consider some of the broader consequences of Decline and Collapse futures, if for instance, as some have argued, we have passed a tipping point in the Earth's carrying capacity. [4] But I argue that threats to civilisation need to be considered in a broader context, not as an acceptance of doom and gloom, but as part of a transition to a desirable, sustainable future. The challenge may be to envision and realise wise, ethical, and good futures particularly in the face of pessimism about growing environmental degradation.

One central driving force in global weirding is the accelerating warming of the Earth's atmosphere, which may continue to rise until it reaches a new state of dynamic thermal equilibrium, as suggested in Gaia theory. [5] What is presented here is informed by the futures studies tradition, particularly the alternative futures typologies, e.g., the Four Futures of American futurist Jim Dator, [6] and shares many of the other assumptions of academic future studies. [7]

To do this an exploration of the emergence of postnormal conditions – those global trends or dynamics that behave contrary to expectations, and are characterised by complexity, uncertainty, chaos, and contradictions [8] – is necessary. Global forces of change including technology innovation, climate change, global economics, demography, and social movements drive the growing levels of complexity, chaos, and contradiction in social and economic systems. All of these forces make informed decision-making more challenging, but more urgent. We are now living in a global village, with blurring boundaries, and so much at stake collectively, our decision-making in terms of implementing the UN's Sustainable Development Goals (SDGs) and operationalising the 169 targets must consider the postnormal times we are in as well as the potential for catastrophe.

Much of the secondary research pertains to the plausibility and possibility of widespread societal decline and collapse, due to accelerating climate change and

peak complexity. The 2018 ASPA panel titled 'Accelerated Weirding: Policy and Administration in Hothouse Futures' was informed and inspired by the idea of global weirding first coined by the American environmentalist Hunter Lovins. [9] In this formulation, global climate change is not solely about heating, although that is a big part of it, but also about weather extremes and other concomitant natural events. So, for example, the double hurricane impact on Puerto Rico resulted in massive electrical system collapse. Abnormal heat waves were measured in the Arctic as this chapter was written. Freak weather increasingly becomes part of the normal background of experience. The physical changes in the world are one outcome of unintentional human experimentation with adding greenhouse gases to the Earth's atmosphere, but we may also need to consider the unintentional experimentation with human, social, and economic systems.

PEAK COMPLEXITY IS AN IDEA, SUGGESTED BY THE AMERICAN ANTHROPOLOGIST JOSEPH A. TAINTER, THAT MANY PAST CIVILISATIONS HAVE COLLAPSED BECAUSE THEY REACH A POINT OF SATURATION, AN INFLECTION POINT, WHERE SOCIAL STRUCTURES ARE NO LONGER ABLE TO ACHIEVE MARGINAL EFFICIENCY IN THE FUNCTIONS OF SOCIAL, ECONOMIC, AND POLITICAL SYSTEMS. [10]

If the inefficiencies in those systems grow and are not addressed, they have a cascading effect, a runaway train, where the problems multiply and social and political systems ultimately collapse. Thus, this chapter focuses both on the impacts of global weirding and peak complexity on infrastructure primarily in the United States. All of these changes are likely to have direct and indirect implications for the implementation and adoption of SDGs over time.

Dator's four generic future typologies are: continuation, collapse, discipline, transformation, which he initially based on images of the future in popular literature and media, have been used extensively over three decades in strategic planning and futures research. [11] Extensive literature elsewhere has analysed the practice and experience of using these alternative futures, but it is important to note that they are not conceived as necessarily discrete, but rather that one alternative future could shift or overlap with another. Relevant to this chapter is the tension between two of the typologies: collapse futures on one hand and technological transformation futures, on the other.

Collapse futures have a long tradition in dystopian literature that includes the work of the nineteenth-century English economist Thomas Robert Malthus. *The Population Bomb* and other alarmist literature emerged in the 1970s and 1980s, and the work of the Club of Rome and the Massachusetts Institute of Technology (MIT) on the *Limits to Growth* underscored the potential of pollution and resource depletion

to threaten the existence of a highly technological civilisation. [12] Science fiction and Hollywood have taken post-apocalyptic visions to extremes, there being no small number of late twentieth century movies such as *Godzilla*, *Terminator*, *The Day After Tomorrow*, and the *Mad Max* movie series to give nightmares to generations of children growing up. A classic futures studies text in the Collapse genre, Vacca's (1976) *The Coming Dark Age*, makes a strong case for a civilisational path that follows Murphy's Law: whatever can go wrong, will go wrong.

A large and growing literature posits that climate change and industrial growth threaten, not only humans, but the biosphere as a whole, [13] although there is ample opposition to doom and gloom views. [14] Catastrophe studies have become a small cottage industry. A growing list of potential sources of existential risk includes:

- Anthropogenic
 - Artificial intelligence
 - Biotechnology
 - Cyberattack
 - Global warming
 - Earthquakes due to fracking
 - Environmental disaster
 - Mineral resource exhaustion
 - Experimental technology accident
 - Nanotechnology
 - Subsidence from oil/water extraction
 - Warfare and mass destruction
 - World population and agricultural crisis

- Non-Anthropogenic
 - Asteroid/comet impact
 - Extraterrestrial invasion
 - Natural climate change (ice age; ocean circulation stops)
 - Cosmic threats (dust, supernova, black holes)
 - Geomagnetic reversal
 - Global pandemic
 - Megatsunami
 - Solar irregularity/dimming
 - Super volcano

One might ask, what good have these frightening and negative images of the future done for us? Aside from entertainment, are they not impediments to aspiring to better, preferred futures?

Some futurists argue that such bleak images of the future not only desensitise and numb us, but they actually result in angst and depression. [15] Similar arguments have been made about some of the classic studies on civilisational collapse, such

as Diamond's (2005) *Collapse*. [16] A strong counterargument can be made that we are better off preparing for the worst, even if it never comes, particularly when it comes to life-sustaining functions of the biosphere, such as the atmosphere. If we can learn lessons about how other civilisations have met their demise, wouldn't it be wise for us to be aware of what the potential warning signs might be?

Global civilisation faces a double-threat of peak complexity, a kind of inertia dragging down political and economic systems, as well as rapid global heating. These threats collectively create a kind of global weirding that goes beyond the original meaning of stranger and wilder weather events, and potentially includes limits to civilisational and societal complexity [17] and then on top of that, forecasts of 6° C or more of global heating within the next century. [18] Acknowledged as the seminal researcher on the various reasons for the collapse of complex societies and civilisations, Tainter posited four concepts that explain the limits to complexity. According to him, these concepts are:

1. Human societies are problem-solving organisations
2. Social political systems require energy for their maintenance
3. Increased complexity carries with it increased costs per capita
4. Investment in social political complexity as a problem-solving response often reaches a point of declining marginal returns [19]

Tainter notes that the first three are the underpinnings of the fourth. It could be argued, given much of the evidence from 'tribal' politics, leadership dysfunction, and the US withdrawal from the world since 2016, that we have reached that point of declining marginal returns across a range of sectors and systems in modern society. To be sure, technology and innovation have been the answer to many of these challenges, but at the same time have created their own vulnerabilities and complexities. And the author assumes that there is a connection between infrastructure and the evidence that such systems have reached a point of declining marginal returns, or as seems to be the case, are in actual decline. It must be acknowledged that this notion of limits to complexity is challenged by popular ideas about evolution, where systems tend to respond to entropy by transformation into more complex forms. Technology innovation, such as super machine intelligence, may serve to overcome or transcend the limits that Tainter identified in previous societal collapse. Yet, human civilisation arguably is now more chaotic, complex, and contradictory than at previous points in human evolution.

The other part of global weirding is based on some of the worst forecasts for the consequences of carbon dioxide and greenhouse gases in the atmosphere, which may push global temperatures past the point of civilisational sustainability. One of the more compelling narratives is by the British author Mark Lynas who analyses the potential consequences of global warming, by degree, by using analogies to previous periods in the earth's geological history. [20] Because Lynas adopts a very straightforward yardstick for the potential consequences of accelerated warming,

this is a recommended text for public administrators to get a sense of the scope of the potential changes ahead. Extending the analysis of the English scientist James Lovelock who argued that we already are past the tipping point towards driving the planetary system to a new thermodynamic steady-state, [21] similar to the temperature range in the Carboniferous era, Lynas argued that even at 3 °C above the baseline, the US (and by extension, many other parts of the world) will experience severe drought, dust bowls, and extreme heat events. The UN Paris climate accords had aimed to cap greenhouse gases that would allow no more than 2 °C rise in temperature, but carbon dioxide projections for the near-term will place us at 3 °C at a minimum. Given the potential for even greater temperature shifts, communities, leaders, and institutions need to prepare for the worst. And these additional stressors and challenges must be reconciled in planning for and implementing the goals and their 169 targets.

THE FINAL NAIL IN THE CIVILISATION COFFIN MAY BE THE INABILITY OF GOVERNMENTS TO ADEQUATELY RESPOND TO THE GLOBAL WARMING CHALLENGE.

Dator argued that the coming problems of peak oil, environmental catastrophe, and global economic and fiscal collapse are all bad enough, but that government intervention has been, and will be, insufficiently focused on the longer term to respond in time [22] to raise consciousness about the need to prepare for global weirding, so that we can work our way through it, hopefully not just to survive, but to flourish as a species.

The purpose of this discussion is to consider the implications of global weirding and the constraints complexity puts on the SDGs and what critical infrastructure is required to help better inform public administrators and first responders. For example, how will the likelihood of more frequent catastrophic weather events, drought, wildfires, dust storms, and other consequences of thermal stress and the implications of the limitations on complexity have for the implementation of the SDGs? This is an attempt to raise consciousness about the interconnected forces weaving together environmental challenges and human society. A great deal of our resilience in the face of such catastrophes will depend on our ability to prepare and plan for the worst and to imagine and envision desirable futures. Communities arguably need to engage in 'what if' exercises to explore the topography of futures where remediation may be too late, and adaptation the only solution to accelerated, global heating. Because our collective ability to move social justice and climate change initiatives forward depends on the external environment, we need to consider that milieu as we prioritise and operationalise the SDG targets.

The theoretical framework for this study arises from both the traditions of hermeneutics and post-structuralism, particularly critical theory, in deconstructing

structures of power within contemporary society. These theories form the bedrock of much of the work of the last few decades on critical futures, integral futures, and causal layered analysis. This research also adopts the assumptions of academic futures studies including the ideas: that a single future cannot be predicted, that there are multiple possible futures, that the images in people's heads have a role in determining which futures become the present, and that the future is not predetermined. [23]

The academic discipline of futures studies posits that there are probable, possible, and preferred futures, and that trends are not destiny. [24] However, the Gaia theory argues that solar evolution over billions of years is destiny, our understanding of the physical evolution of our sun is that it has increased its intensity over billions of years, and will continue to increase its radiation output into the far distant future. In spite of solar evolution and output that is now 30% more than when life began, the Earth's biosphere has managed to maintain the optimal temperature range for the existence of life. Over the last 10 million years or so, that thermal balance has been maintained during cycles of glaciation that have stabilised the earth's temperature between cold and warm cycles entrained to orbital mechanics, the Milankovitch (orbital forcing) effect. Unfortunately, the key regulatory system, the carbon dioxide geological cycle and the addition of other greenhouse gases will likely disrupt that homeostasis. Lovelock argued that the most likely planetary system response will be to find a higher state of thermodynamic equilibrium, possibly the global temperatures that were common during the Carboniferous era, over 300 million years ago.

The average planetary temperature is currently 16 °C; it was 20 °C during the Carboniferous. One challenge is that we are pushing carbon dioxide levels in the atmosphere even higher than they were during the Carboniferous, so Lynas speculates that even 6 °C is possible – painting a gloomy picture of the consequences of much more than 3–5 °C increase in average global temperature. And one of the major problems is the lag time, the nature of feedback loops that means that once the changes begin, they can accelerate in a vicious negative feedback loop. [25] The classic example in global weirding is the potential release of methane in the Arctic, melting methane solids in the ocean, and greater rates of decomposition in a warming world. All of those release potent greenhouse gases that could potentially pose existential threats if accelerating warming becomes 'a runaway train'.

The postnormal theoretical framework holds that our prospective futures are likely to be characterised by complexity, chaos, and contradiction. [26] This framework is congruent with a critical theory standpoint, acknowledging the complexity of a highly technological global civilisation, and making problematic the structures of power that extract resources for the rich, plunder the earth, and fail to share these riches equitably. The critical theory tradition appears to have had an influence in postcolonial social movements, intentional communities, slow growth, no growth, and regrowth discourses. The systems view of the Gaia theory, and the challenge of maintaining marginal returns both align with the suggestion

from the postnormal times discourse – that we have to understand phenomenon as complex objects within a complex web of relationships.

Another key concept in addressing apocalyptic images of the future is also the suggestion of the work of the Dutch futurist Fred Polak that images of the future of individuals have a collective impact on the direction that societies take. [27] Societies with apocalyptic eschatology tend to be less successful, and those with more open-ended or optimistic End Times had greater longevity. There is the danger of negative wishful thinking, to acknowledge an obvious danger. How might this be reflected in the state of the built environment and physical infrastructure that supports basic functions of transportation, communication, and the provision of basic goods and services?

IT IS WIDELY ACKNOWLEDGED THAT THE US HAS AGING INDUSTRIAL INFRASTRUCTURE THAT IS IN NEED OF REPAIR OR REPLACEMENT. IN OTHER WORDS, EVEN BEFORE WE CONSIDER THE THREATS OF ACCELERATING WARMING, WE ALREADY FACE SIGNIFICANT CHALLENGES PROVIDING ADEQUATE INFRASTRUCTURE FOR THE COMING GENERATIONS.

It has been estimated that simply to upgrade highway, seaport, and airport basic infrastructure will cost in the neighbourhood of \$6 billion. Some parts of the basic infrastructure, such as water and plumbing in older urban areas are in a state of crisis or collapse, such as in Detroit. Demographic changes, such as flights to the suburbs have exacerbated funding and scale challenges. Neglect and weather impacts have also taken their toll on infrastructure. Other structural shifts have reduced the power of unions, corporate and financial power have grown, and governments face growing opposition from conservatives and a limited government ideology that has altered spending priorities.

What are the major aspects of infrastructure that public managers and administrators should consider, when planning for crisis events? Those include various parts of the transportation system, planes, trains, and automobiles and their platforms-- airports, rails, highways, and bridges. Basic infrastructure also obviously includes energy distribution, water, sewerage, solid waste disposal, and communications networks. It helps to see each of those systems within the context of levels of analysis – how they serve individuals, families, neighbourhoods, communities, states, countries, and regions. Ultimately, understanding how those systems can be optimally nested to protect resilience and sustainability could help offset many of the challenges ahead in adapting to climate change and civilisation in decline. Will we continue to grow community, counter trends that appear to fragment social institutions and build greater complexity into local structures, or

revert to tribalism? That question may only be answered over the course of time, over the next century or so.

How can public administrators and political leaders prepare for 6° C of change, civilisational stress, and postnormal conditions driven by complexity, chaos, and contradiction? The threats to infrastructure have been fairly clearly identified, the types of events, and driving forces behind the threats. Hurricanes, as we have learned again in the past hurricane season, can produce extreme flooding, storm surge, and wind damage. Three major storms to hit the United States was typical this last season, but it is argued they will be more common and severe in the future. The frequency of extreme events becomes more likely. Serious, and widespread drought would be expected above 3° C, accompanied by dust storms, worse than the dust bowl of the 1930s in the Great Plains.

THE CONSEQUENCES FOR AGRICULTURE ARE LIKELY TO BE SERIOUS. EXTREME HEAT EVENTS WILL LIKELY BECOME MORE COMMON, AND AS THE OVERALL HEAT INDEX CONTINUES TO CLIMB, THERE WILL BE ADVERSE EFFECTS FOR WORKERS, ALREADY EVIDENCED IN TEXAS AND FLORIDA. MAINTAINING HEALTHY TEMPERATURE ENVIRONMENTS INDOORS WILL ALSO BE CHALLENGING, AND GREATER USE OF AIR CONDITIONING WILL ONLY ADD TO ENERGY CONSUMPTION AND CARBON DIOXIDE IN ENERGY PRODUCTION.

The ASCE's 2017 report on the state of US infrastructure was a gloomy report. Virtually all of the twenty-six elements were worse than the previous 2013 report. Additional literature documents the specific threats faced by elements of the infrastructure menu. Major studies have addressed some specific geographic and political regions, for example Alaska, [28] South Africa, [29] threats to specific demographics and communities, [30] and community/agency resilience [31] in the face of disaster and climate change related events.

Aviation received a D grade – among the worst scores given out. Recent research has addressed the consequences of sea level rise, weather issues, runway damage, and the likely need for lighter loads as temperatures rise. [32] Bridges received a C+. [33] Larsen et al. addressed the particular needs of Alaska, for example, with bridges challenged not only by sea level rise and coastal erosion, but also a decline in permafrost. [34] Permafrost soil failure also impacts pipeline footings as well. Dams earned a D and received special attention, along with levees (earning a D) in both the National Research Council and ASCE reports. [35] Potable drinking water received a D from ASCE and the continuing problems of lead contamination in Detroit and other Rust Belt cities underscore the challenges of urban replacement of

aging infrastructure, compounded by the challenges to freshwater due to drought, pollution, and declining sources of aquifer water. [36] Energy infrastructure was graded D+. [37] Burke recently addressed challenges to the aging energy grid, but noted the emergence of smart grid technology that could help transform that sector. [38] Hazardous waste also earned a D+ and Inland Waterways a D. [39]

Parks and Recreation earned a D+ and national parks are already facing damage and challenges directly related to changing climate. [40] Ports scored a relatively good C+ but are among the facilities most at risk from sea level rise and hurricanes and possibly terrorist attacks. Rail improved from the previous assessment and earned a B grade. [41] Roads, earning a D grade, are particularly important given the dependence of communities, particularly in rural areas, on roads for many aspects of life and are particularly vulnerable to climate change and weather damage. [42] In the same vein, the facilities and infrastructure that round out the list have similarly poor scores: Schools – D; Solid Waste – C+; Transit – D; and Wastewater – D+. [43]

Former Department of Homeland Security director Jeh Johnson recently stated that one of the biggest threats to national defence and homeland security was aging infrastructure and climate change. The ASCE 2017 report puts that claim in sharp focus and provides a map of how to improve those elements of our national infrastructure. [44] The estimated gap to bring US infrastructure up to par is estimated at \$2 trillion. And to maintain all of it in optimal condition will require annual investments by federal and state governments to the tune of \$206 billion per year. [45] Until those investments are made, our infrastructure will continue to deteriorate, and it could cost more in the long run to fail to maintain what we have.

Postnormal times may very well mean the collapse of the federal government's ability or willingness to respond adequately to infrastructure funding needs, and the responsibility may fall increasingly on states and local government. This trend of decentralisation, might be positive, if it can enhance local resilience and adaptation. [46] State and county leaders and administrators should consider the relative vulnerability of consumers and elements of infrastructure. [47] Similarly, those leaders can share and pool knowledge with each other and with federal leaders in response to disaster and recovery. [48] A large body of knowledge and cross-sector approaches exist in risk management and preparedness that can inform decision-making in the aftermath of events stimulated by accelerating climate change and civilisational stress and decline. Insurance pools, and other funding strategies, such as crowdsourcing, and new fees may need to be considered to support infrastructure projects.

In terms of facing the future, political leaders and public administrators need to plan for the worst but also engage communities to envision their preferred futures, and vision the sustainable cities and communities they would like to inhabit. The best way to build resilience is to raise consciousness and build shared understanding of the challenges, risks, and responses to accelerating change. Administrators, planners, and first responders should practice for multiple catastrophes and collapse scenarios. The year 2017 provided a good example of multiple major hurricanes,

widespread wildfires, and continuing drought, much more likely to be the norm in postnormal times. Experience shows that preparedness for emergencies pays off.

The role of technology has been understated in this chapter, but also has the potential to be transformative. One of the very weaknesses of civilisation, following Tainter, may well be solved by the artificial intelligence, [49] or what Gidley calls super machine intelligence. [50] The dilemma of maintaining complex systems in the face of the limits to complexity may well be mitigated by neural networks, super machine intelligence, and expert systems. A rapid transition into a solar and renewable energy economy could also have significant positive impacts on infrastructure. For example, automated control systems and smart grid technologies, efficacious decentralisation, and tax incentives could empower individuals, families, and communities. It has also been argued that widespread environmental catastrophes could be the wake-up call to galvanise widespread social movements to counter the fossil fuel economy and end the destructive behaviour of consumer capitalism. In any case, it looks like we are in for a dramatic ride into the future, whether in the form of autonomous electric cars or horse and buggies.

In the face of Collapse, potential limits two, complexity and postnormal times, why not just 'party until the End', bury our heads in the sand, or give up envisioning and realising sustainable futures? One answer is that sustainability is not a lifestyle choice, but rather an inevitable requirement for co-evolution with our planet. If the projections of the Club of Rome and *Limits to Growth* are reasonable forecasts based on the assumptions of growth, growing pollution, and resource depletion, then arguably at some point we will reach a steady state. The models argue that the current macro-economic assumptions are unsustainable, so at some point, collective behaviour changes will be necessary, but not necessarily sufficient to avoid major human catastrophe.

One key to transformation into a more stable civilisation or bridge through the decline and/or collapse is envisioning preferred, sustainable futures. [51] Defeatism and escapism are inevitable facing the challenges of infrastructure and global weirding, but as the American activist Joanna Macy noted, hope and optimism are tools to cope with the depersonalisation and anomie that come from the dangers that confront us. [52] While it may not be an immediate solution to the crisis in infrastructure, the empowerment of individuals and communities to envision and create better futures is one way to instil hope and optimism for the future. There is an abundant literature and numerous examples of such futures planning across the globe. [53] The World Futures Studies Federation and Teach the Future are both organisations that are promoting futures education at all levels, from professionals to kids. Teach the Future offers free resources, for example, to K-12 educators for foresight education. Projects across the globe, from favelas in Brazil to children in Africa and futures labs in Europe are deliberately trying to reach the youth of today to build more responsible leaders for the future.

Engaging in the SDGs is clearly another way to model that wisdom by addressing environmental and social equity and justice. The SDGs do not currently have

high visibility, but there is obviously a direct relationship between the support of physical infrastructure, both in the US and the world at large, and society's ability to implement the goals and their targets. Without adequate infrastructure, the likelihood of attaining those goals diminishes. Conversely, an understanding of humankind's aspirational goals beyond the struggle for infrastructure is also a key to sustaining hope and optimism for the future. Setting higher goals reminds us that infrastructure is a means to higher ends.

IMPLEMENTING THE SDGS AND ENVISIONING PREFERRED FUTURES

CONVERGE AS PARALLEL PROCESSES OF SEEING THE POTENTIAL FOR A

MORE EQUITABLE AND JUST SOCIETY AND HELPING PROVIDE THE

MEANS TO HELP MANIFEST THOSE VALUES.

Postnormal times is by definition a transitional period between normal times, so part of the project of seriously addressing climate change mitigation, and not just adaptation, in the global climate regime is a fundamental change in worldview. The project of the SDGs and their targets is to begin moving some of the values embedded in social equity and justice to the forefront, ahead of the exigencies of scarcity economics and the current system of growth at all costs. Certainly, political leaders and public administrators will be required to deal with the unfolding crises that will likely peak during the mid-century, but must not lose sight of the longer-term goals of establishing sustainable development values and practices as a baseline for the social and economic goals for humanity and planetary health. However, it just may be the case that the aphorism 'things will get worse before they get better' is true, but we cannot neglect or disregard our collective responsibility for future generations. Infrastructure, particularly, represents that kind of investment in the long-term future that will either make it harder or easier for future generations to envision and build preferred, sustainable futures. We need to engage policymakers, communities, and individuals in envisioning those good futures at the same time that we promote and implement the SDGs. It is especially important to engage young people in the visioning of those good futures, to give them hope and ownership of the future that they will inhabit. Realising the SDGs by 2030, and beyond, will require not only financial and human resources, but also a commitment to creativity, imagination, and the will to make better, good futures.

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ADVENTURES IN POSTNORMAL TIMES

Jerry Ravetz

The evolution of science now proceeds at an accelerating pace. To appreciate how science is changing, an historical perspective is ever more necessary. Otherwise, those with experience just content themselves with moans that 'things aren't what they used to be', forgetting that, as the old Yorkshire song goes, they never bloody were. In my own struggles with, and writing on science, going back well over six decades, I have attempted to think historically. Roughly, that means understanding the conflicts of the present in terms of the unresolved contradictions inherited from the past. This heuristic works very well in some political cases, notably Ireland and Israel/Palestine. I have attempted to apply it to science; and I might as well apply it to my own work – the better to move forward.

My 1971 book, *Scientific Knowledge and its Social Problems*, highlighted my initial concerns about science. [1] The formative problem of the book was expressed in the slogan: 'the activity of modern natural science has transformed our knowledge and control of the world around us, but in the process, it has also transformed itself; and it has created problems which natural science alone cannot solve'. I had accumulated problems and discontents with the standard account of science on very many issues, and I identified the key contradiction as the passage from Little to Big science, or from academic to industrialised science. But, as it happened, my knowledge of industrialised science was extremely limited. I had valuable experience of reflective research in scientific and arts disciplines, and I had a very precious historical understanding derived from my academic work. I could write a very insightful account of the craft work of science, including some quite original material on the obscurities at the foundations of theoretical science. But on industrialised science, I had little more than experience of a rapidly growing university and a deep political commitment, originally Marxist, then shaped by activity in the anti-nuclear campaign. Also, I already had enough experience of the corruption of good causes, so I was not uncomfortable to find similar phenomena in science. However, there are two significant absences from the book. One is that I did not know of the warnings about science in President Eisenhower's Farewell Address, written by political scientist and speech writer, Malcom Moos. That text could have defined, and justified, the critical programme of my own book. But no

one in the radical science movement in Britain ever mentioned it; perhaps it was assumed on the Left that nothing that Eisenhower had said could be worth looking at. The other, unrelated but also interesting, point is that my language reflected a lack of awareness of the feminist approach, in that I referred to scientists as ‘men’. I don’t have a huge burden of guilt over this, as the book was written before the explosion of radical feminist thought; but it is worthy of remark in the cause of historical accuracy.

In the ensuing sixty years, the social problems of scientific knowledge have grown and proliferated, now perhaps more quickly than their solutions. Internally, the challenges of quality assurance, described euphemistically as a ‘reproducibility crisis’, reveal a corruption in the transmission of the tacit knowledge in the craft skills on which that knowledge depends. The management of uncertainty is crippled by the persistent faith in numbers as nuggets of truth, revealed both in the ubiquitous pseudo-precise quantities and in the unresolved disputes over the techniques of statistical inference. In the external relations of science, the core myth of the beneficence and benevolence of an infallible natural science, creating a fountain of facts for human welfare, is increasingly frayed.

**THE ENLISTING OF THE SYMBOL OF SCIENCE IN POLICY DEBATES LEADS
INEVITABLY TO THE POLITICISATION OF SCIENCE ITSELF, AND THEN TO
THE CONFUSION AND HENCE CORRUPTION OF ITS NORMS. SIMPLISTIC
POLICY CRUSADES INVOKING SCIENCE, DEMONISING ALL WHO
WITHHOLD UNCRITICAL SUPPORT, THREATEN THE INTEGRITY OF SCIENCE
AS NO OVERT ATTACK EVER COULD.**

Even in the 1960s, I had an insight into a possible solution: a ‘critical science’ modelled on the philosophies of the French Enlightenment. In my later collaboration with philosopher of science, Silvio Funtowicz, our 1990 book, *Uncertainty and Quality in Science for Policy*, established the basis of a reform of quantification, in the NUSAP (Numeral, Unit, Spread, Assessment, and Pedigree) notational system – now widely used in climate science, hydrology, medical research, and risk assessment. [2] In the Epilogue to that book, we made clear that this technical reform was a key to the reform of knowledge as manipulated by a new secular priesthood. A few years later, we developed the notion of postnormal science (PNS), with its simple diagram and mantra: ‘facts are uncertain, values in dispute, stakes high, and decisions urgent’. Postnormal science opened windows to the new realities of science. There are now many movements for the reform and rejuvenation of science. These work on many fronts, including transparency, ethics, and democratisation. There is even a renegotiation of the Cartesian boundaries on reality, as science now shows that whales and trees think and communicate, perhaps even with us. But, as yet, there is

no direct confrontation with the forces that are transforming science into a debased instrument of policy and profit.

Postnormal science has now become a movement of some significance. It has a history which is well documented in the back issues of the journal *Futures*, thanks largely to Ziauddin Sardar, the journal's former editor. Our paper, 'Science for the Postnormal Age', is the most cited paper in the history of the journal. [3] It should be remembered that when it was first announced, the field of radical critique of science was barren. The Utopian-anarchist imaginings of Paul Feyerabend, Austrian-American philosopher of science, had become an historical curiosity. The Marxist critics of the 1960s and 1970s were reduced to a tiny sect. Even to challenge the prevailing orthodoxy, that all policy problems could be reduced to comparisons of precise quantities, was itself a radical act. For my earlier writings, I recalled Lenin's term 'Aesopian language', as a way of getting past the censor. The radical message of our study of quantities was well hidden in our Epilogue of *Uncertainty and Quality in Science for Policy*. [4] But our censor was in our intended readers – the science and policy communities – so we had to be very tactful indeed. In describing postnormal science we sneaked in the politics through the technical term 'extended peer community'. And we were careful not to challenge the puzzle-solving 'normal science' on its own turf; we just said that now there are big problems where facts are uncertain and decisions urgent.

This caution served us well; we did not scare off potential supporters who were privately worrying about the way that the official pretence of certainty was harming science in the difficult policy-science domains. The growth in readership and influence from the original defining paper was steady and organic, and the paper eventually achieved great prestige. A time-lag of roughly a generation is not bad, for a radical idea. But I have been aware, for quite some time, that this restricted perspective will eventually render the original doctrine obsolete. Whether a renewal will come from within the PNS movement, remains to be seen. But the terms 'corruption' and 'power' never appear in the early writings, and quite soon they will need to be incorporated in any analysis of science that hopes to be relevant.

It is personally gratifying to see scholars mentioning PNS without citing any sources. It shows that PNS has become a meme! It is now taking its place in a variegated and rapidly growing movement for reform in science. It is scarcely a decade since a prominent mathematician called for a boycott of a leading publisher because of their particularly rapacious publication policies. This was the 'spring' for science. Not long after, the problem of quality, which had long been festering, was thrust upon both scientific and lay publics. By the mid-2010, the persistence of discriminatory practices based on ethnicity and gender became an issue within science as in other institutions. With all these campaigns, science has joined the human race. The mystique of the Scientist as a dedicated, white-coated, bespectacled, middle-aged male is gone forever.

But the last decade or so has also seen other radical changes. Accelerating change, globalisation, instant communication, and interconnectivity, and many

other factors led my friend, Ziauddin Sardar, to the notion of Postnormal Times (PNT). Sardar showed speed, scope, scale, and simultaneity as driver of change, generating contradiction, complexity, and chaos. It was not just science that had gone postnormal, Sardar argued, but many other spheres of human activity from politics to governance, economics to finance, social relations to communication. [5] Indeed, postnormality had become the spirit of our time, where facts tended to be contradictory and disputed, values are not just contested but are also in constant flux, stakes impact the planet as well as communities and individuals, and decisions have existential dimensions. PNT too has a simple mantra: 'we live in an in-between period where old orthodoxies are dying, new ones have yet to be born, and very few things seem to make sense'. [6]

There is a fruitful tension between my postnormal science and Sardar's postnormal times. It is really quite common in the development of radical and intellectual movements for the earlier critics to be overtaken by those coming later. The Protestant Reformation had Erasmus and then Luther; the French Enlightenment had Fontenelle and then the Encyclopaedists. The French Revolution had Condorcet and the Gironde, and then Jacobins and Robespierre. Mid-nineteenth century Russia had Herten and then Chernyshevsky, with his fateful slogan 'what is to be done?' Of course, the radicals did not always shape history their way; after Luther came the turmoil which persisted for more than a century and left Germany in ruins; France went from The Terror to Napoleon; and the Russian revolution produced Lenin and Stalin. If there are indeed some radical defects in our science-based civilisation, we should be aware that they will not simply be put right with piecemeal social engineering. So, we need to be aware of historic errors and ensure that history does not repeat itself.

My own thinking on these issues provides a bridge between the two sorts of postnormal analysis. Some years ago, I realised that my early study of Marxism had left me with a very powerful insight: contradiction. I developed this in a couple of papers in the noughties, working on the 'characteristic contradiction' of a complex system. The papers received very little notice. It is heartening to see that postnormal times brings contradictions to the heart of its analysis, along with complexity. There are several topics on which a fruitful dialogue between PNS and PNT could now be opened. For example, the role of ignorance in contemporary modes of knowledge production. The possibility of a real decline of science is hardly ever discussed, even among those who warn of the dangers of technology going out of control. Yet history teaches us that excellence of any sort cannot be maintained indefinitely in any local milieu. A Japanese scholar, using primitive data-processing methods, established a seventy-year cycle of scientific excellence, with centres moving through Italy, England, France, Germany, and the US. There are already strong signs of senescence in American science. Could Chinese science take over after American science? We consider how 'classical' Greco-Roman civilisation gave way to the 'Hellenistic' of the Eastern Mediterranean, itself soon blending with the flourishing Islamic cultures. Could we now be witnessing an analogous development, with

emerging foci of creativity, each with their own characteristics, in the mainland and in the 'Confucian diaspora', both practicing Feng Shui? That could be an emerging paradigm, which would go with the shifts in power from the West to the East. Time will tell. Perhaps a renaissance of Islam will be next in the queue for greatness.

Until quite recently, I had been taking a rather relaxed view of my relations with Sardar. PNS has been, in historical context, a window to the new world of science. PNT, by contrast points out how it could all go horribly wrong unless we learn to, as its champions put it, 'navigate' our way out of postnormal times. The difference in style and affect was so total, that they could co-exist comfortably. Quite suddenly I have realised that we are actually well on the way from PNS towards PNT. I am still trying to make sense of it all. So far, I have a collection of themes that require serious attention.

A MANIFESTATION THAT WE ARE MOVING AWAY FROM PNS AND TOWARDS PNT IS WHAT WE CAN CALL 'CRUSADING SCIENCE'. THERE IS AN APOCALYPTIC VISION OF IMPENDING DOOM, A CALL TO URGENT ACTION, A DAMNING OF CRITICS AS 'DENIERS' (ECHOES OF THE HOLOCAUST), AND A CITATION OF EVIDENCE THAT IS NOT MERELY POLICY-BASED BUT POLICY-SHAPED.

We have grown accustomed to the apocalyptic declaration of the collapse of the environment, starting in the 1960s with the population bomb, then global freezing, limits to growth, global warming, resources exhaustion, climate change, and now climate emergency. This crusade now shares public concern with the Covid-19 pandemic, for which we face repeated lockdowns, health passports, and perpetual vaccinations. Such declarations not only paralyses agency and hope but have other serious problems. But this is not the place for detailed critiques of these campaigns. I will only make observations based on my own special interest: the management of uncertainty. For climate sensitivity, the crucial link between increase in CO₂ concentrations and the rise in global temperature has an error-bar of +50%, in other words a factor of three. This huge gap in policy-sensitive knowledge persists in spite of decades of scientific resources being thrown at the problem. In policy terms it means that the consequences of an increase in CO₂ can be anything between totally benign and totally catastrophic, and we cannot know until it starts, or does not start, to happen. This annoying feature of the emergency remains concealed in full view; for the mainstream of politics, media, and science, it does not exist.

There is a similar situation with Covid-19. It is known that the mortality rates vary enormously with age and pre-existing illnesses. When an old person, already sick, dies, does this count as a Covid death? In the UK, it is quite simple. For the published statistics, so long as a person has tested positive within the previous

four weeks, it counts as a Covid death. Any death with Covid is logged as a death from Covid. The possibility that they were moribund anyway and that Covid was irrelevant, does not appear in the published numbers. And then these are presented to the public daily, with no indication of their uncertainty. Of course, the rate of incidence and mortality from the disease varies strongly; but vital statistics with no hint of their uncertainty and quality are seriously weakened as contributions to knowledge and policy. Indeed, the closer one looks at the statistics for Covid, on issues like masks and testing, the more it becomes like one of Sardar's 'smog of ignorance' – where ignorance is deeply embedded in what we regard as trustworthy knowledge. [7]

IT COULD BE ARGUED THAT IN THE IMPORTANT ISSUES IN THE POLICY DOMAIN, SCIENCE HAS BEEN SUBJECT TO HIJACKING BY EXTERNAL INTERESTS, THEMSELVES WITH A MIXTURE OF IDEOLOGICAL AND COMMERCIAL MOTIVATIONS.

There is little doubt that this has already happened to a serious extent in pharmaceuticals. To the extent that this analysis is correct, we face some really new theoretical questions. We are familiar with the political and ethical problem of the applications of science to harmful or even evil ends. The H-bomb and Silent Spring showed dramatically that the classical optimistic view of scientific advancement needed revision. But even in those cases, there were extenuating circumstances: the basic scientific research was done by persons who were competent and well-intentioned. Now, by contrast, the research effort itself has arguably been compromised. The crucial evidence for a 'hockey stick' of global temperatures included a time-sequence where two completely different data sets were surreptitiously pasted together; this was the notorious 'Nature trick'. More recently, at the onset of the Covid-19 pandemic, the academic computer simulation model that was crucial in convincing the UK government to do lockdown was revealed to have no documentation of its code, so that it was impervious to scientific criticism until a team of industry experts was brought in to sort it out. We might consider this as an innovative scientific methodology – 'solipsistic science'. And the communal aspect of science, with open, collegial debate between opposing viewpoints, has largely been replaced by the exclusion, even banning of critics, with the slogan 'the science is settled'.

It has all happened with such apparent suddenness, that we are now scrambling around looking for an explanation. Part of the answer will be found in the unresolved social problems of scientific knowledge. Among these, quality assurance is prime. As I discovered in the course of writing my old book, and later found support in the work of W. Edwards Deming, there is an essential ethical element in the operation of quality assurance. As I had previously learned from my Atlantic City tram driver,

wherever there's a system there's a racket to beat it. Without a commitment to quality in a community of practice, no amount of regulation, however strong the incentives and sanctions, will be able to enforce it. Who guards the guardians? This general commitment depends crucially on the stature and behaviour of the leaders, and their success in imparting it to every new generation. I saw that the transition from 'little science', where supervisors could be mentors to their students, to 'industrialised science', where sheer numbers made that impossible, presented a deep challenge, which would need new sources of commitment for its resolution.

All this helps to explain how important areas of science can be taken over so easily, whenever it was to someone's advantage to do so. With the loss of commitment consequent on industrialisation, compounded with the confusion of methods, old-fashioned criteria of quality fell into abeyance. The situation was made worse by the belief that science is automatically self-correcting; people in key positions then lowered their guard. In their recent article, 'Policy Making in the Post Truth World', Steve Rayner and Daniel Sarewitz, have pointed out that contemporary science, with its focus on complex systems, has another hazard. [8] With so many 'confounding variables' in any experimental situation, the 'feedback loop' whereby ideas are tested, becomes an ever complex and lengthier process. As a result, quality-testing is delayed and compromised; and so inferior work survives longer, perhaps indefinitely longer, and the identification of 'shoddy science' is rendered ever more problematic.

The quality problem has been compounded by the rise of statistics. Particularly in the study of complex situations, statistical methods are the only barrier against the ubiquitous pitfalls of inference. But statistics does not provide a new alchemy, whereby the ore of raw data is infallibly converted into the precious metal of scientific facts. The techniques themselves are vulnerable to quality problems, with incompetent misuse and malevolent abuse common on a large scale. Worse, it has been found that in some fields the scientists don't even know that their corrupted techniques are wrong! There are even deeper levels to the problems, which I am only beginning to explore. The perennial debates among statisticians have gone to a new level, with some now warning that the standard tests of significance are seriously misleading. Teachers of statistics might now be wondering what to put into the curriculum! We might say that statistics has lost the 'paradigm' which uniquely defined good practice. For me, the situation is evidence of an inherent contradiction of/in modern science: namely the founding fantasy that quantitative knowledge is both simple and necessarily true. The way out of postnormal times will not be straightforward.

For me, it is all summed up in a public display in Berlin of a 'carbon clock' which shows how much time there is left before our 'carbon budget' is exhausted and global warming sets in seriously. The Mercator Research Institute describes it: 'that's how fast the carbon clock is ticking'. It displays the remaining time to the nearest hundredth of a second and the remaining quantity of CO₂ to the nearest ton. [9] This is a beautiful example of mathematical gibberish; to express this hypothetical

global quantity of carbon budget to one part in a trillion is as near to nonsense as a grammatically expressed statement can come. The explanatory text describes the numerous uncertainties that affect the estimate; but it has occurred to no one that the precision is unnecessary and misleading. And I am sure that most readers of this essay will not see that there is a problem; and it is in this misperception that I see the real civilisational problem: our modern-scientific mathematical language does not distinguish between good sense and pernicious nonsense.

Such a state of affairs is definitely beyond postnormal, but equally perhaps not yet PNT. Is there a key attribute whereby it could be named and thereby identified? Certainly, not all of science has been hijacked. Nor has it all become 'promotional', with policy-shaped evidence, like the science of weight-loss diets or anti-ageing face creams. Perhaps its strength lies in its great variety; thus, we still have the mass of academic researchers enjoying a huge variety of sources of support, leaving room for critics to make their invaluable contribution as an 'extended peer community'. There are also the important movements for reform, ranging from citizen and open science, through to reproducibility, research integrity, decolonising research, and similar radical movements. So, can we identify a particular branch of science where the matured contradictions are salient and threatening?

I would like to consider biomedical science, as the integrated research arm of the sickness industry. In the US, this is a very large element of the cash economy, and its performance is generally accepted as low-quality. The contradictions are clear to all: much of the world's best research in the causes of disease benefits from generous public and private benefactions there; but the absence of a healthcare system was cruelly exposed by the Covid-19 pandemic. We might even apply a concept from what I now call 'cacologic systems theory': in that, the principal subsystems have effectively broken away from the main system and pursue their own ends, even though this selfish policy by each, effectively dooms them all. The corruptions of the American big pharma industry, including its tamed regulators, were clearly exposed in the opioids scandal. A single paper from the 1970s was the official, accepted evidence for their safety for all the subsequent decades, until the mounting toll of addiction and death forced a review. Who knows what other abuses are flourishing out there, noticed only by the fringe of critics who are ignored or denounced? Indeed, there are even agencies that provide any result that is desired by their clients. But the claim of systemic corruption in science is, as yet, very rarely made.

If policy-related research is truly in a state of vulnerability to manipulation, then what sort of counter-force could there be? It is less likely to be found within the formal institutions of research. What about external groups? Serious critics tend to be very marginal thinkers or activists. But the elements of a mass base are mainly found on the Right, where commitments are rather more about identity than science. On that side there will be a dearth of elite institutional expertise for all the structural reasons I have mentioned, in addition to the weight of accepted scientific argument. Hence, by default populists and demagogues will be more prominent, thereby furnishing another argument against them by the mainstream.

This situation raises a number of paradoxes, which I believe are significant for our understanding of the crisis as it matures. The original formulation of PNS mentioned the 'extended peer community'; in PNT it is replaced by polylogues, but both emphasise different legitimate perspectives and ways of knowing, akin to the working of a democratic society, characterised by extensive participation and diversity. Examples of this are community activist scientists mobilising against obvious abuses. Lois Gibbs, the American environmental activist, who brought global attention during the 1980s to the environmental crisis at the Love Canal Homeowners Association, is an example. Her efforts led to the creation of the US Environmental Protection Agency's Comprehensive Environmental Response and Compensation Liability Act, now used to locate and clean up toxic waste throughout the US. Another is Erin Brockovitch, who, despite formal education in law, took successful action in 1993 against California's Pacific Gas and Electricity Company – the company's cooling tower system was dumping various toxins into drinking water. But popular-science campaigns are not always so totally simple. Sometimes, indeed, the academic science is correct and the populist outsider is a charlatan and adventurer, like the Soviet agronomist Lysenko. The May 2021 local elections in Madrid was resoundingly won by a right-wing candidate for her defiance of government orders to lockdown. It seems that the experience of the dreaded disease was not sufficiently intense to overcome the pleasure at conviviality of Madrid's citizens. Could this flaunting of populist rejection of science be a harbinger of a sustained revolt? Sometimes I play with a scenario where the Northern Hemisphere soon has a succession of three cold summers. This could well be a random fluctuation, quite consistent with an overall warming trend. But it would be seized upon by the deniers as a refutation of the dire predictions. In the debate, the mainstream could then be seen to be in the position of welcoming confirmations while rejecting refutations of their theory, a methodology which Karl Popper had identified as pseudo-science.

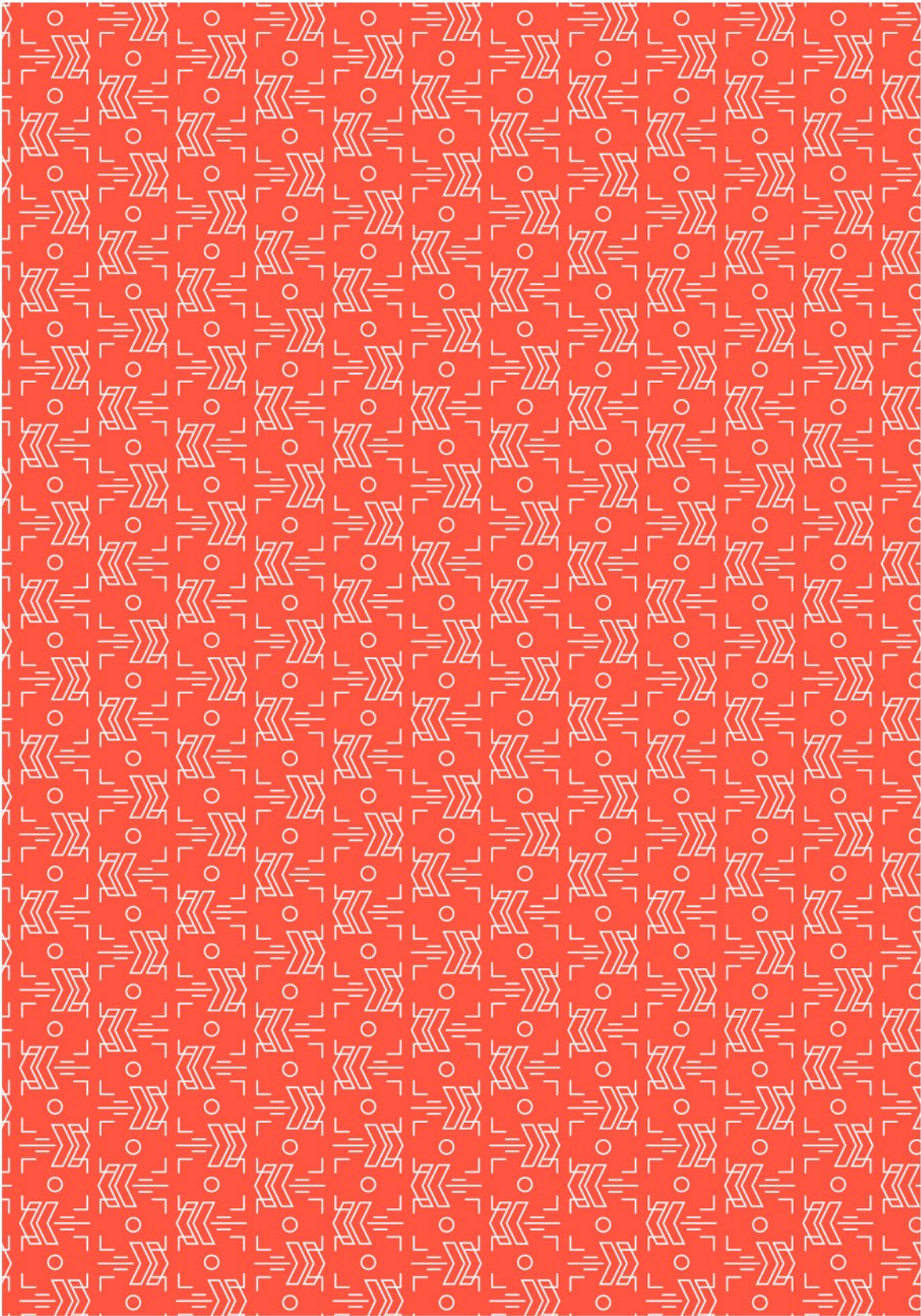
GIVEN THE RIGHT-LEFT SPLIT ON THE CLIMATE EMERGENCY, THIS SITUATION COULD LEAD TO EXTREME COGNITIVE DISSONANCE AMONG THE PROGRESSIVE TECHNO-ELITE, REMINISCENT OF THE EFFECT ON THE OLD LEFT OF THE SOVIET INVASION OF HUNGARY IN 1956.

Perhaps we are heading towards postnormal times with its contradictions, complexity, and chaos. The appropriate response would be to get ready for another style of science, with its appropriate social and conceptual base, to take the lead. We might look for a clue to the necessary innovation in identifying what has been absent from science as we know it. A candidate for that element is non-violence. In his Oval Office, the Forty-Forth President of the United States, Barack Obama, had memorials for three (nonWhite) heroes of non-violent social change. Where

is science in this inspiring scene? For me, it is conspicuous by its absence, just as nonviolence is conspicuous by its absence from any discourse on science. I concluded my radical social analysis in scientific knowledge with an invocation to charity, taken from Francis Bacon. Now we might speak of a postnormal consciousness of non-violence, realised in practice through mercy and compassion, thus taking us back to Sardar's own expression of the essential commitment.

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METHODOLOGY

THE PERFECT POSTNORMAL STORM

Christopher Burr Jones, Jordi Serra del Pino, and Liam Mayo

Ziauddin Sardar welcomed us to postnormal times a decade ago in a germinal 2010 article that proposed a new theoretical approach to provide a better understanding of how change is unfolding in the twenty-first century. [1] Sardar's initial description of postnormal times theory generated substantial interest within the futures studies field [2] and criticism [3]. Sardar responded to criticisms and, further, presented a timeline of how various civilisational artifacts such as meaning, truth, knowledge, world order, and governance have been transformed over time from the classic period to modern, postmodern, and then to contemporary postnormal times. [4] Sardar and fellow futurist John A. Sweeney further developed the concepts, exploring the temporal topography and possibilities of change over time. [5] The Postnormal Times Reader emerged in 2017 with twenty new and reprinted articles that added to the postnormal times body of analysis and knowledge. Postnormal times analysis has been further explored by futurists and others across a range of subjects and disciplines: agriculture; art and design; conservation biology; creativity; education; epistemology; evaluation; futures studies practice; global change/weirding; intelligence services; Islam; science education; and sociology. [6] Over the past few years, the number of events, issues, and cases that support postnormal times theory have grown rapidly. We argued in a 2020 blog series that the current COVID-19 pandemic and ripple effects are a perfect example of emergent postnormal times phenomena.

No More Normal

Sardar characterised postnormal times as 'an in-between period where old orthodoxies are dying, new ones have yet to be born, and very few things seem to make sense'. Bauman and Mauro put it this way: 'we are hanging between the "no longer" and the "not yet" and thus we are necessarily unstable'. [7] We are thus living in 'a transitional age, a time without the confidence that we can return to any past we have known and with no confidence in any path to a desirable, attainable, or sustainable future'. A common and persistent meme of the pandemic in the mass media, press, and social media is 'when will we get back to normal?' Everything has been disrupted by the pandemic, but is a return to normal even possible or desirable?

It seems clear to us that the accelerating rate of change in contemporary times has had something to do with it, as has our ability as individuals to communicate with millions of people at the speed of light due to the spread social media. We live in a globalised world that is interconnected and interdependent in numerous ways. News and information, as well conspiracy theories and misinformation, spread at astonishing rate; we are primed to act and interact in an instant. All these actions, interactions, and interconnections at every level, from local to global, at nearly every moment of our lives, constantly and perpetually, generate a change that is outside of previous human experience – postnormal change. A convenient way to think about it is to consider the four letters S of change: the speed, scope, scale, and simultaneity of change (4Ss). The overall acceleration of change is a direct product of combined force of the speed with which change occurs; the global scope of this change; the fact that this change can scale down to individual levels and scale up; and that these aspects of change occur with increasing simultaneity. The 4Ss define the dynamics that generate postnormal change. The postnormal times conditions are both part and parcel to the emergent Covid-19 pandemic.

**POSTNORMAL CHANGE DOES NOT INTRINSICALLY PRODUCE
POSTNORMAL PHENOMENA, BUT IN AN INTERCONNECTED, GLOBALISED
WORLD, WITH A MULTIPLICITY OF SCALES, ACCELERATING SPEED, SCOPE,
AND SIMULTANEOUSLY INTERACTING ELEMENTS WITH NONLINEAR
FEEDBACK LOOPS, THE CONSEQUENCES MANIFEST IN COMPLEXITY,
CHAOS, AND CONTRADICTIONS (THE 3CS).**

Contradictions come to the fore and enhance the complexity of social, technological, and economic systems. These systems are wholes far greater than the sum of their parts; they exhibit properties of emergence and cannot be analysed in terms of their parts but only be understood in complete, unabridged form; and the myriad interacting components self-organise to produce new patterns and structures. Complexity and contradictions then generate positive feedback loops leading to chaos. It is when the complexity, contradictions, and chaos emerge together that postnormal phenomena become visible.

Together the 4Ss and the 3Cs constitute the basic pillars of the postnormal times theory and are complemented by two other aspects: rising levels of resulting uncertainty and ignorance, which vary in kind, but generally grow in tandem as postnormal phenomenon develop and mature. Over time, the extent of ignorance and uncertainty can expand or deepen dramatically. Over longer time frames and across greater scales of change, ignorance, and uncertainty can accelerate. Postnormal phenomena generate and are deeply embedded in growing uncertainties, which in turn produce a variety of ignorance. We use the three

tomorrows scenario planning and scenario building approach (addressed in other articles and essays in this issue), each of which has a particular type of ignorance and uncertainty, as described by Sardar and Sweeney. Three tomorrows are where futures studies meet postnormal times analysis in attempting to explain postnormality. We argue that to deal with uncertainties and gaps in our knowledge, we need to expose our individual and cultural biases. We have to consider uncomfortable, unthought, and/or unimagined futures, to help re-examine our basic assumptions, ideas, values, narratives, and worldviews. We need to show humility. Postnormal events and issues cannot be controlled or managed – they can only be navigated.

The Covid-19 pandemic is a postnormal phenomenon/hyperobject because it satisfies all of the postnormal criteria: complexity, contradictions, and chaos, and their handmaidens – the speed, scope, scale, and simultaneity of accelerating change.

Speed

The contagion spread incredibly fast. The first confirmed case was on 17 November 2019, five months later, there were 2.5 million confirmed cases and more than 167,000 deaths. At the time of this writing, global cases were reportedly 26.4 million, with 870,000 deaths. [8] Given the shortage of test kits, undercounting early in the pandemic, and data collection and reporting inconsistencies, the real figures are probably much higher. Similarly, the economic impacts were swift – US equity markets lost roughly 40% of their value between mid-February and late-March 2020; the technology heavy Nasdaq market regained most of that value in two months. These were rapid and historic shifts. Lockdown policies had almost immediate consequences for employment: US unemployment numbers doubled from 3.3 million to 6.6 million in the third week of March. [9] Misinformation and conspiracy theories also spread at the speed of light. Social media have played a central role in accelerating the speed of active responses to video records of police murders and brutality. Protests have occurred in the wake of the pandemic, both on the right and left, but most notable are the protests against police brutality in the United States and related anticolonialism protests, internationally. [10] The pandemic itself will be the fastest-growing global pandemic in human history. The ripple effects have moved equally fast.

Scale

Global 2020 infection maps graphically demonstrate the spread, first from Wuhan, through land transportation systems, then globally thanks to air travel systems through clusters of infection: parties, ski trips, and conferences. Currently, only a single African country and geographically isolated Pacific Island countries have no detected cases. It is just a matter of time until they too report local infections. Thanks to globalisation and interconnections, it will be the most widespread global pandemic in human history. The only continent spared thus far is Antarctica. In the United States, Midwest states that largely avoided outbreaks in March are seeing surges in cases as this was written.

Scope

The combination of a comparatively high degree of infectiousness, undetected transmission by asymptomatic individuals, and our lack of knowledge about the virus made human confinement the best option to fight further spread. Some countries have been more successful than others, and intrastate and international travel continue to pose challenges to contain the coronavirus. The world's economy and global supply chains have been under great stress. After starting in China, Covid-19 triggered cascading effects. The scope is so vast and immediate that threats to industrial capitalism and liberal democracy are potentially far greater than the 2008 global recession. Tens of thousands of small businesses and restaurants have closed in the United States, and likely multitudes more, globally. Industrialised nations initially spent billions of dollars/euros on unemployment and wage/unemployment subsidies. There are possibly serious downstream consequences for future generations burdened with the debt incurred. Or will debt simply be forgiven, in national and international jubilees? While it is impossible to predict the outcome, the scope of these disruptions will echo through the lives of young people today. Reconceptualising, or reforming, the global market economy, is perhaps one of the main outcomes of this pandemic. It has had an impact on almost every individual, in every community across the planet; there is no telling what the mid- or long-term effects will be. The World Health Organization (WHO) projects that a widespread Covid-19 vaccination is not likely to be available until the middle of 2021.

Simultaneity

The pandemic has altered billions of lives. Initially, communities learned how to live indoors, and during the early 2020 lockdown, many cities looked like ghost towns. Wildlife crept back into urban spaces and nature had a short reprieve from human activities. Control of the coronavirus spread was effective in some places that led, in late spring, to cautious reopening. The rules were often ignored. There were notable successes, but simultaneous nonconformity – particularly risky behaviour by adolescents and young adults – that caused outbreak clusters and resurgence into the summer of 2020. Meantime, global supply chains were disrupted and the shortcomings of production and distribution of personal protective equipment (PPE), much of it manufactured in China, raised questions about reliance on global distribution systems. Retail and manufacturing similarly suffered, and many businesses have restructured to use local resources and suppliers. New wrinkles in our reliance on globalisation were easier to see. A new set of economic relationships may be unfolding and beg the question: How much of our present arrangements will survive and recover after Covid-19 runs its course, assuming we can achieve widespread vaccination? Will the direct short-term impacts on the economy and the rippling secondary and tertiary impacts, to which we are not currently paying attention, transform economic and technological systems? What will the long-term consequences be of joblessness, isolation, masking, economic disruption,

housing, generational (age cohort) impacts, education, travel, and transportation realignments? Telecommunications technology, the internet, and instantaneous communication provide greater awareness and ignorance about all of these things, at the same time.

Arguably the Covid-19 pandemic has all of the expected characteristics of postnormal change, but what made it a postnormal event? The 4Ss describe the changing nature of change itself, but Sardar's original study argued that postnormal times emerge as a result of the growing complexity, chaos, and contradictions within human systems – the 3Cs. More than being the driving forces or characteristics of postnormal times, they are also postnormal enablers – intrinsic factors that need to combine or overlap in order to trigger postnormal phenomena.

COMPLEXITY, CHAOS, AND CONTRADICTIONS HAVE ALWAYS BEEN A FACTOR OF LIFE, BUT THEY ARE CONVERGING AND FEEDING EACH OTHER NOW IN HUMAN SOCIAL AND TECHNOLOGICAL SYSTEMS IN WAYS THAT ARE UNIQUE, UNPREDICTABLE, AND INCREASINGLY NONLINEAR.

Complexity

Complexity is the property of a system that has multiple components that interact in many ways. Complex systems exhibit behaviour based on the interaction of these components. Some properties that complex systems feature include: self-organisation, nonlinearity, emergence, feedback cycles, and adaptation. Growing complexity will require a better 'understanding of the dynamics of intertwined human and planetary systems'. [11] To grapple with the postnormal aspects of complexity, consider plurality of diverse elements in the Covid-19 system and their interconnections.

The pandemic was a result of several elements acting synchronously in response to the emerging coronavirus. First, a large Chinese diaspora spread across the world after 1850. Second, the timing of the emergence of the pathogen coincided with the Chinese Lunar New Year. Third, continuous national and international travel and transportation systems. Those latter systems spread the virus at astonishing speeds. Fourth, the pandemic has had impacts across a whole range of sectors of the economy: from international finance to health services, employment, food production, and manufacturing. The pandemic has exacerbated system stress by restricting travel and freedom of movement upon which the systems originally depended. Business and public organisations have adapted, and there has been some cost savings for corporations, but the use of Zoom meetings and remote employment contribute complexities of their own.

Over the January 2020 Chinese New Year celebrations, millions of Chinese travelled from the far corners of the Earth to return home to celebrate with families, in what is among the largest annual population movements across the planet.

Diffusion maps of the virus across China show how widespread and complex air, rail, and road transportation made viral transmission unavoidable. This tapestry of multiple interconnections made the spread of the virus inevitable, despite the apparently effective lockdown measures in Wuhan, and the surrounding region, because the virus was already loose in the world. The spread in the Americas was primarily via Europe and followed a similar diffusion pattern of clusters, super-spreader events often involving long-distance travel. The outbreaks in eldercare facilities obscured the fact that young people can be asymptomatic hosts.

COMPLEXITY, AS A FEATURE OF MODERN LIFE WAS A PRIORI, A GIVEN, WELL BEFORE THE PANDEMIC. ONE OF ITS EMERGING LESSONS MAY BE THAT FRAGMENTED, SELF-GOVERNING POLITICAL SYSTEMS ARE POORLY ADAPTED TO A PLANETARY CIVILISATION.

The liberal democratic concept of personal liberty may be incompatible with maintaining public health. To make matters worse, the global system is not even close to a system of governance, it is still a Wild West of nation-states not unified, but separated by territorial integrity, tenuous sovereignty, and a lingering attachment to the Peace of Westphalia. With roughly 200 separate countries, not to mention the thousands of cities, states, and territories in the mix, connectivity is sought even more desperately to respond to the scientific, economic, social, and political needs of the pandemic and the problems/challenges it will generate in our futures.

Another factor adding to global complexity is China's growing financial muscle and status as the world's second largest economy and growing military power. What will economic contraction mean for its Silk Road Initiative and infrastructure projects around the world? In any case, system complexity has been fuelled by the success of the Chinese economy and the huge demographic shifts from rural villages to megacities. China has become an increasingly mobile society. Making things even more complex, China has become a critical player in the global supply chain. Before the pandemic, China produced more PPE than the rest of the world combined.

The concurrent New Year's celebration and mass travel increased system complexity. The complex mix of unitary, federal, and confederal states, the WHO, and leading experts often took (and continue to take) disparate responses in restrictions of movement and epidemiology tracking. China is criticised for taking draconian steps, while South Korea is praised for taking a democratic but communitarian response. When we began writing our blog, in May 2020, Italy, Spain, and the United States seemed to respond "too little, too late" to avoid serious casualties. The United States is now the record holder for the highest caseload, over 11 million, and nearly 250,000 dead. The United States, Spain, Iran, and parts of Latin America were active hotspots at the time this was written.

Chaos

The second C in postnormal analysis is seen as the feature of dynamic nonlinear systems that exhibit disproportionate inputs and outputs; the Covid-19 pandemic has shown chaotic behaviour in many ways. Indeed, the fact that we know so little about the virus has not helped, but its high rate of infection (R₀) and asymptomatic carriers have resulted in a wide range of responses leading to a large variance in results. Differences in geography, climate, and community infections have continued to make it hard to identify patterns. It is increasingly clear, however, that asymptomatic transmission by younger people is prevalent, how the virus spreads, but the long-term consequences of the disease are troublesome. For example, long-term pulmonary and coronary complications affect many survivors, along with brain fog, circulation problems, and other side effects of the disease. [12] It remains to be seen what the longer-term medical and healthcare needs will be (even at the end of 2023) for people, especially young people, who survive with deeper underlying damage to their bodies. The pandemic has been like an event where thousands of butterflies begin to fly simultaneously, without anyone noticing them, and they then unleash a series of hurricanes far too powerful to be mitigated.

Chaos was particularly evident in the first two months of the global pandemic, with the initial reluctance of China to accept the Wuhan outbreak, then immediate lockdown. The lack of science and knowledge led to mixed messages about mask effectiveness, and WHO officials did not always appear to agree with nation-state spokespersons. The intricacy (complexity and contradictions) of systems and messaging of surveillance and communication channels and media were revealed. The overlay of social media complicated matters more, with confusion about conspiracy theories, basic facts, and then presidential and prime ministerial fake news. The EU came to face the realities of decisive leadership on one hand, and the re-emergence of hard borders, on the other hand. Sovereign decision-making and reliance on supply chains hampered manufacture and distribution of basic protective gear, and leaders sent mixed messages to consumers about appropriate behaviour. Vaccine production has also been compromised by short-term capitalism and a lack of strategic, long-term responsibility for the possibility of pandemic. Ironically, contagion war gaming and roleplaying has been widely used in academic and foreign policy settings, but apparently no one at the top paid attention or cared enough to respond in time. Response to the pandemic reflects the complexity of the global milieu. For example, in the United States, leaders at the local level, governors, and city mayors have been making the more aggressive and effective science-based policies to prevent the spread of the coronavirus (like in Italy, where some mayors have personally enforced the confinement). There has been widespread criticism of the former US president for a lack of consistent and effective leadership in responding to the crisis – his campaign continued to refer to the pandemic in the past tense, despite the growing case numbers, appearing to hope that the whole thing will just go away!

Contradictions

The contradictions in the wake of this crisis are obvious. Efforts by politicians to downplay the crisis and avoid panic in many cases have made it worse. Long held values get in the way; the values of economic production, jobs, and continued growth contradict community health and physical well-being. The pandemic will illuminate, like no other, the direct relationship between androcentric values, particularly economic values, and the rest of the planet. Preliminary figures already demonstrate the improvement in the quality of air, water, and atmosphere due to the economic slowdown. Covid-19, some say, may be Mother Earth's rejoinder. [13]

The pandemic brings a host of other contradictions to the forefront. It has been driving a centrifugal globalisation dynamic, but forcing a centripetal, inward spiral with travel restrictions, surge lockdowns, isolation, safe distancing, and masking. Some are even calling for economic deglobalisation in a 'waning hyper-globalisation era'. [14] The question is, while some countries seem to be doing well, so far, will they be able to make it through a global recession or depression? Projections for a fall resurgence in the Northern Hemisphere are dire, not only for the pandemic but for the growth of hunger and homelessness barring more economic stimulus and/or unemployment compensation (now at a standstill in the US). A global food crisis is emerging. [15] Social distancing reinforces the importance of close-community networks, yet it is also lethal for local retail as it lacks the structure to deliver, while Amazon and the like are making record profits. [16]

The pandemic may provide growth opportunity for some sharing economy firms (Globo, Uber, and Airbnb), on the other hand, the impact on gig economy workers is less clear. Unemployment may drive more individuals into the sharing and gig economies. [17] The new business models may suffer the consequences of riders and drivers getting sick, homeowners going bankrupt, and the vicissitudes of the general economic and employment crisis. The pandemic calls for effective and inspiring public and private leadership, leadership that has been sadly lacking and characterised by fructuous ideologues worldwide (with few dignified exceptions) that enable or encourage authoritarianism and the rise of strong men who go unchecked. The internet and telecommunications now make it possible for people to stay in touch with friends and family near and far, and for many professionals to carry on more-or-less 'as usual'. But it will also accelerate growth of cyber-infrastructure, the automation process, and will likely leave millions unemployed. Perhaps the most poignant contradiction has been the moral dilemma – the tension – between saving lives or saving jobs. Or even worse: killing people that do not respect confinement (a measure originally designed to keep them safe) as in the case of the former President of the Philippines Rodrigo Duterte, who ordered lockdown violators be shot. [18] As shocking or worrying the emerging pandemic contradictions may seem to be, the main lesson is that the contradictions only increase the postnormal nature of the phenomenon. How are we going to cope, as individuals, communities, and societies as things become more and more postnormal?

The staff, fellows, researchers, and directors of our Centre, the Centre for Postnormal Policy and Futures Studies (CPPFS), are particularly concerned and disturbed about the likelihood that the Covid-19 will have its greatest impact on the most vulnerable and marginalised people on the planet; our primary concern is decolonising futures. [19] In industrialised countries, it is clear that the elderly and marginalised are expendable. There appears to be great media attention and public gratitude to “first responders” and yet we, collectively, and our leaders are allowing hundreds if not thousands of nurses and doctors and other healthcare workers to succumb to this pandemic. The general public might not have been able to foresee Covid-19, but environmental scientists, epidemiologists, and other experts as well as futurists forecast the inevitability of zoonotic pandemics to follow in the wake of MERS, SARS, H1N1, and Ebola. However, now that the event has begun to unfold as a postnormal phenomenon (the WHO only declaring an end to the Covid-19 pandemic emergency as of 5 May 2023), we need to learn to navigate it.

OF COURSE, THE BEST WAY TO NAVIGATE A STORM IS TO BE ABLE TO
 ANTICIPATE AND FIND THE COURSE THAT CAN TAKE US AWAY FROM IT,
 AND THIS IS WHY FUTURES STUDIES ARE IMPORTANT. HOW CAN WE
 NAVIGATE THIS CRISIS? HOW MUCH DO WE NOT KNOW ABOUT CURRENT
 COVID-19 CRISIS? AND HOW ARE GOING TO DEAL WITH OUR IGNORANCE?

Navigating the Pandemic

What is known about SARS-COV-2? Researchers appear to know where it originated, how it spread, and have a rough idea of its contagion levels. [20] We know that the spread of the coronavirus has been matched by the spread of information, and misinformation, about the virus and the disease Covid-19 through social media networks, which have exacerbated levels of anxiety and clouded clarity in decision-making at every level. We know that governments have made decisions to lock down communities to enact social distancing to mitigate against viral spread, while the business sector suffered the loss of customers and workers, and many industrial and service sectors have been damaged. Tourism and the travel industries have been hard-hit, as have retail trade, but impacts in other sectors are minimal or mixed. [21] The global economy is in decline, yet global equity markets have seen both volatile lows and recent highs that seem illogical in the face of economic uncertainty. Healthcare workers, across the globe, are now on the front line of the gravest existential threat to humanity in a century. Global warming and social inequity movements have been eclipsed by the global pandemic.

How can individuals and organisations better navigate the emergent global Covid-19 crisis? We suggest that it is essential to address these two questions:

(1) How much do we not know about the Covid-19 pandemic and its consequences at this point in time? And depending on the answer to that question: (2) How are we going to act based on determining what we do not know but still need to find out?

Manufactured Normalcy Field

Cognitively, human minds excel at normalising whatever happens. Our brains tend to reject contradictions and anomalies when we experience cognitive dissonance. It is an evolutionary biology advantage that allows individuals to adapt quickly to external change, but it becomes a hurdle when one needs to be open to a wide range of possibilities, particularly novel ones. The writer and consultant Venkatesh Rao's notion of a cognitive manufactured normalcy field aligns with postnormal adaptation to the impact of normalcy in our thoughts and behaviours. [22] The manufactured normalcy field is the ontological construct, a hyperobject, that reaffirms normalcy despite disruptive external change. The manufactured normalcy field is not intrinsically positive or negative, but an adaptive strategy that may need recalibration in the face of rapid change or the accumulation of uncertainty and ignorance in postnormal creep. The manufactured normalcy field tends to reinforce conventional linear thinking and induction as the best strategy to deal with the 'normal'. Covid-19 entails deeper layers of uncertainty that cannot be overcome with plain ignorance. The normalcy of concerts, spring break, teen parties, bars, and large weddings in many societies is challenged by recommendations or mandates to wear masks, social distance, and the new norms of public health policy.

Postnormal Shifts

Postnormal theory has argued that the greater the influence and convergence of complexity, chaos, and contradiction within a phenomenon, the greater the uncertainty. Yet, uncertainty is not unidimensional, simply by increasing in size, rather as the 3 Cs overlap each other, uncertainty grows in phase changes: postnormal creep. Postnormal creep is the specific process any event or phenomenon follows when developing its postnormal potential and has a material aspect (uncertainty) and a cognitive aspect (ignorance).

**THE MORE POSTNORMAL CREEP PROGRESSES, THE GREATER
UNCERTAINTY BECOMES AND DEPENDING ON THE DEGREE OF
UNCERTAINTY, OUR INDIVIDUAL IGNORANCE BECOMES MEASURABLY
DEEPER AND/OR WIDER.**

Once postnormal creep reaches a certain threshold, there can be a postnormal tilt – a readjustment to the manufactured normalcy field – or a phase change – a postnormal burst. We argue that Covid-19 has features of all of those manufactured normalcy field adjustments and is multi-layered with cross-sectoral, temporal (old

and new characteristics), and cultural adjustments. The postnormal creep and adjustments are widespread in the emergence of SARS-CoV-2 and the resulting Covid-19 pandemic, which provides further proof that Covid-19 is a postnormal 'perfect storm'. Arguably, the global pandemic, considered as a hyperobject, has become a postnormal burst.

Levels of Uncertainty

Continuing to unravel the effects on the manufactured normalcy field, postnormal time theory describes layers of uncertainty from shallow to deep. Challenging this normalcy are the underlying driving forces of change in the twenty-first century, the tsunamis of change including demographics, economics, globalisation, technology, and the environment/climate change. These tsunamis are the underlying dynamics accelerating global change. What propels any major force into the postnormal space is the accelerating speed, scope, scale, and simultaneity of changes to those forces and the concomitant complexity, chaos, and contradictions that follow. The driving forces and postnormal dynamics demonstrate a consistent pattern of creep. How creep leads to burst is best understood through the interplay and combination of growing degrees of ignorance and uncertainty.

Uncertainty in postnormal theory and analysis is a measure of our capacity to realise what is going on, both quantitatively and qualitatively. Uncertainty also builds, following the trajectory of the postnormal creep. In the case of SARS-CoV-2, researchers knew very little at the beginning, but pundits and some political leaders seemed to assume it would be like any other coronavirus and did not express concern about it. At this point, leaders and individuals faced surface uncertainty and most people assumed that our accumulated knowledge would carry us through the outbreak. Public leaders could use what was learned in the flu pandemic of 1912, or perhaps the polio epidemic. The novel coronavirus was understood to be far more aggressive and more lethal than had been thought.

SARS-CoV-2 behaved in unfamiliar ways, and it took time for researchers to uncover the mysteries and quirks of the coronavirus, as a pathogen: by then the progressive postnormal creep moved into deeper territory: shallow uncertainty. Some observers wondered if the pandemic and the resulting economic crisis might shake the very foundations of modern institutions or question collective assumptions about globalisation, capitalism, of institutions like the EU, and the idea of materialistic growth itself. [23]

As human societies plunge deeper into the pandemic, we may need to ponder if humanity will sink even further into a state of deep uncertainty. Because the pandemic has occurred in the midst of already emergent postnormal phenomenon, the creep contributes to the existing depth of uncertainty about accelerated global warming, growing wealth and equity imbalances, and a host of other hyperobjects and wicked problems that threaten civilisation or human survival. Social justice movements (e.g. Black Lives Matter) and the growing power of women (e.g. #Me Too) have similar transformative potential and could be accelerated or dampened

by the pandemic. Other uncertainties abound: discoveries about the ubiquity of microplastics in the environment and plastic pollution were serious before 2020, but the demands for PPE and safe food handling have resulted in a dramatic growth in plastic uses. [24] The consequences of this development and myriad others create ever greater uncertainty about the health of the planet and environment. Some of the concerns are existential. [25] Assessing the kind of uncertainty humanity faces is just part of the equation: postnormal times theory posits that individuals and organisations should evaluate how that uncertainty is measured and processed and then plan how/work to compensate.

Layers of Ignorance

Also important are the depths of ignorance that result from growing uncertainty. In postnormal times theory, the layers and depth of uncertainty are mirrored by the depth of our individual and collective ignorance. Ignorance is not only what it is that we do not know but also what we ignore. It is the cognitive side of postnormal creep, and it grows to/corresponds with each degree of uncertainty. Each level of uncertainty aligns naturally with a level of ignorance. The levels of ignorance are as follows: plain, vincible, and invincible ignorance. Take surface uncertainty: although future outcomes may be unclear, decision makers should have a fairly good idea of the direction outcomes may take and what kind of impacts are likely. In a state of surface uncertainty, previous experience really does help us to anticipate what might come next. Research indicating widespread coronary damage, even in non-hospitalised Covid-19 survivors, should lead us to expect to see greater incidence of heart problems and healthcare costs downstream. Researchers have learned from past pandemics and earlier crises and can gather relevant data, process useful information, and distil the knowledge to get society through the current crisis. This top level is plain ignorance and it is the cognitive approach humans are best at: mechanisms like linear thinking, dichotomy, induction, and specialisation work beautifully here and give reassurance that knowledge can serve to reduce uncertainty. The pandemic cannot be really managed by business as usual or by 'standard operating procedures' (SOP). Many Western cities had no contingency plans for a pandemic simply because they had no memory of one. At the beginning of the pandemic, cities and provincial governments may have believed they suffered from surface uncertainty but, in fact, were in shallow uncertainty territory.

Growing uncertainty, shallow uncertainty, required recognition of the deeper state of ignorance: vincible ignorance. New Orleans Mayor LaToya Cantrell never considered cancelling or curtailing Mardi Gras in late February nor did US federal agencies raise concerns. The mayor knew how to respond to hurricane threats but not to Covid-19 spreading across the planet. Mardi Gras seeded Louisiana's first wave of Covid-19. Plain ignorance was overwhelmed by uncertainty, and the mayor was facing vincible ignorance. The state of vincible ignorance demanded that policy makers address what was unknown. In strategic decision-making, nothing should be taken for granted. Accepting the assumption that Covid-19 was like a

mild flu likely cost tens of thousands of lives. [26] At the level of vincible ignorance, individuals and groups are forced to both acknowledge cognitive shortcomings and expand awareness by integrating all accessible and available knowledge. To respond to a pandemic, governmental responses cannot rely upon medicine alone but need to integrate epidemiology with health systems management, logistics, psychology, network management, and engineering. Response needs in the longer term may include resources or capabilities not even being considered currently.

BECAUSE THE LAG IN DETERMINING LONGER-TERM NEEDS IS A CENTRAL CHARACTERISTIC OF VINCIBLE IGNORANCE, LEADERS AND PUBLIC HEALTH OFFICIALS HAVE TO ACCEPT THAT THEY LACK THE PERSPECTIVE OF SUFFICIENT TIME TO PROPERLY ADDRESS THE CURRENT SITUATION.

As humanity leans deeper into the pandemic, it seems increasingly likely that many lifestyle changes will be permanent, as the SARS impact in many parts of Southeast Asia and the acceptance of mask wearing. Some changes could go far deeper as economic disruptions continue to worsen as hunger and famine grow. The deep uncertainty component of the Covid-19 phenomena will require us to engage in addressing the last kind of ignorance, invincible ignorance. Invincible ignorance requires that we turn to our own epistemological structures, paradigms, narratives, and worldviews and ask if they are hindering our comprehension of the situation. Invincible ignorance is a kind of ignorance that requires that individuals examine the foundations of their worldviews to consider whether they are hindering our ability to grasp the Big Picture – the scope of the crisis and its consequences. Covid-19 seems, again, to be a perfect example of a postnormal phenomenon. If globalisation dynamics boosted the spread of the virus, can/should we collectively or individually (boycott Amazon?!) try to change the dynamics? If present supranational structures have failed, we need to collectively develop new ones; if national governments cannot cope, they must be reformed or replaced.

At this deepest level of ignorance, it is not what can be learned from the pandemic experience but what we have to unlearn to better respond to the next pandemic (or pick the environmental catastrophe of your choice!). If current capitalist logic compels us to choose between saving people or saving the economy, then perhaps it is time to take a hard look at the extent to which the old ways (the 'old normal') were not sustainable or humane. As the imperfections of the system are laid bare, it may require our species to take a good hard look at our invincible ignorance deficits and not only imagine better futures but continue to work on realising wiser futures. This level of ignorance also suggests that we need to anticipate and engage with unthought futures to explore the unknown unknowns, to consider wildcards and even catastrophes. Resilience will require thinking 'outside the box'.

Back to Normal?

As researchers, we argue for a multi-layered analysis of the levels of uncertainty in and ignorance about postnormal phenomenon and to apply the right kind of ignorance depending on the phenomenon being explored or scenario being built. The challenge is identifying which level of uncertainty to address and then apply the right depth of ignorance for analysis. This is a demanding challenge. The postnormal literature has dedicated considerable attention to what constitutes 'normal'; it seems increasingly clear that when trying to sharpen our individual and organisational anticipatory capabilities, 'normal' can be a big liability. Normalcy resists the consideration, and the wider use, of alternative future approaches; it even restricts what is acceptable in the present. A point made in a number of blogs and posts in the spring peak in Covid-19: 'we will not return to normal because normal was the problem'. [27]

MAINTAINING A BUSINESS-AS-USUAL APPROACH, IN THE FACE OF ACCELERATING CHANGE, IS POSTNORMAL LAG, WHEN INDIVIDUALS AND ORGANISATIONS PERSIST IN APPLYING OLD RECIPES TO NEW SITUATIONS, WHILE PRETENDING THAT THEY WORK IN SPITE OF MOUNTING EVIDENCE TO THE CONTRARY (THINK CLIMATE CHANGE DENIAL).

Covid-19 has shown several examples of this: every time a government has declared that there was nothing to worry about; or when they said that their health system was more than ready to face SARS-COV-2; when they declared that the measure that worked in one place 'would not work in our country'; when they kept stating that the country had already reached the peak (for days and days); and when they promised that their measures will keep the economy ready to go as soon as the confinement is over. Lag is one of the more dangerous aspects of the manufactured normalcy field, when individuals and organisations 'bury their heads in the sand', when the accumulation of anomalies in the Kuhnian sense push the paradigm toward collapse. [28]

The continuation of postnormal lag can potentially lead to burst, to collapse, or transformation – a phase change. But before that, there is another possibility, an intermediate postnormal phase change – postnormal tilt. Postnormal lag may result from failed corporate and government leadership – not entirely new – but it appears that some leaders really do believe that decisions they make and directions they give are best in the absence of scientific and public health evidence. Moving beyond plain ignorance to acknowledge even deeper deficits and challenges to our knowledge, postnormal science is required to expand the boundaries of what we do not know and to expand our epistemological universe. Culture and governance

differences provide different outcomes. China's domestic Covid-19 strategy suggests that the postnormal lag can be beaten. Hong Kong, Taiwan, South Korea, Denmark, Germany, and Andorra took approaches to the early pandemic in effective ways, both in terms of public health and their economies. Either they had the capacity to see the real potential impact of the pandemic or realised that a business-as-usual approach would not do.

The effect of a correction to the manufactured normalcy field is the postnormal tilt. It is modelled on the effect one feels when a modern bus stops at a curb and lowers hydraulically. The idea is that when the manufactured normalcy field can be altered in ways that we may actually experience the emerging postnormal nature of a rapidly developing event or issue. No matter how compelling or pervasive the manufactured normalcy field, humans do have the capacity to go beyond ontological and epistemological constructs and see phenomena for what they really are. The growing body count of the Covid-19 pandemic makes it painfully clear that adjusting the manufactured normalcy field is a very difficult thing to do.

Postnormal creep processes come to an end. According to Sardar and Sweeney, this is the postnormal burst, 'when the system goes totally postnormal and there is no place to hide'. [29] We have argued that the postnormal creep is expanding and extending and that tilt may have normalised the manufactured normalcy field somewhat. For example, working remotely and home-schooling are increasingly seen as the 'new normal'. Larger systems are still behaving within the expected parameters of corporate capitalism and nation-state power appears to be reasserting itself. Although lifestyles have clearly changed, some of them likely to be permanent, there are still places to hide from postnormal times. Some organisations, and presumably systems, are adapting and thriving. High technology and space development growth continue relatively unrestrained.

When it fully arrives, the postnormal burst should both signal the end of postnormal creep and force the manufactured normalcy field to reset as the accumulated uncertainty is resolved, one way or another. The things researchers do not presently know will be discovered and resolved: the true SARS-COV-2 infectiousness, including its incidence and virulence; its lethality; the Covid-19 pandemic's total effect on the economy; and the actual impact of the pandemic on our lifestyles and our normal, ordinary activity. All these questions, so uncertain now, will become facts that we will be able to gather, measure, and process with plain ignorance. Even the remaining peripheral unknowns will fall under surface uncertainty. Right now, a burst might seem to be a bad thing. But it may also mean that individuals and organisations will become fully conscious of the situation, with little or no lag in the face of the new evidence, and we will gain experience and capacity to respond to future coronaviruses or other zoonotic outbreaks. Ebola, Zika, MERS, and SARS are reminders this is unlikely to be either the last or worst zoonotic pandemic. We may need to learn relatively fast, collectively, institutionally, and individually to respond to the next outbreak.

The uncertainties, the ignorances, and the postnormal conditions driven by accelerating change have set the stage for unfolding postnormal phenomena. The Covid-19 pandemic has been a postnormal perfect storm because the pandemic has illustrated all of the key features and functions of postnormal times, and the creep and tilt that lead to eventual postnormal burst. The extent of socioeconomic and political changes in the future is addressed elsewhere on the three tomorrows of Covid-19. The pandemic has legitimised addressing taboo subjects and brought serious social justice and equity issues to the surface. The basic assumptions about liberal democracy, the rule of law, what constitutes truth and facts – all are under scrutiny.

For postnormal times analysis to have significance, the work will need to engage more fully and deeply with scenario building and planning. Organisations need to more fully engage in imagination, creativity, and envisioning preferred futures, such as the transmodern and now transnormal aspirations championed by Sardar. We also need to better engage in the metaphysical and spiritual dimensions of postnormal times in order to come to grips with the meaning of these transformations. The pandemic has caused great losses, to lives and livelihoods, and we need to come to terms with our grief and pain, to honour the people and activities we no longer have with us, but also celebrate the opportunity and gifts that have arrived unexpectedly.

Our intention here was to not only discuss the pandemic as a postnormal phenomenon but also to lay the groundwork for understanding the future monkeys of chaos, black swans, and elephants in the room, and proliferating jellyfish events that have been driving our social and technological systems to postnormal burst, prior to the current pandemic. Improving our collective understanding of postnormal times and the forces at work will be required to survive and even thrive in postnormal times. The challenges we are likely to face due to global warming may make zoonotic pandemics feel like one of the least of our problems. That could not be illustrated more graphically than the massive forest fires in the US Pacific Northwest at this writing. Multiple catastrophes are a likely harbinger of the future. The drivers of postnormal change are inexorably compounding complexity, chaos, and contradictions, further accelerating our ignorance and the uncertainty of it all. However, we now have tools to better understand and challenge the assumptions of the old normal, navigate emerging postnormal times, and chart a course to a more resilient, equitable, and wise, transnormal civilisation.

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THE POSTNORMAL LANDSCAPE

Philip Spies and Chris Jones

The Chinese government initially remained silent about corona influenza incidents that occurred in the country in November 2019, but finally, on 31 December 2019, informed the World Health Organization (WHO) about the cluster of SARS COV-2 flu cases in Wuhan, a city with about 11 million citizens, and the cultural and economic node of central China. By 5 January 2020 there were fifty-nine cases, ten days later 282 cases, and thereafter infections spread like a wildfire worldwide.

The 'Covid-19 pandemic' was not only characterised by deadly flu infections as it progressed, but more particularly also by large-scale control-driven disruption. The lockdown measures for infection control cut people off from their workplaces, their friends, their families, and their recreation facilities. Supply chains crumbled, businesses went bankrupt, and unemployment increased. Social and political unrest coupled with growing poverty and famine have caused further disruption, especially in poor countries. By mid-2020, the disruptive control measures of governments created a chaotic world. Nations became inward-looking, thereby disrupting international political and economic relations. This (self-created) disruption continues today and seems to become more irreversible the longer it lasts. The hour has now also arrived for the twenty-seven-year-old 'New South Africa'. Major changes lie ahead for the country and its people.

Was the pandemic really that unexpected? With hindsight and reflection, people suddenly began to realise that warnings about the possibility of disruptive global flu pandemics were already published decades ago. Why was this not taken seriously at the time? This is one question that is addressed in this article. However, there is another question that first needs to be answered: Why has this pandemic disrupted the existing world order to the extent that people now struggle to find solutions?

Prevention is better than cure: future awareness ('memory of the future' [1]) could have led to better planning and more informed management of the Covid-19 pandemic. Good forward planning thirty years ago would have resulted in less confusion, disruption, and economic damage today. Unfortunately, the social and economic consequences of managing this pandemic are going to disrupt our lives even more, and for longer, than would have been the case if we only had to deal with

the flu infections on their own. In retrospect, previous pandemics, such as the Great Influenza Epidemic of 1918, are predominantly remembered in terms of the number of people who became ill and died. This one will be remembered differently, because it led to the disintegration of existing world systems.

The ultimate social and economic consequences of this pandemic are incomprehensible today, and this causes great confusion. It is a wave that cannot be controlled, at best it can be navigated. Three futures researchers at the Centre for Postnormal Policy and Futures Studies (CPPFS), Del Pino, Jones, and Mayo, as highlighted in this edited collection describe the Covid-19 pandemic as a 'perfect postnormal storm'. This article discusses some aspects of their views and applies them to the South African situation.

The World System

The rapid technological and industrial development over the past sixty years – especially the revolution in information, communication, and transport technology – has produced a world-system of interdependence between countries, between people, and between people and nature. Since 1972, systems thinkers have regularly issued warnings to the world community about the serious consequences of unbridled growth and 'progress' within a limited, closed world ecosystem. Over fifty years stress built up in this ecosystem, and the quality of the atmosphere, the earth's limited natural resources, and sensitive ecology have been subjected to growing risks. Nature started pushing back harder and harder against exploitation and misuse, and people became vulnerable to the unintended consequences of their mindless actions. Metaphorically speaking, today we are 'space travellers' on 'Spaceship Earth' within which our actions and the consequences of our actions take place in one interdependent whole. [2]

The disruption of the Covid-19 lockdown pushed the world community to a tipping point in 2020: a prospect that Meadows et. al anticipated forty-nine years ago. [3] In 1972, they called upon people to take note of and respect the interactions in the 'great whole' that supports their existence and wealth. But at the time, even they did not foresee the fragility of global manmade systems. Only since the 1980s have the complex dynamics of human systems become the subject of focused inquiry among researchers who specialise in 'soft' systems.

Government actions against the Covid-19 pandemic are now exposing just how fragile manmade systems are – just as global warming and the disappearing ozone layer have made governments more aware of the fragility of natural systems. No matter how hard you may try to restrict the transmission of infections, it is impossible to control the feedback chain reactions caused by social and economic disruptions. Unfortunately, no solutions can be gained from specialised knowledge, because good specialists are usually not good systems thinkers. Nor do we know what lies beyond the tipping point, and that makes goalsetting substantially impossible.

The Crisis

In their first article entitled ‘The Postnormal Perfect Storm’, Del Pino and colleagues describe the disruption caused by the Covid-19 pandemic as *Postnormal Times* (PNT). They describe PNT as an “in-between period” during which old ways are dying out, and new ways have yet to be discovered, and very few things make sense to people. The Italian journalist Ezio Mauro describes PNT as: ‘we are hanging between the “no longer” and the “not-yet”’. [4] It is a transition period in which people begin to realise that they cannot return to the previous dispensation, but do not know which future route is feasible, sustainable, and desirable.

The chaos of PNT has probably also been conditioned by the rapid pace of technological and social change that has built up systematically since the 1960s. Since the 1980s, the information, knowledge, and transport revolution has brought billions of people and millions of institutions from around the world together in one global ‘roller coaster’. Alvin Toffler notes in his 1970 book, *Future Shock*, that the speed of change is accelerating to such an extent that people are struggling to adapt to it. He calls the affective and cognitive implications of this ‘future shock’.

THE INTRINSIC NATURE OF INNOVATION HAS ALSO CHANGED OVER THE PAST FORTY YEARS. INFORMATION AND KNOWLEDGE TECHNOLOGY HAS BROUGHT A NEW DIMENSION TO THE FORE THAT IS CHARACTERISED BY THE SCOPE, SPEED, AND DIVERGENCE OF INNOVATION.

In other words, innovations in information and knowledge technology were not only rapid and repetitive in nature, but they also produced an extensive chain reaction of innovation metamorphoses for, and in, new application landscapes. This has made the innovation process increasingly complex, while people’s expert abilities struggle to keep up with its systemic implications.

As mentioned, modern scholars are excellent specialists in their particular disciplines or fields of study, but often fall short when it comes to practical/general application of their knowledge within complex systems. Knowledgeable but ‘narrow-minded’ people can, with good intentions, produce harmful unintended consequences because they do not know what they did not know. [5] If every person does their best in narrowly focused ways in their individual supposed worlds, the integrity of the real world will be systematically dismantled, because one or two elements of an interdependent whole are changed out of harmony with the whole. This disintegration is essentially an entropy process that can build up tension to a tipping point. A perfect storm is thus brewing, so to speak, while the ‘navigators’ of society struggle to read the broad ‘weather patterns’.

It is now very clear that the Covid-19 pandemic has morphed into an extensive phenomenon with two interactive dimensions: a pandemic dimension interacting with a broad socio-political dimension. This creates confusion stemming from

decisionmakers' poor insight and understanding of the spill-over consequences of lockdown: the pandemic as a disease is better understood (however poorly) as the systemic consequences of its management. Moreover, superficial and one-dimensional news reports (including fake news), inappropriate information systems (manifested in incorrect and/or contradictory information), a lack of relevant research results on both levels, and general ignorance about all facets of the new phenomenon, further confuse the issue – especially because this phenomenon is developmental in nature, i.e., it is a continuous state of becoming. People's actions, reactions, and interactions to address the problem – locally and globally – are constantly evolving and have consequences for virtually every level and every facet of our global society. This is a transformative chain reaction that produces new, previously unfathomable outcomes and disruptive phenomena. Del Pino and associates call this evolutionary chaos 'postnormal change'. [6]

**POSTNORMAL CHANGE INVOLVES EVERYONE AND EVERYTHING, QUICKLY
AND SIMULTANEOUSLY: IT IS A ROLLER COASTER. IT TRICKLES DOWN
FROM THE WHOLE TO THE PERSONAL LEVEL.**

It disrupts the big scene of world order and economies, as well as the small scene of people's way of life, existence, thinking, and psyche – to then move again in a circular motion from the small scene to the big scene. Postnormal change does not produce clear outcomes, because each outcome in turn gives rise to further changes until the process is finally played out. While this happens, apparent outcomes (or logical clarifications) are supplanted by contradictions that further confuse people, because they cannot make sense of it.

It is well known that a system is much more than the sum total of its various parts – and also that the outcomes of systemic activity are phenomena from interactions and not cause-effect outcomes. The Covid-19 pandemic has produced complex systemic problems that cannot be anticipated, explained, or understood by ordinary logic. Complexity is a characteristic of systems with extensive components and elements that interact with each other in many ways and have the abilities of self-organisation and self-creation. The confusion that arises from Covid-19 is due to this. As a postnormal phenomenon, it cannot be analysed; it can only be approached in its entirety by trying to understand the supporting circumstances it produces.

A Postnormal Phenomenon

Because postnormal phenomena self-organise and produce 'contradictions', they cannot be controlled or managed but only navigated – by trying to understand the phenomena in all their contradictions and then making choices and finding the best routes to possible (and desirable) alternative outcomes. Of course, another way

out is not to react to postnormal events, but to avoid the issue and wait the storm out. But then you can wash up in a strange world. Because there was no learning experience, the new circumstances can be equally incomprehensible and difficult to master.

How can one read this phenomenon? To start with, it is necessary to identify the blind spots and gaps in existing knowledge, as well as the reasons for these blind spots and gaps. This involves aspects such as people's underlying assumptions, paradigms, ideas, values, and worldviews that influence their perception, thinking, and behaviour. Due to inappropriate worldviews and gaps in their existing knowledge, decisionmakers' constricted actions can produce unintended consequences. For example, the old order is built on global integration while the strategy to curb the Covid-19 pandemic causes the dismantling of global integration. Efforts by politicians to avoid, delay, or remain silent about the crisis to avoid panic ultimately exacerbated its impact. Establishing lasting solutions to the pandemic requires the dismantling of ideological differences, cooperation between stakeholders, and strong, innovative leadership, but there are worldwide signs of ideologically driven centralism and self-centred populism in managing the situation. In South Africa, this has led to a strengthening of race-based government support and even to greater corruption and new criminal networks. [7]

Entrenched aspirations, values, and ideologies also sometimes stand in the way of implementing lasting solutions to the economic problems created by the Covid-19 disruptions. In South Africa, for example, the government's pursuit of interracial wealth-equality through race-based affirmative action rules and workers' union activism, do not consider the impact of such actions on unemployment. On the one hand, this can become an obstacle to the development of South African industries and businesses (with associated higher unemployment), and on the other hand, it can give rise to trafficking, corruption, and other criminal activities that increase social and political instability. Long-term support for those who lost their jobs due to the pandemic could produce a dependency syndrome and eventually poor human resource utilisation and poor economic growth. And, with continued high population growth and immigration towards South Africa, the number of people in need would increase systematically, because the South African economy cannot create enough jobs.

Therefore, curbing the number of deaths due to the Covid-19 pandemic in South Africa must be weighed up against the deadly long-term consequences of Covid-19 lockdown measures – consequences such as endemic unemployment, famine, and the possibility of social and political unrest in the country. This crisis, to an extent like no other, also highlights the contradictions between people-centred objectives, especially economic objectives, and the ecological sustainability of life on earth. South Africa's energy sector is highly dependent on coal-fired electricity generation. Moving away from such an environmentally abusive energy system is becoming a commercial and ecological necessity for the country. Preliminary global figures

already indicate an improvement in the quality of air, water, and atmosphere due to the global economic slowdown: Covid-19 seems to have given Mother Earth the chance to breathe again. But in the case of South Africa, the problem of transforming an entrenched energy system is compounded by the economic impact of Covid-19 on the country.

The most painful contradiction is the moral dilemma when a decisionmaker has to choose between saving lives or saving jobs – which is ultimately also about survival, or worse – killing or assaulting people who do not adhere to lockdown rules (a measure originally intended to keep people safe), as in the case of President Rodrigo Duterte of the Philippines, who ordered the shooting of offenders of lockdown regulations. [8]

Pandemic management will always deal with such inconsistencies and unintended consequences, and the longer a pandemic lasts, the greater the possibility that more such dilemmas will emerge. This inevitably leads to increasing uncertainty in decision-making. Hence, (metaphorically speaking) good navigation systems are necessary in stormy times. Scouts must be placed in the right places and have good scanning systems that can see the hazards on the way forward timeously. The question, however, is how can this be done in practice? To answer this, we must first determine how much we do not know about a strange situation such as the Covid-19 pandemic, as well as its consequences. [9] Depending on the answer, we can then discuss how we should deal with it.

Recognising Uncertainty and Ignorance

Del Pino and associates begin with a well-known systems studies point of departure, namely, the more complex a phenomenon is, the greater the intertwining of processes and the number of accompanying interactions. [10] This means that in this respect the extent of the change is only one of the indicators. Complex changes lead to uncertainty about the endpoints because the process is characterised by division (or branching) of processes, development from processes, overlapping of processes, and change in the nature of processes. This creates a chaos of uncertainty, which systematically moves towards a phase change: a process that Nicolis and Prigogine characterise as ‘self-organisation’: a phenomenon resulting from neighbouring or local interactions between the elements of a complex system. [11]

There is also the possibility of guided self-organisation by the management of so-called ‘strange attractors’. In socio-economic transformation, information management, value management, and learning processes, among others, can give rise to new collective insights, paradigm shifts, and worldviews that can serve as strange attractors for guided self-organisation. A later discussion on a cognitive homeland and cognitive dissonance is related to this.

Del Pino and associates call the deployment of uncertainty during postnormal change ‘postnormal creep’. They consider this creeping movement to be typical of any post-normal change process. It systematically involves more variables as it evolves and changes, therefore, becoming more complex over time. Consequently,

the further this creeping movement progresses, the greater and deeper the uncertainty becomes, until it reaches a tipping point by itself and can undergo a phase change. This postnormal uncertainty is characterised not only by the number of unanswered questions, but, according to Del Pino and associates, also by three types of uncertainty arising from three types of ignorance.

PEOPLE BECOME INSECURE WHEN THEY DO NOT HAVE THE ABILITY TO DETERMINE WHAT IS GOING ON. GREATER CLARITY IS SOUGHT, BUT THE POSTNORMAL CREEP CONSTANTLY SHIFTS THE GOALPOSTS, WHILST UNCERTAINTY GROWS AND DEEPENS.

For example, in the beginning, people knew little about SARS-COV-2; many accepted that it was like any other coronavirus, and were not too worried about it. They revealed a so-called 'surface uncertainty', because they believed that there was enough knowledge available somewhere to deal with the problem but felt uncertain about how and where that knowledge could be found.

During their surface uncertainty, experts still believed that the social and economic situation that would arise from Covid-19 would not really be that different from previous situations and that it would be sufficient to focus on and combat just the infections. Particularly in the first phase of the pandemic, there was great ignorance about the serious disruption that would result from combating Covid-19. It also took time for people to understand the mysteries and indistinctness of the SARS-COV-2. When it was discovered with shock that the new coronavirus was much more aggressive and deadly than previous ones, lockdown with all its unpredictable consequences was decided on as an emergency action. When the consequences of lockdown started to unfold, people began to realise that their current knowledge about pandemics could not provide answers to the chain reactions set in motion by policy decisions. They then experienced so-called 'shallow uncertainty': an uncertainty that forced them to look below the surface of the current knowledge landscape, to ask other questions, and seek new solutions.

The eventual realisation that the 'solutions' put in place to combat Covid-19 were shaking the foundations of the existing world order, led to people experiencing a third level of so-called 'deep uncertainty'. People suddenly realised that their lives beyond the Covid-19 pandemic were also threatened: that the sustainability of the world community's prosperity, and even people's survival, has been jeopardised by the management of the pandemic.

Although it is necessary to understand these three types of uncertainties, this is not sufficient. Uncertainty must be managed, and this is only possible when the kind of ignorance that underlies uncertainty, is understood. Del Pino and associates' PNT theory postulate that each level of uncertainty is related to a specific type of ignorance.

When confronted with a viral pandemic crisis, the first (and most natural) approach is to fall back on scholarly knowledge gained from earlier apparently similar pandemics. However, if it is a new type of (so-called 'novel') virus, such as SARS COV-2, that presents new patterns of infection, it can initially be wrongly postulated that one is only dealing with 'plain ignorance'. Plain ignorance presupposes that all that is needed is to bring together existing knowledge with greater dedication. It is a cognitive process that experts feel comfortable with because it is well known: it includes methods such as case studies, established theories, deductive research, cause-and-effect thinking, right-or-wrong thinking, and the bringing together of all specialised knowledge. This approach provides peace of mind for surface uncertainty, as with initial attempts to manage the Covid-19 pandemic when it was still developing.

When it was discovered over time that SARS COV-2 is something completely different and that established practices cannot deal with it effectively, people began to realise that they would have to dig deeper for solutions. For example, many Western cities have no contingency plans for a pandemic like Covid-19, simply because they have never experienced it before, e.g., Del Pino and associates noted that the mayor of New Orleans knew how to respond to a hurricane threat, but not to the Covid-19 pandemic. The initial failures in pandemic management caused shallow uncertainty, with the realisation that creative thinking, stronger efforts in new directions, as well as hard work are needed to find the right solutions to the problem. It was assumed that the Covid-19 pandemic presented a problem of 'invincible ignorance'.

VINCIBLE IGNORANCE MEANS THAT EXPLICIT ATTENTION MUST BE PAID TO WHAT PEOPLE ARE IGNORANT OF, IN OTHER WORDS, SEARCHING FOR NEW KNOWLEDGE LANDSCAPES AND TECHNIQUES. IN THIS SITUATION, NOTHING IS TAKEN FOR GRANTED, WHILE PERCEPTIONS OF EXPERTISE AND IGNORANCE ON THE SUBJECT ARE WEIGHED AGAINST EACH OTHER THROUGH DIALOGUE.

For example, the assumption that Covid-19 is just like a mild flu has cost thousands of lives. People were then forced not only to acknowledge their existing ignorance, but also to reinforce their knowledge of the phenomenon by compiling all accessible and available knowledge in public discourses, as well as launching new research projects for a vaccine (or vaccines). This determined that not only new vaccines and medicine are needed, but also better knowledge of, among others, health system management, logistics, psychology, network management, and engineering.

An important consequence of these initial efforts is that people started to realise that there are huge gaps in their existing knowledge landscape. They suddenly

understood that the Covid-19 pandemic is multifaceted and complexly systemic in nature, and that it creates all sorts of problems worldwide, forcing people to change even their thinking and lifestyles. People feel ‘deeply uncertain’ because existing knowledge cannot offer them good solutions. They feel ‘invincible ignorance’. Therefore, they become discouraged in the face of inability to manage the Covid-19 pandemic with all its implications efficiently and effectively.

Feelings of invincible ignorance arise from thinking within the established knowledge landscape. Therefore, the solution lies outside and beyond that knowledge landscape. The search for solutions can move through four levels: Initially a scoping of the knowledge landscape of experts and decisionmakers is necessary to determine how this hinders their ability to interpret the Covid-19 pandemic correctly. Second, helping people to acknowledge and manifest their feelings of invincible ignorance, opens the door to examine attitudes, worldviews, and paradigms. This helps to determine why people approach and formulate a problem in a certain way. Third, since the Covid-19 pandemic has spread rapidly globally, it only makes sense to research the underlying dynamics. Fourth, an investigation of culture and institutions is needed: if current cultural practices and social and economic institutions have failed, the reasons for the failure must be investigated and new practices and institutions developed.

However, just developing new skills is not enough. We also need to determine what should be learned and done differently. If market-oriented capitalism forces decisionmakers to make choices between saving people or saving the economy, it is necessary to consider whether some aspects do not pose a danger to the sustainability of society. As the imperfections of the old order are exposed, it may require further investigation of shortcomings in accepted practices and then weighing them up against new feasible and desirable alternatives.

Good change management requires innovative and forward thinking. To sharpen this ability, one must determine what ‘normal’ in people’s worldview is. People tend to be attached to normal, which limits their ability to adapt and consider new alternatives. As stated in a slogan during the riots of October 2019 in Santiago, Chile: ‘we will not return to normal, because normal was the problem’. [12]

Our Cognitive ‘Homeland’

Del Pino and associates note the excellent ability of the human brain to normalise anything that happens as an obstruction to innovative thinking. [13] Normalisation is beneficial when people have to adapt to a situation quickly but becomes an obstruction when totally new possibilities need to be considered. They also refer to Venkatesh Rao’s idea of a ‘manufactured normalcy field’ to emphasise the inertia of fixed views of reality. [14] This manufactured normalcy field (MNF) is a cognitive ‘homeland’ to which people want to flee when they are confronted with changing realities – back to their usual way of life, thinking, and doing things. This is not in itself detrimental when dealing with ordinary problems, but the MNF causes

conventional ways of thinking and actions to dominate when disruptive changes require innovative thinking and actions.

The urgent need to manage the Covid-19 pandemic caused great uncertainty among 'cognitive homeland people' when they discovered that this is not just a problem of ordinary ignorance and that they have to leave the homeland as soon as possible. This emotion, or feeling, emerged after an attempt was made to deal with the pandemic in the usual way. Del Pino and colleagues describe the lag that accompanied this attempt as 'postnormal lag'. [15] Postnormal lag is a persistent behaviour in new situations despite increasing evidence that perceived solutions tend to produce new problems. For example, it is postnormal lag when governments and organisations persist with carbon practices, despite clear evidence of climate change and global warming due to the carbon economy. When governments, in terms of their past experiences (and in all honesty), persisted in doing the same things and then declared that their health care systems were fully prepared for the Covid-19 pandemic, when in fact the opposite was true, it is also a postnormal lag.

A postnormal lag is also indicative of weak, and even failed, transformative leadership. Weak leadership often manifests in cases where a long period of even change is suddenly interrupted by a disruptive phenomenon. Leaders are also just people who are accustomed to living calmly within the normal course of events. They tend to follow the familiar route, even when movements suddenly change course. Their persistence in following this route can lead to two mutually supportive organisational pathologies called 'defensive avoidance' and group thinking if they do not realise, and acknowledge, that the new situation makes the usual way of doing things, invalid. [16]

The process of transforming the MNF is called 'tipping point management' – which also underlies the development of strange attractors. This is when new insights and perceptions are systematically stimulated by decisionmakers through a variety of management practices such as undirected environmental exploration, heuristic learning processes, dialogue, and causal layer analysis. [17] [18]

Like so many other things in life, postnormal creep tends towards an endpoint. In PNT theory, this moment is known as 'postnormal burst'. This not only indicates the end of the creeping movement, but also forces the MNF to migrate to a new view of reality. Adaptation to a new view of reality can, as already mentioned, be managed systematically, and Del Pino and colleagues propose three metaphors that can help people diagnose the reasons for adaptation problems, namely the Black Elephant, Black Swan, and Black Jellyfish. [19]

Cognitive Dissonance

The introduction to this article notes that there were warnings about the possibility of disruptive flu pandemics decades ago. The question is asked: why was it not taken seriously at the time?

One explanation for this is cognitive dissonance among leaders, experts, and in society in general. Cognitive dissonance is a state of confusion in thinking, what

people believe, and people's attitudes towards a new situation when it is necessary to make creative decisions and change their approach to the situation. A first and overarching explanation for the occurrence of cognitive dissonance is summarised in the problem of escaping from a MNF. Next, three symptoms of cognitive dissonance and the underlying reasons are briefly described.

The metaphor Black Elephant is based on the well-known metaphor 'elephant in the room', which refers to something that everyone knows about, but no one wants to talk about. Black elephant is applied by Vinay Gupta to an event that experts foresaw, and considered highly probable, but, for convenience's sake, put out of their minds. If that event finally occurs, they downplay it as a Black Swan. [20]

A BLACK ELEPHANT IS ONE EXAMPLE OF DEFENSIVE AVOIDANCE OF ACTION, BECAUSE IT CAN DISRUPT EXISTING POWER RELATIONS, OR GIVE RISE TO THE PERCEPTION THAT ACTION IS SIMPLY TOO INCONVENIENT OR TOO EXPENSIVE AND SHOULD THEREFORE BE AVOIDED (AND THE PROBLEM IGNORED).

When the bomb finally explodes and people are forced to pay attention to the crisis, the consequences are greeted with surprise and disbelief as unforeseen or unexpected. By then it is usually too late to prevent serious damage.

Black elephants are also supported by narrow (non-systemic) thinking and group thinking within the (indifferent) wider society that tends to be nonchalant so that people can get on with their lives. The premise is that there is no need to fix something that is not yet broken – even if the prognosis of a developing catastrophe is clear to everyone. For example, in South Africa a rigid economy, weak race relations, very large inequalities in income and wealth, divisive politics, rising unemployment, and poverty, predict a high probability of national collapse in the near future – unless something drastic is done about it with the cooperation of all our citizens. Expert observers recognise this, and informed people can sense it, but the developing catastrophe is expelled from South Africans' manufactured normalcy field or cognitive homeland.

Cognitive dissonance can also be related to a breakdown between the cognitive (comprehension), affective (emotional), and conative (willpower-driven) dimensions of people's thinking. This classification has its origins in research in Germany in the nineteenth century, but, according to the American psychologist Ernest Hilgard, is still used today by psychologists who investigate the connection between people's thoughts, emotions, and actions. [21] It has been indicated elsewhere that it is possible to strengthen this link through good leadership and well-ordered, tipping point management. [22] Therefore, the black elephant phenomenon is also a symptom of poor transformative and ethical leadership, including poor planning

processes. An intertwined power-political game (the 'power system') often plays a major role if politicians maintain dissipated thinking and dissipated behaviour in societies or organisations to advance their political objectives.

For effective action, good prognosis is essential, but not sufficient, and therefore black elephants emerge.

The Black Swan metaphor was created by Nasim Nicholas Taleb with reference to events that emerge unexpectedly from outside the observation landscape. The underlying message of the black swan (outlier) metaphor is: What you do not know is often much more relevant than what you do know. [23]

Taleb's warnings relate to invincible ignorance: you do not know what you do not know or should know. He explains this situation with reference to the discovery of black swans in Australia when it was still firmly believed in Europe that all swans were white. A black swan is described by Taleb as a highly disruptive event that lies beyond people's knowledge, conceptual landscape, and expectations – to such an extent that, if someone were to refer to this, they cannot comprehend it, or at least firmly believe that it is a total impossibility. Taleb adds that, when this happens, people tend to give good explanations as to why it was 'foreseeable' and 'predictable' in hindsight. In other words, they suddenly become 'smart' by reflecting on the past.

If people in hindsight believe that a black swan was previously foreseeable and predictable, then why not also in foresight? The obvious answer is that you did not know in advance what you did not know. Our expertise is only a small aspect of our much greater ignorance – as the Bible puts it: 'for we know in part, and we prophesy in part ...'. (1 Corinthians 13:9) Only when a Black Swan appears can you, through research and backcasting, begin to discover how and why certain things happened as they did – and begin to realise the extent and nature of previous ignorance. Experience can be a good teacher for those who want to learn.

However, good foresight is possible today through good futures research. The aim of futures research is to improve people's 'memory of the future' and prognostic ability: something that is not possible by simply trying to predict the future. Over the past fifty years, futures researchers have developed a knapsack full of methods that can help curb the possibility of black swans: methods such as undirected futures exploration, causal-layered futures exploration, trend-impact analysis, cross-impact analysis, scenario planning, systems analysis, and heuristic questioning.

The possibility of black swans increases when a business's or a country's future research weakens.

Black Jellyfish is a metaphor created by Del Pino and associates to identify normal phenomena with 'postnormal potential'. Black jellyfish refers to normal phenomena which, through systemic interactions with other normal phenomena, can suddenly change in nature, also in the reach of impact. [24]

The reason for this is twofold. First, changes in one or two elements of a system can trigger a chain reaction that produces large disruption with a ripple effect. Second, entropy can play a role if different elements within the system respond unilaterally (out of harmony) to changes. The disillusionment and great disruption

caused by the Covid-19 pandemic worldwide is due largely to black jellyfish phenomena that have emerged from countermeasures. Therefore, it is a good example of how one-dimensional and short-term decision-making by management or authorities during major crises, lead to unintended adverse consequences. Black jellyfish is, therefore, a metaphor for an outcome of poor decision-making that can ultimately have worse consequences than either a black elephant or a black swan. The consequences of reactionary decision-making in combating the Covid-19 pandemic are clear evidence of this.

Lack of systems thinking in controlling and managing pandemics or other similar crises can result in more dire consequences than the crisis itself would have.

A Guide to A New Cognitive Homeland for South Africans

The manmade consequences of the Covid-19 pandemic are a product of sixty years of unequal progress in the world characterised by:

1. The systemic integration of peoples through business, economic, social, political, and resource utilisation networks through which prosperity growth has been produced primarily for the benefit of the affluent;
2. Unbridled population and industrial growth that has built up systemic overstress in a closed world system (natural and social);
3. A disproportionate explosion in technological innovation that has benefited rich countries significantly more than poor countries;
4. Consequently: unbalanced industrial and prosperity growth in a closed world system in which 10% of the world population accumulates 80% of the world's wealth while the externalities, such as atmosphere and marine pollution, due to some of their exploitive practices, is shared by all;
5. 80% of the world population is caught in a low-level poverty trap due to a (endemic) technological handicap, dwindling natural resources, and high population growth, while rich countries are dealing with low population growth, aging population, and new technology;
6. Utilisation of natural resources is overstrained by both greed and a need for survival. In rich countries this is the result of high-level consumer economies, a drive towards uninhibited prosperity, and industrial practices that pollute particularly the atmosphere and oceans. In poor countries overstress is mainly due to natural resource dependent survival economies that threaten the sustainability of their scarce natural resources;
7. As a result of these social and economic imbalances, the old global normal was probably unsustainable and awaiting a shock, such as the Covid-19 pandemic, which set in motion a global restructuring of which the end result is still a mystery to everyone;
8. We now live in postnormal times – an in-between period in which old ways are dying out, new ways have yet to develop, and very few things make sense to people.

If the world situation at the beginning of 2020 was unsustainable, then the situation in South Africa was even more so. South Africa was already in deep trouble politically, socially, and economically in March 2020 when the Covid-19 bomb also exploded here. The sources of economic progress that served South Africa so well since the country's economic awakening in 1880 – agriculture and mining – have lost momentum, especially since the 1980s. After the 1990s, industrial development could no longer provide the kind of impetus to South Africa's economic development that it did from the Second World War to the 1980s. Besides, the contribution of manufacturing to South Africa's gross domestic product has fallen from 21% to 6% since 1990, which should be a source of great concern for every South African. Manufacturing and construction are the natural employment destinations for South Africa's large, poorly trained workforce because agriculture and mining are no longer able to rise to the occasion.

A Gordian Knot of issues are facing South Africa, including: a low to negative economic growth-rate, a large and growing debt burden, an overloaded (and apparently politically-entrenched) civil service, high and still rising unemployment, a fiscal abyss with a dwindling tax base, increasing demands for social support, while the ability of the unemployed to ultimately take care of themselves is hampered by poor education and a dysfunctional educational system.

SOUTH AFRICA'S BUNDLE OF CRISES CALLS FOR CREATIVE, INNOVATIVE THINKING. BUT THE COUNTRY CONTINUES TRYING TO FIND SOLUTIONS WITHIN THE BOUNDARIES OF THE OLD COGNITIVE HOMELAND OF A RESOURCE-BASED ECONOMY, INTERGROUP CONFLICT, AND RACE-BASED POLITICS. IN SHARP CONTRAST, THE REAL WEALTH OF ANY TWENTY-FIRST CENTURY COUNTRY LIES IN THE CHARACTER AND SKILLS OF ITS PEOPLE AND IN BUILDING STRONG SOCIAL CAPITAL.

South Africa's National Development Plan (NDP) is now over ten years old (launched in 2012). It is an excellent diagnosis based on a comprehensive analysis and clear problem identification. However, as far as implementation is concerned, the focus is insufficient, and, as it stands, it will be extremely difficult to execute. [25] The current government's proven inability to implement plans is a problem, but it is doubtful whether any other government (as a central government) would be able to carry out the plan successfully. The NDP will probably be easier to implement from the local level up to the national level, than by a top-down approach.

The current approach of the South African government is ideologically centralist. In addition, there is a tendency to occasionally come up with something unexpected such as President Cyril Ramaphosa's vision to launch the World

Economic Forum's Fourth Industrial Revolution in South Africa, while it would be better for the country to rather look at a development strategy for the manufacturing and construction sectors. Another unexpected development is Radical Economic Transformation with its assumption that South Africa's wealth lies in money and goods, while it lies in the quality of its people and its social capital.

Moreover, a centralist approach to development in South Africa will be difficult to implement, because true people-centred democracy has, as elsewhere in the world, come under great pressure over the past twenty-eight years. Representative politics has been replaced by what South African legal scholar, Koos Malan calls a "politocracy", where political parties have become bureaucratic institutions in which service to a party has replaced service to voters. [26] Due to this, South African politics has probably become an enemy of the country's future.

South Africans have not yet managed to escape from their pre-1994 (apartheid) cognitive homeland. The country has, therefore, been living in postnormal times (PNT) for twenty-eight years, which took on a new, even more confusing, meaning in 2020 with the Covid-19 pandemic. South Africans currently experience a deep uncertainty about the way forward and a feeling of powerlessness and invincible ignorance about where the solutions lie. In the meantime, informed persons know what the end will be for South Africa if no effective and urgent action is taken to find solutions outside (and beyond) existing South African world views, paradigms, attitudes, and ideologies. In other words, there is a black elephant in South African boardrooms that must be challenged head-on, otherwise things can go very wrong going forward. We no longer have the luxury of time or a drawn out postnormal creep (which brings the black jellyfish into play) and the postnormal lag that is characteristic of behaviour that keeps returning to the old cognitive homeland must be avoided. It is time to rise above divisive thinking, divisive attitudes, and divisive politics, to carry out well-designed, tipping point management processes and then devise new, sharply focused plans with new attitudes and thinking.

South Africa's endemic problems of corruption and crime are partly the symptoms of divisions within the country. There are signs of polarisation due to social inequality and wide-spread poverty, which create fear of survival within both rich and poor communities. In-group perceptions of the others that dehumanise outsiders (albeit only in their collective psyche) indicate an absence of communal empathy that is essential for building a strong society. Dehumanisation is a destructive social pathology that blocks community building and the development of strong social capital.

Crime and corruption need to be addressed through administrative means, but this alone is by no means sufficient to put the country on a development path. People must learn to see and understand what is really going on in South Africa, otherwise old thinking and values dominate. People's perceptions and values can become the (previously discussed) foreign attractors that can help steer developments in this country in a positive direction. South Africans' great trek today should be to a new cognitive homeland in which a new awareness, new worldviews, and strong

values give impetus to society building. They must discover new ideals together and work together to realise those ideals. New symbols of unity are needed to serve as continuous direction indicators for the way forward. Society building requires that individuals and their communities be the most important role players in a renewal process, and not the state or a political party. Therefore, any renewal process should start from the bottom up: from personal initiatives and from local communities, which then spread upwards and cascade like a different kind of viral infection, which floods the South African landscape with creative, compassionate renewal actions.

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POLYLOGUES

Ziauddin Sardar

Shaping tolerant futures requires us to be more accepting of others, to understand other cultures, ethnicities, worldviews, on their own terms, from their own perspectives and experiences. This a big ask in a globalised world that is fractured, fragmented, full of strife and conflict, and deeply divided. Indeed, we find ourselves facing irreconcilable views and perspectives, numerous positions that are logically inconsistent – a world full of contradictions.

Contradictions are one of the major driving forces of our contemporary, postnormal times of accelerating change, realignment of power, upheaval, and uncertainty, where trust and confidence in conventional ways of doing things is rapidly evaporating: ‘we live’, I have stated, ‘in an in-between period where old orthodoxies are dying, new ones have yet to be born, and very few things seem to make sense’. [1]

One particular reason why things make little sense is that almost everything we encounter is complex – not amenable to simple, or to age-old established solutions, or orthodox ways of solving problems. A complex system has many components that change and interact in multiple ways. Its properties and behaviour cannot be explained by the mere addition of its parts; these emerge when the parts of the system interact with each other. Complex systems are thus dynamic, with extensive uncertainties, and numerous legitimate perspectives. Moreover, a complex, interconnected, and networked world with instant communication and prompt reactions, is prone to positive feedback that escalates things rapidly to the edge of chaos. This is why we find ourselves in a turbulent, chaotic world of political upheaval, cultural wars, and social strife. Complex problems require complex approaches; this is called the law of requisite variety. And contradictions cannot be resolved; they can only be transcended. This means that linear and static approaches to understanding the present and shaping the future are becoming increasingly irrelevant. We need to focus instead on the dynamic interconnections amongst complexity, contradictions, and chaos of postnormal times; and develop new approaches to navigate astonishing diversity, contradictory possibilities, and chaotic potentials. This is where polylogues – dynamic, multiple dialogues – enter the equation. [2]

The notion of polylogue was first developed in 1977 by Bulgarian-French philosopher Julia Kristeva, to represent ‘multiple logics, speeches, and existences’. As a literary critic, Kristeva is interested in the interrelationship between texts. [3]

How 'texts' – language, discourse, literature, paintings, designs, logos – talk to each other and shape meaning; what, in the technical language of cultural studies, is called 'intertextuality'. Later, Austrian philosopher, Franz Martin Wimmer, used the concept to overcome the Eurocentrism of contemporary philosophy. Analysing polylogues from an intercultural perspective, Wimmer argues that philosophical thinking, as a continuous, ever-present activity, needs to involve thoughts and ideas of different cultures, giving equal voice to all. [4] For Wimmer, polylogues are not just about mutual understanding but also about mutual criticism and enlightenment; it is about coming closer to some kind of appreciation of universality.

But polylogues are not just about contemporary philosophy escaping its western solitude. Neither is it just about arid 'texts' dynamically engaging with each other. They are also about ushering positive change in the real world, here and now. Polylogues are about, as I have stated elsewhere, 'creating new physical and mental spaces where diversity, pluralism, and contending perspectives are present on their own terms but also deeply invested in engaging others in creating and sharing information and knowledge'. [5] From the futures perspectives, polylogues serve as an approach for transcending contradictions, appreciating complexity, and bringing us back from the edge of chaos by producing fresh synthesis and new knowledge that can help us navigate postnormal times.

We need polylogues of various scope and scale, operating at different levels. At the most obvious level, polylogues connect minds: people from diverse communities, different worldviews, cultures, ethnicities, identities, perspectives, backgrounds, disciplines, and views come together to explore common problems. This not simply an exercise in being nice but acceptance of necessity and willingness to redistribute power. The emphasis shifts from toleration – accepting each other – to the necessity of making visible what has previously been shrouded in obscurity: the meaning of a particular culture or perspective to the bearers of that culture or outlook. What also happens to conventional power structures should not be underscored. Not only is power taken from the formerly powerful, so as to be democratised by the participants, but also the power of ideas to discipline and colonise is at least called into question, if not entirely impeached. The embrace of polylogue places self-description first, however destabilising that may be to cherished ideas of the dominant system of knowledge.

The knowledge dimension of polylogues is important. Polylogues are needed to take us forward from the decaying and increasingly irrelevant dominant paradigms, and systems of knowledge accumulated by and through the lens of modernity. By bringing different forms of knowledge production together – modern, traditional, indigenous – and according them equality and respect, polylogues can usher inclusive paradigms and pluralistic ways of knowing. They take us beyond the world of binary logic of black and white, zero and one, to Kristeva's 'multiple logics' where a complex issue can be expressed as true, or false, or both, or none. A space is created for perhaps, and maybe between, the stark conformist alternatives of certainty and denial.

By giving equal importance to knowledge systems of non-Western civilisations and cultures, including indigenous cultures, tacit and intuitive method, reason and revelation, polylogues could promote the realisation that in a diverse and dynamic world, there are many ways to be human. And different, but equally important, ways of knowing, being and doing. Polylogues are not just about engaging with others but, more importantly, listening to others.

**OTHERS ALSO INCLUDE NATURE AS WELL AS THE EARTH, THE ABODE OF
OUR TERRESTRIAL JOURNEY, AS EQUAL PARTNERS IN OUR DISCOURSE.
JUST AS WE HAVE TO LEARN TO LISTEN TO EACH OTHER, WE HAVE ALSO
TO LEARN TO LISTEN TO NATURE.**

Modernity has marginalised nature just as it has marginalised and written off traditional and indigenous cultures. The consequences are everywhere: from the arrival of the Anthropocene era (where human activities have a direct impact on the ecology and geology of the planet) to loss of biodiversity, the depletion of the rainforest, potential mass extinction of insects, ocean acidification, industrial and agricultural modes of production that have polluted oceans, rivers and atmosphere, to feeling and experiencing climate change in real time (with astonishing temperature rises, epic fires and floods on a Biblical scale), right to the Covid-19 pandemic. Without nature as a full participant, polylogues would be truncated.

And so, we arrive at the most enigmatic aspect of polylogues: the multiple dialogues with the Self. Our alienation with nature has alienated us from our own multiple selves. Our selves have become distorted, and hence fear all others, whether we perceive the others as people, cultures, lifestyles, nature, ways of knowing, cosmologies, or the sacred. The distorted self sees itself as fixed: unchanging, in control, with absolute certitude, and possessing a monopoly of truth. Such a self cannot engage in polylogue simply because it does not recognise two simple facts: that individuals, like cultures, change and transform continuously and constantly shifting their perceptions and outlooks; and that our own happiness and enrichment depends on the happiness and enrichment of others. So, meaningful polylogues can only commence with the recognition of our own changing, multiple selves.

Polylogues are based on the premise that we are not just different, but our difference depends on, and is connected to, all other different cultures and communities. Our survival as individuals, communities and cultures, and the endurance of our planet, depends on embracing difference in all its numerous forms. It involves different voices talking simultaneously to each other and Others.

This, I would argue, is perhaps one of the most reliable pathways to tolerant futures.

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ENGAGING COMMUNITIES IN POLYLOGUES

Liam Mayo, Caroline Osborne, Marcus Bussey, and Timothy Burns

How local governments engage communities through significant global change has become a central issue for councils, urban planners, and policy makers worldwide. Some local governments in Australia have recognised this and are undertaking to explore non-traditional forms of community engagement. These new forms of engagement seek to go beyond the jurisdictional legislative requirements. They aim to both amplify the characteristics and values deemed core to their respective communities and imagine alternative futures to which communities may collectively aspire.

The Sunshine Coast Council (scc) and the University of the Sunshine Coast (usc), based in South East Queensland Australia, have undertaken a collaborative research project to investigate multi-modal approaches to community engagement that grows social capital and increases local capacity as a way to address complex world challenges. This project posits that society is now operating and evolving in the context of postnormal times, and the research seeks to explore the notion of polylogues as a way to elicit 'ongoing discourses on the present and futures'. [1] In this sense, the research demonstrates how polylogues may be mobilised through community engagement, as operationalised with the structure of local governance.

Within a framework of anticipatory action learning, the ongoing research is exploring the utility of postnormal times as a cultural, social, and political theory that contextualises change in the present. It aims to mobilise polylogues around local solutions to complex problems, and in doing so investigate emergent manifestations of subjectivity. The research schedule was recently disrupted by the Covid-19 pandemic. However, this disruption provided an opportunity for the project to pivot toward an examination of online platforms as a mechanism for councils to engage with and support their communities through a shared existential crisis.

This chapter is divided into four sections. First, the discussion of uncertainty will be framed from the perspective of postnormal times, in particular, how polylogues may be used as a means to navigate our transformational epoch. Here, the role of – and emergent challenges to – local government in engaging communities through uncertainty will be explored. The second section outlines how the present research

is more deeply exploring methodologies for effective engagements through periods of uncertainty. Here, we propose that community engagement mechanisms innate in local government provide an operating framework within which the notion of polylogues may be further expounded. The third section offers an overview of the impacts the Covid-19 pandemic had on the research project, and the manner with which the research team moved to explore digital engagement methodologies as a result. The closing section provides a discussion around a consolidation of the research and potentialities for future research in this space, specifically, the impacts that omnipotent digital technologies have on subjectivity and the implications this has on traditional notions of engagement.

The Context

Sardar argued that postnormal times is the in-between period when the conventional distinctions between facts, values and politics no longer hold sway. [2] Reflecting on this, Mayo proposed that the uncertainty of postnormal times is a consequence of humanity's inability to move beyond a manufactured normalcy that perpetuates a familiar sense of the present. Our desire for stability and certainty, to de-emphasise change and make all things normal, perpetuates a cultural crisis, which itself nurtures ignorance and fosters uncertainty; the distinguishing characteristics of the postnormal condition. [3] Thus, Bussey concluded that, when faced with the overwhelming uncertainty of contemporary change, humans are overcome by a postnormal paralysis – a gridlocking of our social, cultural and ecological processes. [4]

Sardar's major contention is that we need to be aware that we cannot manage and control postnormal times, only navigate through them. He argued that we need to negotiate our way out of postnormal times toward a new normal. [5] According to Alfonzo Montuori, this requires imagination and creativity, and an awareness of the complexity of interdependencies and networks within which we function. [6] Expanding on the thought, Sardar noted that a diversity of thinking, combined with the ability to see the world in all its plurality – including multiple perspectives – will ensure the imagination and creativity of the collective is not only captured, but fostered and nurtured. [7] In collaboration with John A. Sweeney, he went on to argue that we must move from dialogues to polylogues: 'the creation of new physical and mental spaces where diversity, pluralism, and contending perspectives are present on their own terms but also deeply invested in engaging others in creating and sharing information and knowledge'. [8]

Sardar and Sweeney's notion of polylogues is akin to the concept of extended peer communities described by Jerry Ravetz and Silvio Funtowicz who, in their work regarding postnormal science, undertook to interrogate the scientific realm through the lens of mathematical risk. [9] They argued that it had become universally understood that the pursuit of discovery was no longer the principal motive of the scientific realm. Instead, after centuries of achievements and the steady advancement of humanity's certainty in knowledge and control, science

had become a bastion to remedy the pathologies of the global industrial system of which it forms the basis. Postnormal science (where postnormal times finds its foundations) was conceived as a means by which questions of value and power may be made explicit in scientific research. In this regard, Funtowicz and Ravetz were advocating for nonexpert stakeholders, those groups whose concerns and values are usually considered external to the scientific process, to be included as a way to democratise scientific research – both its inputs and outputs. These extended peer communities, it was proposed, may lead toward the integration and absorption of localised knowledge, which may shape areas of study and bring about more collaborative and responsive modes of research. [10]

In many ways, Funtowicz and Ravetz were foreshadowing ruptures across the disciplines of modernity to come; an acknowledgment that reductionist enquiry was becoming insufficient for understanding and interpreting an increasingly complex and chaotic world. Sardar and Sweeney's polylogues seek to rethink deeply-held traditions and practices of knowledge production and dissemination as a way to navigate postnormal times. [11] Polylogues – conceptualised in both the business and community sectors – encourage multilevel communication, collective sense-making and a co-creation of meanings to examine varied viewpoints, withholding decision-making until shared agreements are reached and deep reflections enacted. [12] In this way, rather than a cascade down of information and knowledge from those in authority or those in positions of hierarchical power, polylogues move new ideas from the local level, informed by lived experience or wisdom, upward in a way that ensures ownership of solutions are shared by all.

THIS REQUIRES AN APPROACH TO LEADERSHIP THAT IS COLLABORATIVE AND SHARED: TRANSFORMATIVE LEADERSHIP THAT ACKNOWLEDGES THAT EVERYONE CAN LEAD, AND EVERYBODY, WHETHER CONSCIOUS OF THEIR AGENCY OR NOT, CONTRIBUTES TO AND CO-CREATES THE WORLD WE LIVE IN.

Therefore, polylogues are a devolution of decision-making responsibilities and an evolution of a cadre of sense-makers and cocreators. Polylogues, by providing participants the opportunity to express their opinions and co-create solutions through negotiation, become a focal experience that concurrently satisfies many of the existential dimensions of human experience. [13] Sardar and Sweeney argued that polylogues in postnormal times should find 'better and more egalitarian ways to share what and how we know' and 'continuously seek out collaborative and dynamic means to craft and share our stories'. [14] In this way, the postnormal polylogue is an aspirational process that, when applied to a system, collegially embraces and values diverse opinions, while embracing commonality toward a shared and co-created future.

Communities and Local Governance

Anchor institutions such as local governments and universities, as leaders of their communities, have a key role to play as conveners and facilitators of opportunities to engage, collaborate and co-create. [15] Community engagement, is a term used interchangeably for similar yet distinct concepts, such as public or citizen participation and community consultation or collaboration. Community engagement is also broadly used across a range of disciplines, including but not limited to public health, business and strategy, marketing, community development, urban planning, natural resource management, youth, aging, and education. In some cases, community engagement may be conflated with the distinctly different purposes of communication, such as promotion or recruitment efforts.

Clear themes emerge from the literature regarding community engagement. These themes emphasise the value placed on a variety of outcomes that are achieved through the delivery of good community engagement projects: diverse knowledge, existing community assets, and ways of knowing; [16] the co-creation of mutually beneficial outcomes and responses to shared challenges and opportunities through collaboration and participatory approaches; [17] the role collaboration plays in supporting greater trust, reciprocity, and social capital to sustain partnerships and relationships; [18] and evidence that learning, knowledge, and relationships can be transformed through a feedback loop of teaching, research, and engagement with the broader community. [19]

In Queensland, community engagement is acknowledged as a critical mechanism of local governance, through the provisions outlined by the Queensland State Government under Section 4 of the Local Government Act 2009. Specifically, Queensland local government organisations are obliged to adhere to the principles of transparent and effective processes and decision-making in the public interest, democratic representation, social inclusion, and meaningful community engagement. [20]

While local government organisations in Australia have a legislative obligation to engage with their communities, the effectiveness of these processes to build trust and legitimacy, and enhance community decision-making, is variable. The literature suggests that there are clear gaps in how to embed the voice of the community from participatory and deliberative community engagement into decision-making processes. [21] How local government currently understands community engagement, relative to their role and responsibilities, to the state and their broader communities, is an important one. While local government has a legislative obligation to conduct community engagement, it could be argued that the participation of a characteristic proportion of community members may also represent a proxy method for local government to establish a social license to operate. Defined by the French ethicists Geert Demuijnck and Björn Fasterling, social license to operate is broadly used in the business sector to describe tacit consent by society, established typically through consultation and engagement

with stakeholders, that indicates that their activities are considered as legitimate in the eyes of society. [22] In this way, community engagement is one mechanism that local government uses to establish consent and legitimacy of their community (or social license to operate) for their projects, policies, or activities. However, this approach to community engagement and participation undermines the vital importance of authentic community voice in shaping democratic and participative decision-making, particularly in the face of significant uncertainty.

In addition to their legislative obligations, local government organisations across Australia also undertake a wide range of community planning and development activities by working with the community to provide programs that offer people opportunities to connect, to build their capacity and take steps to improve their wellbeing and quality of life. Over the past forty years, the scope of local government functions has expanded to incorporate a growing range of these community services, [23] with community services now nationally accounting for 33% of total local government expenditure by purpose, and 13% of Queensland local government expenditure. [24]

Emergent Challenges to Community Engagement

It has long been the argument of governance theorists that many of the most important challenges now facing governments (central and local) require collective consideration and action by communities. [25] Theories of participatory democracy, deliberative democracy, and social capital assert that citizen involvement has positive effects on democracy: it contributes to the inclusion of individual citizens in the policy process, it encourages civic skills and civic virtues, it leads to rational decisions based on public reasoning, and it increases the legitimacy of both the process and the outcome. [26] To enhance decision-making, best practice community engagement deploys a variety of methods to engage stakeholders to enhance the greatest possible rate of participation and democratic representation. [27] Increasingly, creative approaches to engaging multiple publics, through multiple methods, are part of the current landscape of engagement practice. [28]

Thus, community engagement has the capacity to be transformative. Its commitment to long-term relationships, emphasis on diverse and existing knowledge and community assets, co-creation, collaboration, trust, and reciprocity, we argue, are complementary and provide an operating framework from within which the notion of polylogues may be more acutely enacted. In this way, community engagement is a mechanism for local governments, to not only facilitate the transitional epoch of its communities, but to reimagine its role in providing transformative leadership through the complexity and chaos of postnormal times.

Yet the primary assumption of community engagement, particularly from the perspective of local governments, is that the people that community engagement mechanisms function to engage are the residents from the geographical area

governed by the council or city authority. This premise is grounded in the assumption that those who live in the local government area (or who pay rates or taxes in the geographical boundaries of the city authority) have the right to be engaged in decision-making pertinent to that community.

There remains a significant challenge to this, however: in a world where reality is so heavily mediated through the digital realm, the traditional unitary notion of the humanist subject – the community resident – is destabilised. This raises questions: ‘who are the residents that the community’s local governments govern?’; ‘In what spaces do these residents live, work, and play?’; and, most importantly, ‘How do these residents construct themselves?’.

Subjectivity in Flux

Sweeney highlighted how our ‘infectious connectivity’ has impacted our way of being in the world. He argued that it is the radiant screen of our digital devices that affects us most, now meaning ‘humanity is itself an open interface’. [29] American theorist and artists, Rosanne Stone noted that this ‘prosthetic sociality’ implies new definitions of space, volume, surface, and distance. The medium of connection, she argued, ‘defines the meaning of community’. [30] Philosopher and feminist, Rosi Braidotti argued that the relationship between the human and the technological other has changed radically with the contemporary technologies of advanced capitalism; technological construct now mingles with the flesh with unprecedented degrees of intrusiveness, whilst the human-technological interaction increasingly blurs boundaries of modernist constructs of subjectivity. [31] This is at odds with normative notions of subjectivity traditionally perpetuated by government and regulatory structures. We now have a disembodied subjectivity that muddles with *whereness* because in cyberspace ‘you are everywhere and somewhere and nowhere, but almost never here in the positivist sense’. [32] Because of this, the Australian sociologist Camilla Mozzini-Alister argued, we are confronted more and more by the ‘desire for omnipresence’, the desire for simultaneously inhabiting distinct space-times – for concurrently inhabiting the physical body and the digital realm. [33] Mayo argued that this abstraction of self across each of these spaces, itself a symptom of postnormal times, is so severe that time as an experiential part of the human condition has altered. [34] As such, postnormal times signals subjectivity in flux, an important consideration that must be addressed in any exploration into the development of polylogues.

Postnormal Indicators

Postnormal times emits four key indicators which the present research project identifies and is working with. First, an acknowledgement that the current epoch is transitional; characterised by significant change. This change cannot be controlled or mitigated, simply navigated. Second, that in the face of significant change, our cultural conditioning seeks to down-play change and reaffirm long-held notions of control and certainty. This conditioning aggravates the effects of the transitional

and further exacerbates a collective sense of uncertainty. Third, in navigating this change, polylogues provide spaces and opportunities for the diversity of agendas to come together to negotiate outcomes toward shared futures. One of the most powerful mechanisms to navigate uncertainty and facilitate polylogues, is community engagement mechanisms deployed by local governments. Finally, these collectively have implications for the manner with which subjectivity is constructed and dealt with by local governments. How subjectivity is changing and how community engagement methodologies, in turn, need to evolve to capture emergent forms of subjectivity, is also being explored through the research.

Engaging Communities through Uncertainty

Reflecting on the literature review, the project team developed the following shared statement to outline how both partner institutions define community engagement, and each understand their commitment to it as a regional anchor institution:

Engagement is how we actively connect and collaborate with the diverse voices and knowledge in the community. Through engagement, our actions are transformed by the values, creativity, and aspirations of communities, as we respond together to shared challenges and opportunities. By driving innovation and co-creation in our community engagement approach, greater trust, reciprocity, and social capital are fostered. This supports community leadership, decision-making and sustainable partnerships that deliver stronger and more connected communities.

The present research investigates and expands on the notion of postnormal polylogues. Following the development of a regional partnership agreement between SCC and USC, an arrangement exists for further exploration into how place-based community engagements may be utilised by anchor institutions, as leaders in their communities, to elicit polylogues in uncertain times. The partnership aims to leverage the collective service roles of USC and SCC to provide activities and resources that: grow community capacity through wider community involvement with education, research, and activities; grow joint collaborative initiatives to strengthen local capital through economic, social, and cultural impacts; and encourage participation in mutual and inspiring projects that address issues of local importance and policy challenges.

Within this, a project team consisting of staff from SCC and USC will oversee the delivery of place-based community engagements targeting four desired outcomes: the growth of social capital within the Sunshine Coast region, the expansion of jointly sponsored public forums and activities, an increase in the local capacity to address complex world challenges, and the investigation of models for community engagement that incorporate futures approaches. Each of these outcomes will be facilitated through a multitude of engagement methods (to name a few: World

Cafe, The Art of Hosting, Un-conferencing) as a means to measure and assess the outcomes from each method.

Problem and Objectives

scc and usc are both principal stakeholders in the ongoing quality of community engagement across the Sunshine Coast region. This means understanding the context in which engagement occurs and the drivers and opportunities present in the engagement process. The research partnership will provide insights into governance issues, contextualised by postnormal times, with a focus on developing community engagement methods that include the diversity and plurality of voices, in an authentic and perpetual manner, as conceptualised by the notion of postnormal polylogues. In addition, the research seeks to add knowledge to the field of futures studies and strategic foresight, by utilising the conceptual framework of postnormal times to explore and understand the experiences of individuals and communities on the Sunshine Coast. To date, no substantive empirical research into postnormal times has been identified. As an emerging conceptual framework in the futurist toolkit, it is clear that postnormal times requires acute academic interrogation. This will not only validate its rigor and locate it as part of broader scholarship but provide insight and practical tools to be added to the gamut of futures methods. Reflecting on our four key postnormal indicators, the research problem is framed as presented in Table 1.

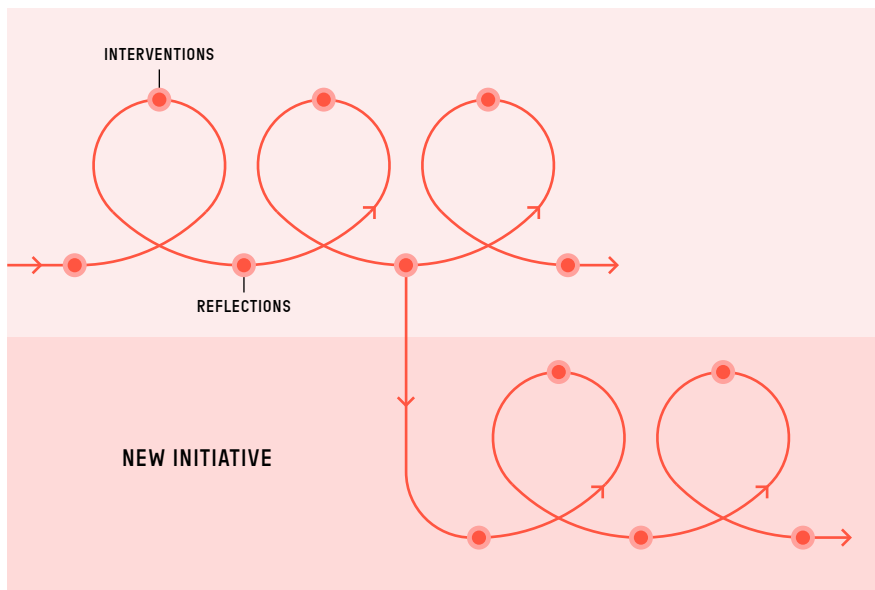
Table 1. Framing the research problem using postnormal indicators.

Postnormal indicators	Research objectives
A transitional period characterised by significant change that cannot be controlled only navigated	Contextualising and making sense of change in the present to lay the foundations for navigation
The desire to down-play change in the face of change leads to a collective sense of uncertainty	An exploration into how local governments may provide certainty to their communities through periods of uncertainty.
In navigating this change polylogues provide conceptual spaces and opportunities for the diversity of agendas to come together to negotiate outcomes toward desired futures	Community engagement, as a mechanism of local government, is an opportunity to test the notion of postnormal polylogues.
In postnormal times subjectivity is in flux	An investigation into emergent manifestations of subjectivity in postnormal times

Method

The research project is couched in an anticipatory action learning framework, an epistemologically participatory process that seeks to generate practical knowledge through a reflective practice. [35] Here, all those involved in a research project are the participants, who identify the problem, propose interventions, assess the outcome, and reflect in on the research problem and process iteratively through the course of the research. [36] New and different initiatives or solutions are invited and introduced into the project, tested, and reviewed, in an iterative and consultative manner. Sometimes, initiatives that show merit take a life of their own and become new initiatives adjacent to the core research project. The framework for this model is presented in Figure 1.

Figure 1. The anticipatory action learning process.



Desired Outcomes

Our research goal is to elicit institutional change, both across SCC and USC, specifically in the manner with which community engagement is approached. The research team are seeking to permeate out, across both institutions, a culture of imagination that stimulates creativity. In this way, the project team are actively seeking opportunities for interventions that may be nested within operational activities. By doing so, they facilitate and provide resourcing, and support operational activities, that articulate how community engagement approaches, when contextualised by postnormal indicators, may grow social capital through encouraging community collaboration and in initiatives that address issues of local importance.

Impacts of Covid-19 – Pivoting

In response to the impacts of the Covid-19 pandemic, and ensuing community lockdowns, SCC developed the #CovidKindness campaign, an online social media campaign that aimed to connect communities and foster social cohesion through periods of social isolation and uncertainty. The campaign commenced on 20 March 2020 and ran for six weeks. Each week a different theme was promoted with accompanying resources and tools for the public to engage with. The six themes were ‘stay connected’, ‘stay informed’, ‘stay healthy’, ‘stay playful’, ‘stay creative’, and ‘stay neighbourly’.

The #CovidKindness initiative was an entirely online engagement program, conducive to the ‘stay home’ directive in place during the pandemic and provided an opportunity to identify learnings and recommendations for the future. As an online engagement program, the #CovidKindness initiative primarily used online communication methods. The predominant platforms used were social media (specifically Facebook) and the SCC website. Other platforms included direct email communication to existing contacts and traditional media outlets. After the initial launch of the campaign on Facebook, Twitter, and Instagram on 20 March, the primary social media platform used was SCC’s Facebook page.

Preliminary Results

Overall, the #CovidKindness campaign had a surprising reach (over 28,000 hashtag mentions and potential impressions of over 201 million, globally, in the first three weeks). Table 2 highlights the total reach figures from the different platforms employed through #CovidKindness.

Table 2. The total reach figures from the different platforms employed through #CovidKindness. Across all platforms March 20–May 10, 2020.

Timeframe	Facebook	Media	SSCC webpage
March 20–May 10, 2020	219,055	359,221	9,332

Evidence of tangible, grass roots, neighbourly engagement was provided through a #CovidKindness stories competition via the SCC webpage and community engagement portal. In total, thirty stories were submitted highlighting people’s creative efforts to care for and connect with each other during the societal lockdown period.

Within the anticipatory action learning process, deliberate reflection was undertaken to consider new possibilities that emerged as a result of the #CovidKindness campaign and Neighbourly Stories competition. This led to an adjustment and further exploration of using online methods to support community capacity and connections. The result was the Building Better Communities (BBC)

online learning opportunity. BBC was a free, six-week opportunity to learn the fundamentals of community building, open to all Sunshine Coast residents and facilitated by Community Praxis Co-op, a local co-operative that works within communities to build capacity pertaining to community development practices. This course is normally presented in face-to-face sessions and the participant number is limited to twelve people. It was agreed to pilot the course online utilising Zoom and scc's 'Have Your Say' online engagement portal, as a private members' forum and document library. This increased participation potential from twelve to eighty. In total thirty people registered for the course. Through further conversation with course participants, it was agreed upon completion of the online learning that it would be advantageous for participants to meet in person once lockdown restrictions were eased. This was to solidify connections and continue to foster what had begun online into potential physical, collaborative community actions.

The reach numbers of the #CovidKindness campaign, the creativity of the neighbourly stories and the effective agility of the digital BBC course highlight the accessibility of online engagement processes, the potential to reach larger numbers of local residents and the ability to use online platforms to facilitate positive social impact. They also offer glimpses into how agile online engagement can lead to meaningful in-person connection and collaboration.

**CLEARLY DIGITAL ENGAGEMENTS ARE AN EFFECTIVE FIRST RESPONDER
TO A CRISIS OF A LARGE SCALE; A RAPID AND EFFICIENT TOOL TO
COMMUNICATE TO A WIDESPREAD AND DIVERSE COMMUNITY.**

Digital engagements, often mediated through social media platforms, also offer space for the facilitation of discourse, a back and forth between the local government and their community. This has potentiality to open space to ignite agency during periods where people may feel overwhelmed by postnormal paralysis, and as such, requires further investigation. The seeming swift and widespread success of the #CovidKindness campaign, accompanied with the ongoing uncertainty of the Covid-19 pandemic, instigated a pivot in the research project, with a view to better understanding how online engagement mechanisms may be used in place of traditional forms of engagement.

A Short Literature Review of Digital Engagement

A literature review presented a summary of five core themes. The first is that digital engagement has not replaced traditional methods of community engagement. In fact, the opposite is true. Online and physical engagement practices complement and strengthen each other, allowing for greater reach and feedback. [36] The emphasis is that multi-modal engagement practices lead to better outcomes. [37] While digital methods can be effective in gaining broad feedback, it can lack the

ability to understand specific nuance or to investigate sentiment more deeply. [38] Furthermore, digital engagement, disconnected from traditional engagement methods and considered strategic plans, can actually create unhelpful platforms for dominant voices to drive decision-making in a particular direction. [39] Therefore, online and traditional engagement methodologies must be considered equally.

The second core theme is that digital engagement can enhance local government's capacity to engage broadly across their region. The online realm can open access for the public to offer comment, feedback, or ideas efficiently and effectively. [40] From this point of view, it is a cost-effective way to increase public participation. [41] Equally, the literature highlights concern that engaging purely in online settings risks alienating and excluding hard-to-reach groups, such as First Nations communities, culturally and linguistically diverse groups, and other vulnerable people. [42]

THE DIGITAL DIVIDE CAN ALSO BE EXACERBATED BY GEOGRAPHY AND INFRASTRUCTURE LIMITATIONS. THESE CONCERNS CAN, IN PART, BE MITIGATED THROUGH ENSURING A PERSON-CENTRED DESIGN FOCUS AND CONTINUING TO BUILD STRONG RELATIONSHIPS AND NETWORKS WITH THE COMMUNITIES. [43]

Thirdly, one time or short-term engagement supported by long-term integrated plans will be far more effective than one-time engagements responding to squeaky wheel issues. [44] Digital methods provide incredible responsiveness and flexibility, but when utilised, disconnected from broader plans and relational networks, will not readily lead to long term effective engagement outcomes. [45] Therefore, considered corporate plans and person-centred engagement design leads to enhanced online participation outcomes.

Fourth, the literature suggested that an internal barrier to online engagement was an unsupportive organisational culture. [46] However, this barrier could be overcome through a commitment to capacity building of staff (including effective resourcing), a consistent approach and commitment to community engagement across the organisation, and legitimate executive understanding of and "buy-in" to, online engagement practice. [47] These actions will lead to improved engagement practice, but also to a more involved citizenry and stronger community perceptions toward council. [48]

And finally, a growing interest and investment in Smart Cities infrastructure is enhancing digital engagement opportunities. The Smart Cities concept, however, is more than infrastructure. It includes smart technologies, smart people, and smart governance. [49] The challenge and opportunity from the Smart Cities framework

for online engagement is that it improves accessibility to various platforms and information, which can lead to more direct interaction with elected representatives and more focused or challenging feedback. [50] Therefore, effective online engagement will necessarily sit within considered participatory and deliberative governance structures and intentions that provide a genuine opportunity for citizen participation, in respect to influencing important decisions.

Online Community Engagement Survey Results

With this foundation, the research team undertook an online community survey to ascertain: 1) how they could best reach the community digitally; 2) whether digital communities were as important as physical communities; and 3) the reasons why people use digital media. During May and June 2020, Sunshine Coast Council invited community feedback on their digital engagement preferences via an online survey. In total, 704 survey responses were received.

Findings of most note include;

- Social media platforms are significantly engaged with: 96.73% used Facebook and 66.34% used Instagram to engage.
- 77.84% of respondents considered online communities as important as the physical communities they live in. Respondents view online communities as an important complement to the physical communities they live in, particularly concerning the way digital methods have helped people stay connected.
- The top 5 preferences for online engagement were: social media platforms (73.7%), surveys (66.6%), polls (48.9%), online forums (35.7%) and blog and article discussions (35.7%).
- People appreciate online forms of engagement, particularly when they are easy to use and access, are not limited to certain times of the day, and allow the participant to control what information they engage with.
- 77.7% of respondents said they feel they can trust online content, but people do take steps to verify the information.
- The scc website rated highly as a source for information about the community but needs to be up to date to remain trusted by users.
- scc was considered by 82.39% of respondents as a trustworthy source of information.
- Respondents suggested they were generally comfortable sharing their opinions online depending on the topic, the safety of the platform for the user and the ease of providing feedback.

Participation in the survey and the subsequent findings highlight a strong appetite and interest in online community engagement. Coupled with encouraging overlaps between the survey findings and literature review, it inspired further reflection to consider a balanced strategic way forward for the Regional Partnership Agreement between scc and usc and their future engagement practice. Lessons

from this survey and the #CovidKindness campaign indicate that through periods of postnormal change, people actively embrace forms of communication and community that were taken for granted in less disruptive contexts.

Reflections

Reflecting upon SCC's Covid-19 inspired pivot, a number of questions arise that might assist in forwarding SCC's online community engagement agenda:

1. What level of investment is the organisation willing to consider in ensuring the most effective and balanced mix of online and offline community engagement?
2. What organisational, structural, operational, and strategic planning adjustments are necessary to ensure the organisation is well positioned to elicit the most beneficial outcomes from online community engagement?
3. In what ways could the organisation strengthen its capacity in online engagement that ensures improved accessibility, participation, collaboration, and representation?

Indeed, these may inform the manner in which local governments (globally) may seek to form their online engagement agenda. The literature and survey results confirm that online engagement should be complemented by other engagement methods. Multi-modal engagement continues to be widely recognised as best practice, and facilitates broader, more inclusive reach that is more likely to connect with those who are not as well accustomed to the online environment. Diverse methodologies will also lead to more and improved feedback, which in turn can strengthen the outcomes of the engagement. Supporting the implementation of diverse methodologies, the existing partnership between SCC and USC will help to strengthen practice, reputation and credibility in community engagement, by assisting in critically investigating innovative engagement methods, frameworks and evaluation. SCC is well placed to lead the facilitation of such partnerships by leveraging council's expansive community engagement opportunities.

Further Research

However, our initial findings following the Covid-19 research pivot alludes to a more significant change occurring at the human level. While the rupture that is our postnormal times may be attributable to how digital culture disrupts traditional forms of knowledge creation and dissemination, the ontological impacts are as equally profound. [51] Braidotti argued these new forms of subjectivity are a complex assemblage of the human and non-human, planetary and cosmic, given and manufactured, which require major re-adjustments in our ways of thinking. [52] The human subject, both porous and supple, with the ability to expand and contract rapidly across a multiplicity of time scales and spaces, has concurrently gone beyond Foucault's biopolitics, the intersection between the biological and political; [53] through Haraway's cyborg, the intersection between the biological

and technical; [54] and into Braidotti's posthumanism, the displacement of the traditional humanistic unity of the subject. [55]

Emergent forms of subjectivity have ontological implications as well: as the boundaries between the subject and object blur, the very notion of *being* is problematised. This new materialist turn enriches, rather than hinders the discussion of the subject and their relationship to community, government, and the world. [56] By way of example, as we investigate notions of subjectivity, should we not too investigate the conceptions of community, for the community is all at once the subject and the collective; the voice of one and the voice of many; unified and diverse; subject and object.

Any further research that seeks to understand how governments engage citizens must first address the postnormality of subjectivity. As subjectivity is expanded, along with notions of self, the manner with which governments regulate, engage, and understand their communities is mutating. How these new notions of the relationship between subject and object are understood and in turn engaged with, remains embryonic. Philosopher Timothy Morton argued that art and nature are the new secular churches in which subject and object can be remarried. [57] Polylogues have the same potentiality.

Conclusion

There is little doubt that humanity is now experiencing a period of increased and accelerating change. Global trends indicate that rapid growth and the effects this has on urbanisation means that cities will become the nucleus of this change and, as such, increasingly important in leading the way communities respond to and adapt to the change before them. Yet the manner with which local governments engage their communities through this change remains in flux. Covid-19, exemplary of postnormal times, has illustrated how the manner with which communities are engaged needs to be re-examined. SCC and USC have partnered to more deeply explore methodologies for effective engagements: through the conceptual lens of polylogues – through periods of uncertainty. It has articulated how, through the Covid-19 pandemic, the research has sought to pivot to respond to the needs of the community. In pivoting in this manner, the researchers have opened new space for enquiry that seeks to interrogate the very nature of subjectivity in flux. This subjectivity in flux, as we have discovered, has deeper implications toward Being in the world.

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FOUR SCENARIOS FOR THE THIRD ROCK FROM THE SUN

Christopher Burr Jones

For two decades, there has been growing discourse about the name of the rock strata that will be associated with *Homo sapiens* in the future geological record. The present age we live in bears witness to a great tension between humans and nature. Hidden within this conflict is the ominous contradiction between humanity's dependence on natural resources and their neglect and misuse of the Earth's goods. Even the idea of Earth being something deserving of fair treatment and respect is a hot item for debate. Going forward we are left to wonder if the lens of artificiality may provide insight to the futures of *Homo sapiens'* relationship to nature. Geologists have labelled the last approximately 11,650 years as the Holocene epoch. Following what has commonly been referred to as the last ice age, this period has been noted as a time of warmth and glacial retreat. During this period, a burgeoning proliferation of species, notably that of humans, has occurred. Rise of civilisations and technological advance have largely been at the mercy of nature's will, but more recently, a more contemporary debate has questioned how even footed was the fight between humanity and nature. Has humanity's impact on the globe changed the tide of Earth's geological progression and is this impact reaching the point of irreversibility? Will the artificial be the final straw in this struggle?

The Anthropocene neologism was popularised after the year 2000 to describe what will follow the Holocene geological era. [1] Human impact on the planet is being deposited in ocean sediments and is recorded in deep ice cores from Greenland and Antarctica. The evidence of our industry and chemistry will be there for eons of future geologists to uncover, including radioisotopes from nuclear bomb testing, trace metals from early smelting in the Bronze Age, and layers of plastic. The evidence of human use of fossil fuels will be revealed in future rocks. Nature, and her legacy of human detritus, will remain indefinitely intertwined.

The Anthropocene will likely contain a record of our increasingly artificial world, our artificial turf, satellites, breasts, hips, and now artificial intelligence. That is particularly true because even our reality is open to question. Are we living in our solipsistic dreams, in *the Matrix*, or a nightmare? In modern society we can feel the dissonance between what we think is real, and alternative, or artificial facts and truths that compete with our beliefs. We face a serious crisis when the boundaries

between the real and the artificial are deliberately confused and obfuscated. Nevertheless, that trend continues.

The Anthropocene emerged as a concept about the same time as postnormal analysis. That is no surprise given that postnormal analysis argued that the acceleration of change, the speed, scope, scale, and simultaneity of changes within technological, social, political, demographic, economic, global, and environmental systems are increasing because of our complex, technological, communications, transportation, and information systems. Not only does the speed of change tend to increase, but also its sweep and scope grow larger, scale grows to planetary and global levels, and all of these things are happening at once. These dynamics of change lead to system level changes that are characterised by greater complexity, chaos, and contradictions. These drivers and characteristics collectively describe the postnormal times in which we live.

SOCIAL AND POLITICAL SYSTEMS THAT SEEMED NORMAL OR STABLE NO LONGER BEHAVE THE WAY THEY USED TO. THE AMERICAN PRESIDENT ROUTINELY IGNORES POLITICAL NORMS, AND OTHER LEADERS AROUND THE WORLD HAVE FOLLOWED SUIT.

During the Covid-19 pandemic, transportation, supply chains, and educational systems were disrupted. Not all systems are postnormal, but increased complexity and the speed of change pose threats to system normalcy. Some systems can go almost postnormal overnight, black swan events, which were once considered to be unlikely, occur. The economic consequences of Covid-19 are a case in point. Postnormal analysis argues for types of postnormal behaviour, such as this Covid-19 postnormal *burst*. [2] Resistance to postnormal drivers creates *lag*, and concomitant pressure and influence from other systems creates postnormal *creep*. [3]

Central to postnormal analysis is the idea that there are deep structures that try to convince us that homeostasis is normal. The built environment, for example, conforms to nature. Cities grow up around harbours and the confluence of rivers, but give lie to the wildness of nature. Interstate highways cross over fault lines, but when they collapse, for example the Loma Prieta earthquake that caused the collapse of the San Francisco Oakland Bay Bridge, the normalcy field also collapses. These deep structures are called the Manufactured Normalcy Field (MNF) and there is debate about whether these fields are physical, psychological, or even metaphysical. [4] Nevertheless, the postnormal disruption is occurring within the MNF and the drivers and characteristics alter or disrupt the normalcy we believe we experience. For example, a MNF is created by a relatively small, aerodynamic aluminium tube, or commercial airliner, that travels in the stratosphere at 600 miles an hour, at 35,000 feet above the planet surface. That is not *normal*, but our culture, our travel patterns and behaviour, our short but rapid evolution as a

species now considers that unremarkable. In postnormal times, it is not simply that what was normal is changing, but the very nature of change itself is changing. The phenomenon of postnormal times is not something that has occurred in a vacuum, but indeed is the continuation of a historical circumstance that has been creeping about for some time now.

The scope and speed of change have been the focus of futurist thought for half a century, or more, particularly within the realm of our technological prowess. Futurist Walter Truett Anderson argued that because our species has now learned to control evolution, it has become our ethical and moral responsibility to take firm, but reluctant control over the *progress* of the biosphere: it is now our job *To Govern Evolution*. [5] He forecast the emergence of a biopolitics that recognises our responsibility, having gained such power over genetic and species evolution. He acknowledged the growing discourse on the rights of living things. His work follows the argument of the late John Platt, physicist and futurist, who posited that we face an *acceleration of evolution*. [6] He showed that across a range of aspects of evolution – encapsulation, energy use, defence, communication, and other dynamics – how our species is poised for one of the greatest transformations in four billion years of planetary evolution.

In the subsequent three decades, the acceleration of the change drivers of evolution have increased in speed, scope, scale, and simultaneity. Moreover, our technological sophistication and development of space technologies has expanded the scope and sphere of human reach. There has been continuous human habitation on orbit above Earth for almost two decades, and within a few more decades, humans are likely to begin inhabiting the planet Mars. We are a migratory species, and as anthropologist Ben Finney and others have argued, our diaspora into the solar system and beyond is likely part of our story as a species. [7]

What does this bode for the Earth, a living organism, a cybernetic, self-regulating system? To what degree does a system need to be artificial, mediated by homo sapiens in order to survive over the very long-term future? To begin with, how did we get to see the earth as artificial?

It is no coincidence that the transformation of mother Earth into machine coincides with the Renaissance and industrial revolution. Early cities developed by filling in swamps and channelling rivers and streams, and creating harbours and dams. We began the transformation of Earth to machine by building canals to improve the efficiency of human transportation of goods. This metaphor for human transformation was likely behind the interpretations of nineteenth century astronomer Schaparelli's Martian canals and likely reason for the eager acceptance of such a possibility. [8] The early industrial phase of human development is very evident in the place where I live, near the Erie Canal in Western New York. The development of the steam engine and railroads further transformed the planet to the extent that it is now crisscrossed with steel rails, and now asphalt and macadam roads. Elon Musk would like to build transcontinental tunnels if we will let him.

The innovation and development of transportation technologies are a good case in point of the growing speed, scale, and scope of change. We have gone from foot travel to the use of the wheel and draft animals, to railroads and steamships, airplanes, supersonic jets, rockets, rail guns, and have launched interstellar spacecraft. We have conquered the planet with the use of maps, and now with GPS and remote sensing earth satellites. The number of low Earth orbit satellites is likely to increase by one hundred orders of magnitude in the next few years thanks to the burgeoning private space launch industry.

We have become very effective at moving water around the planet, and storing it artificially. The development of the US Southwest is largely due to water diversion from the Colorado River and other sources. The California Central Valley and Yuma, Arizona have been transformed into agricultural breadbaskets thanks to large-scale diversion of water and irrigation. Other bodies such as Mono Lake and the Ural Sea have been nearly drained by human diversion of water to cities and agriculture. The relationship between human beings and the Earth has moved from something relatively mutual, akin to a mother's loving relationship to a child towards the child becoming a parasite upon the mother.

We appear to be at a civilisational turning point, where the tensions between nature and human activity are likely to have serious consequences. And yet, there are those who see technology and the artificial as simply another expression of nature.

**AS HUMANS, WE ARE PART OF NATURE, SO WHO IS TO SAY THAT
ARTIFICIAL IS BAD. BAD FOR WHOM? OUR CURRENT PARADIGM PLACES
HUMANS ON TOP, BUT WHAT IF THAT IS NOT THE FUTURE WE WILL
INHERIT?**

Complexity, chaos, and contradiction grow from the increasingly blurred distinctions and boundaries between natural and artificial, between human and machine. We may pine for simpler or more stable times, but since the beginning of modern civilisations, we have longed for the Golden Age, the paradise before modern times. We are now faced with a plethora of choices spanning the spectrum of organic/historic ways and a synthetic, cyborg future. The pathways to paradise and oblivion are not necessarily clear.

The tension between the philosophies of critical posthumanism and transhumanism is one example of the dichotomy between natural and artificial. Critical posthumanism argues for co-evolution with other species, and the planet, and machines, but not in the interests of humanity. Posthumanists such as Donna Haraway have argued for a blurring of boundaries between homo sapiens and our animal kin, as well as seeing cyborgs as an expression of the power of being the Other. [9] Transhumanists, on the other hand, see a bright future of machine and

artificial realities – an oncoming Singularity with transformational change – with the potential of longevity and immortality, uploading of one's personality and memories, and human-machine synthesis or symbiosis. [10] Kurzweil provides an insightful analysis of post- and transhumanism. [11] If either philosophy drives a paradigm shift or worldview change, the potential impacts upon other species and planetary system will be massive.

To help us better understand the impact of the artificial on humanity and Earth we should extend our lens of analysis into the future (say 2200 AD) and explore the potential realities before us. The four alternative futures presented here attempt to capture the spectrum of possible artificial Earths, that is, planetary futures that include some form of homo sapiens. They are presented in order of least artificial to one of the most artificial futures of Earth imaginable. Following each scenario is a brief analysis of the trends and events we are witnessing today that will set us on a trajectory towards something resembling one of these potential Earths.

Scenario 1: Dark Mountain (Earth: 1% artificial)

Dark Mountain imagines a reduction of human population to three million people, the estimated number of humans on the planet before the rise of permanent settlements and regional civilisations. Humans returned to a Palaeolithic lifestyle. Settlements are temporary and move often, agriculture is limited to horticulture and gathering. Cultural norms restrict and suppress innovation, creativity, and development of technology, particularly metallurgy and energy use. Dark Mountain societies are subsistence economies, largely organised similarly to primitive communism, with limited personal ownership of material goods. The values of the society are largely organised around collective myths that celebrate the animal, ecological, and human co-evolution and interdependence.

This scenario in mind, we must ask, what trends are leading us towards this nomadic future society?

The overall trajectory of progress and machines is increasingly uncertain and hardly universally accepted. Since the early Industrial Revolution, workers have thrown tools and clogs in the cogs of industry and the word *sabotage* has roots in rage against the machine. An ongoing back-to-nature movement persists. The green meme has had various manifestations as futures scenarios or images over time. The concept of Earth as a living system, for example, has been around for centuries, in modern history, the environmental movement has ranged from the early conservation movement, public interest conservation advocacy, Greenpeace, Earth First!, to eco-radicals, and now anti-globalists and *degrowth* activists. Mainstream and conservation environmentalism may have been more accommodating of the machine. That might be illustrated today by the “mixed-use” of national forests and US Bureau of Land Management lands with dirt bikers, hikers, snowmobilers, and skiers mixing in the backcountry.

Dark Mountain takes green values to an extreme and is likely to be unfamiliar territory – a hard-to-imagine place for most folks used to electricity, indoor

plumbing, and regular meals. However, it pictures a civilisation that rejects most of the assumptions of post-industrial civilisation. It is extreme, but concentrates the trends toward an authoritarian (non-innovative) society.

The roots and branches of the scenario come from a wide range of literature, scholarly writing, social movements, and social action. The mass migration of humans from rural areas and villages to cities is a continuing trend. On the other hand, it appears humans are alienated from nature and look for connections with nature, such as pet ownership, parks and green spaces, and vacations outside of the city. However, urban living affects some people adversely resulting in what has been described as *nature deficit disorder*. Doctors are ordering nature experiences as a treatment for stress and depression.

Social movements over the last half-century have also contributed to this meme, from Earth Day and the emergence of the modern environmental movement with mainstream and radical green fringes, to the emergence of Green parties in Europe, Earth warrior groups such as the Sea Shepherd Society, the Rainforest Action Network have now been joined by Greta Thunberg's Fridays for Future, the Sunrise Movement, and the Extinction Rebellion. Anti-growth and anti-progress movements also need to be taken into consideration: Occupy Wall Street and antifa (anti-fascist) activists in the US are examples of social movements dissatisfied with the Continued Growth paradigm.

Dark Mountain is a possible, if low probability alternative future. On the other hand, the social structures and organisations served the species well for 200,000 years or longer, so they cannot be ruled out. The one existing meme or theory is a reasonable candidate, the return to hunter-gather societies. While improbable, and extreme, it does align with the skills and cultures of indigenous people who are currently being overwhelmed if not exterminated. Dark Mountain is a variant of the Four Futures' Disciplined Society alternative future and is suggested by the dark ecology movement and Dark Mountain manifesto. The aim is to return to migratory hunter-gatherer societies and leave industrial society behind. It would make eco-radical groups, like Earth First!, look tame. Reducing Earth's population deliberately by three orders of magnitude is improbable, but nuclear war, genetic warfare or pandemics could lay the groundwork.

Dark Mountain pictures the success of antinatalism movements of the mid-21st century, most notably the Human Extinction movement and softer forms of birth control and population reduction. The broad social movement aligned with trends in growing numbers of human deaths over time (particularly since the beginning of the Industrial Revolution), falling fertility rates, rise in suicides and opiate addiction, and depression. What was a fringe philosophy found fertile ground in a world increasingly characterised by suffering and mental illness.

Various religious traditions note the clear connection between birth and death, suffering and life, and the bondage to the material world that imprisons our divine nature or spiritual being. Notably, Norwegian metaphysician Peter Vessel Zapffe argued that consciousness is over-evolved in our species and we are burdened by

the knowledge, unlike any other species, that we are destined to die. [12] Argentine philosopher Julio Cabrera explored the ontological challenges of birth that makes us manufactured and used, the ultimate manufactured normalcy field. [13] We begin the process of dying within seconds of being born, we are afflicted by physical pain, mental willpower or its lack, and the creation of positive values (normalcy fields) that must constantly be engaged lest we fall back into depression, according to Cabrera. [14] Other key issues, according to South African philosopher, David Benatar, is that the balance of good and bad things is tilted towards the presence of pain and suffering and our experience of it in the world. [15] The empirical evidence of death and destruction over the last thousand years is staggering.

**DEATHS OVER THE LAST MILLENNIA NUMBER IN THE BILLIONS:
NATURAL DISASTERS, STARVATION AND MALNUTRITION, PLAGUE AND
EPIDEMICS, DISEASE AND ACCIDENTS, MASS KILLINGS, POLITICAL
KILLING, GENOCIDE, GENITAL MUTILATION, AND SUICIDE. THE GROWING
COLLECTIVE AWARENESS OF THIS RESULTED IN A SERIES OF INDIVIDUAL
AND COLLECTIVE ACTIONS THAT DRAMATICALLY REDUCED HUMAN
POPULATIONS OVER JUST A FEW CENTURIES.**

From a postnormal analysis standpoint, the first alternative future is a return to the 'normal' that characterised human existence for most of the million years before the dawn of agriculture some 12,000 years ago. Dark ecology argues that it is not industrialisation that is destructive, but settled agriculture 'civilisations' that are the source of human misery. A long period of hydraulic civilisations constituted a kind of new normal until the industrial revolution. Arguably there have been punctuated periods of normalcy, but postnormal change has gone through its agricultural, medieval, industrial now high technology postnormality. Dark Mountain reduces the artificial to the impacts of human migrations, tool use, and horticulture. Fire use becomes the largest source of human alteration of the environment.

Scenario 2: Collapse (Earth: 5% artificial)

Collapse is one of the most popular images in literature and movies. Teen fiction has produced a number of dystopian and post-apocalyptic futures, such as *Hunger Games* and *Divergent*. Wikipedia lists nearly two-dozen potential existential threats to humanity and the program on existential threats addresses a wide range of cosmic, terrestrial, and anthropomorphic threats. This alternative future follows the logic of a disruption of Earth's thermodynamic equilibrium over the last million years or so. The position of Earth's continents, tectonics, and the orbital cycles identified by the

mathematician Milutin Milanković have produced recurring cycles of glaciation. If anthropomorphic changes disrupt the Milanković cycle, Earth's temperature could rise to a higher thermodynamic steady state. [16] That might look like the Carboniferous phase some 50 million years ago when Earth's average temperature was 20° higher than today. This is the runaway greenhouse scenario that is the basis for exploring the impacts of 6° C or more increase in Earth's temperature [17] and the results described in JG Ballard's *Drowned World*. [18]

This future could unfold quickly, but more likely may take centuries. As climate change journalist David Wallace-Wells argued, we are already facing cascades of catastrophe and this future in which everything that can go wrong, does go wrong, human systems unravel quickly in the face of growing natural systems failures. In this scenario, the forecasts of ocean and permafrost methane release were vastly underestimated, and glacial melting in high altitudes, Greenland, and Antarctica accelerated. [19] Coasts are flooded, there are mass migrations inland as well as across the oceans. The tropics become inhospitable to human habitation, and human populations are forced towards the poles.

There are massive failures in food production, warfare over dwindling water, migration, and failures of human bureaucratic systems. Eventually, only Antarctica is habitable, with some subterranean cities, domes in high mountain areas. At its conclusion the warming process does not totally exterminate humans, but 5% of the planet is artificial.

So, what can we see today that is setting us on a course for Collapse?

Civilisational collapse has been a recurring image of the future. Dutch futurist Frederick Polak noted the number of civilisations and societies that had negative or apocalyptic eschatology, whose images of end times were dark and violent. [20] The history of those societies suggests that those dark images are likely to have been self-fulfilling prophecies. The current convergence of six or seven cultural civilisations into a global civilisation may provide us with positive as well as apocalyptic tendencies. In any case, apocalyptic images have been a product of speculative and science fiction, fantasy, a twentieth century characterised by two world wars, genocide, and mass killing at greater scales than any time in history. The Cold War, the threat of nuclear annihilation, nuclear weapon strategist and futurist Herman Kahn 'thinking the unthinkable', [21] and now a long list of potential existential threats face us at the beginning of the twenty-first century. [22] Khan's nuclear war scenarios were dramatic and thought-provoking, but Italian writer Roberto Vacca's concern about a coming dark age put Collapse on the futures map. He imagined modern society as so complicated (built on a 'house of cards') that gridlock one afternoon sets off a cascade of catastrophe that becomes the beginning of the end of civilisation. [23]

His speculative fiction parallels the very real research of American anthropologist Joseph Tainter who analysed the collapse of complex societies and found that a large number collapsed due to climate change or resource exhaustion, but many if not most collapsed due to complexity. [24] At some point, marginal efficiencies

used to manage growth failed to work. Growth seems to have limits. This may have implications for postnormal policy. Efficiencies in bureaucratic processes may have improved over time thanks to technological innovation, Taylorism, and process improvement, but may be near its carrying capacity. Artificial intelligence and algorithms presumably are part of the answer in the continued growth mode, but the externalities of industrial growth are now coming back to bite us.

Extinction threats and extinction studies are a growth industry. The Intergovernmental Panel on Climate Change (IPCC) and the UN raised the alarm about the need to reduce carbon emissions by 2030 to avoid catastrophe by 2050. [26] Global heating at the poles is creating further uncertainty given the impacts on Greenland and Antarctic ice sheets that are already in motion. Even if we are able to avoid a 3° C increase over the baseline in global average temperature, sea levels are likely to rise hundreds of feet in the next one hundred to two hundred years.

EXISTENTIAL THREATS ARE NOT LIMITED TO HUMAN ACTIVITY EITHER.

WE LIVE ON AN ACTIVE PLANET WITH A BIOSPHERE AND OCEANS THAT

HAVE PREVIOUSLY EXPERIENCED UP TO SEVEN MASS EXTINCTION EVENTS.

Some may be due to impacts of asteroids or comets, or more likely biological and chemical catastrophes in Earth's oceans. We still know very little about our planet's history, but would do well to consider that life is sometimes fragile and messy business.

The collapse scenario is a logical extension of Murphy's Law to the accelerating dynamics of change and system characteristics in post-normal times: everything that can go wrong, will go wrong. That was the premise of Vacca's dismal future and perhaps our luck as a species has run out. [26] Nevertheless, there will likely always still be some artificial facet of nature, as long as humans or our near relatives are still around.

Scenario 3: Hybrid Gaia (Earth: 50% artificial)

Hybrid Gaia is a highly artificial world, but driven by a totally different worldview than today. It is driven by critical posthumanism, where human-centred ethics and mythology are replaced by respect and cooperation with other species rather than dominance and exploitation. The model is a blend of Haraway's *Chthulucene* and Lovelock and Appleyard's *Novocene*, a cybernetic union of biology, machines, artificial intelligence, and creativity that remake the world, both organic and inorganic, in a dance, a symphony of co-evolution on a small planet in a violent cosmos. [27]

This scenario assumes a rebound from coastal flooding and inundation due to the melting of Greenland and Antarctic ice sheets, and a rapid shift to a green economy, beginning with initiatives launched by governments at the turn of the

millennium, but resisted well into the middle of the twenty-first century. A global consensus emerged principally around universal healthcare and disease prevention in the wake of pandemics and environmental refugee migrations into the twenty-second century. Artificial intelligence, automation, and the transition away from global to regional supply chains and circular economy enabled the radical shift in the political economy to an abundance economy and wealth levelling strategies. Incomes over one million dollars were taxed at 100% globally by 2150.

Cities are either greened up with vertical farming or built from scratch as energy-efficient arcologies. The idea began by Italian architect Roberto Soleri was to create dense structures at human scales to minimise the distance travelled between work, home, and entertainment and services, to sequester industrial activities belowground, and reclaim space given to automobiles. [28]

The worst of climate catastrophes have been surmounted and mitigated, and despite the deaths of hundreds of millions from warfare and climate related starvation, the global population stabilises around 8 billion. The principles of Gaia 2.0 are internalised in governance, consumption, and economics, with vast reduction in the use of fossil fuel – based pesticides and fertilisers. Drones are used to more efficiently pollinate, and apply fertilisers and nutrients to individual plants. Industrial agriculture is replaced by cooperatives and most people are involved in some level of community gardening and food preparation.

Space exploration is replaced by Earth and Ocean exploration, by spiritual and self-actualisation pursuits. Space development is limited to near Earth orbit remote-sensing and telecommunications, but culture has begun to focus inward rather than outward. The economics of scarcity inherent in capitalism is replaced by abundance economics supported by robotics, automation, and a leisure society that enables people to engage in community development, gardening, arts and crafts, and democratic participation in decision-making and governance. One model is the planetary society featured in the James Hogan's novel *Voyage from Yesteryear* where the colony planet economy is based on individual competence and service rather than growth and industry. [29]

THE WORLDVIEW HAS SHIFTED FROM ACQUISITION, CONSUMPTION, AND MATERIALISM TO COEXISTENCE WITH NATURE. MOREOVER, IT EMBRACES THE REALITY OF HUMAN DESTRUCTION AND DOMINATION OF OTHER SPECIES, AND ATTEMPTS TO BOTH ATONEMENT FOR AND CELEBRATION OF SPECIES AND ECOSYSTEMS LOST TO HUMAN DEVELOPMENT.

At the same time it allows for the exploration of genetic futures in seeing human exploration of genetic possibility, but informed by other moral values. Freeman Dyson famously argued that we should embrace genetic play the same way we

developed computers by playing with the technologies as well as the games on them. [30] This is like Haraway's five generations of clones with butterfly genes whose life mandate is to stand with and help sustain the monarch butterfly. [31] Genetic play and manipulation are seen as ways to become liberated of anachronistic mental models about what it means to be human. Efforts are effective in re-establishing extinct species, particularly the megafauna (mastodons, sabre toothed tigers) that existed during early human existence, and entire communities of Neanderthal and Denisovan and other archaic human species, as well as hybrids. Education and child-rearing radically altered. Children raised in cohort groups with multiple, non-biological parents.

What is happening today to revive Gaia theory and deliver us to the Hybrid Gaia Earth?

Framing useful scenarios depends on a number of factors, including plausibility, coherence, and comparable elements across alternative future scenarios. Alternative futures are arguably most helpful when they collapse contradictory or conflicting driving forces, because they clarify some of the reinforcing characteristics of drivers. Of course, the future is not likely to eliminate contradictions – one of the lessons of postnormal policy – but it is sometimes valuable to take things to their extreme conclusions. That is clearly the case with the scenarios presented in this analysis.

Looking for the driving forces, emerging issues, and trends leading to a post-human paradigm and civilisation one microcosm of that future may be the annual Burning Man Festival, now in its thirty-sixth year, held in a desert playa in the northern Nevada wilderness. The festival is named after the iconic wooden structure sacrificed to flames every year. As many as 70,000 people now attend, and Black Rock City is built each year from scratch and then removed from the desert, leaving 'no trace'.

There is an emergent culture and value system in the Burning Man phenomenon, some visible, explicit, and other aspects hidden or more deeply embedded. The stated rules from the official website are:

- radical inclusion
- gifting
- de-commodification
- radical self-reliance
- radical self-expression
- communal effort
- civic responsibility
- leaving no trace
- participation
- immediacy

Beyond the rules, there are other obvious and not so obvious assumptions about the temporary, mobile pop-up culture that characterises the built environment of

Black Rock City. There are some clear contradictions between the libertarian and communitarian tenancies of participant organisations and individuals. My sense is that these rules represent two divergent aspects of posthumanism, what Nayar has described as critical post-humanism, on one hand, and transhumanism on the other. [32] These rules, however, may to some degree inform both evolving alternative futures represented in this paper. Burning Man rules represent post-normal values in contrast to liberal industrial capitalism, in spite of the fact that increasingly Silicon Valley and Hollywood elites are becoming entangled in the phenomenon.

It does seem that the values embedded in the Burning Man rules are representative of a shift in worldview that could be manifested in political redesign away from neoliberal representative democracy. Burning Man and other intentional communities are trying to create the space to innovate, and certainly colonies on Mars and space settlements will have enough distance from current cultural structures to experiment and innovate in political design and social structures.

There appear to me to be at least two major streams in the broad green movement, a moderate organic green movement closer to the mainstream, and a radical natural green movement. The former envisions a blend of modern technology and particularly renewable energy and abandonment of fossil fuel use. The latter holds that the problems of modern society began during settled agriculture, and advocates for a vastly smaller human population that would adopt hunter-gatherer practices more consistent with society before settled civilisation.

While transformational, the Hybrid Gaia alternative future is perhaps one of the more likely futures, either due to the threat of Collapse or as a result of cascading climate catastrophes over the coming century or two. Unlike the conservation movement and much of the liberal environmental movement today, deep ecology would be a driving force in the philosophy and worldview – the idea that all parts of nature have intrinsic value, even rocks, and that humans are not special or any more valuable than other aspects of nature. This philosophy has clearly influenced or has been adopted by radical feminism and other parts of progressive social movements. This future also has roots in the Gaia theory that the earth is a living organism, a complex, cybernetic system that has regulated the atmospheric composition, temperature, and habitability for life on the planet.

Gaia is relevant to the discourse on the tension between natural and artificial, because human generated by-products and activities are beginning to have a significant impact on the landscape, on the oceans, and atmosphere. Humans cannot deviate very far from large-scale geomorphic processes, or we will threaten the regulatory structures that maintain conditions for life on the planet. Therefore, our introduction of greenhouse gases into the atmosphere, species extinction, and altering of ocean chemistry are transforming the planet in unexpected ways. The evidence suggests that our interference with feedback processes may potentially raise average global temperatures far in excess of nominal forecasts by the IPCC, academies of science, and climate agencies across the planet.

Scenario 4: Dyson's Children (Earth: 99% artificial)

The late physicist Freeman Dyson, for a thought experiment, imagined a technological civilisation advanced sufficiently to capture all of the energy produced by its sun. Physical structures that approach this ideal have been described in science fiction as Dyson spheres. [33] Dyson's structure was first described in Olaf Stapleton *Star Maker* and has become a popular concept in science fiction. [34] More recently, astrophysicists have begun planning space telescope observations for extrasolar civilisation Dyson spheres. [35]

DYSON'S CHILDREN IS THE ALTERNATIVE FUTURE WHERE ALL THE DREAMS OF TECHNO-OPTIMISTS AND POST HUMANISTS COME TRUE. IF THE PREVIOUS SCENARIO WAS INWARD LOOKING, THE PRO-ARTIFICIAL VISION IS OUTWARD LOOKING AND TRANSFORMATIONAL WITH RESPECT TO TECHNOLOGY.

It is the product of not one, but many Singularities, from advances in machine – mind interfaces, genetics, artificial intelligence, space development, and many other technological dimensions see quantum leaps in control over nature. Human science achieves godlike control over medicine through molecular and nanite robot prevention, repair, and disease defence. Cancer is effectively cured, and longevity increases dramatically, with the likelihood that genetic flushing technology can extend lifespan.

Low Earth Orbit habitations, a growing lunar settlement, and asteroid mining barely dented the growing population pressures and horrors of sea level rise, but the mass movement to Mars (remember the old saw 'Mars or Musk!') and then Venus by 2200 was still not enough to reduce social blowback. One current scheme is to download one billion minds onto quantum computers to send them on colony ships to be decanted into cloned bodies on the nearest earth-like planets in 100 solar systems.

The surface of the earth is effectively artificial, with geoengineering projects that regulate the Earth's temperature (space reflectors, deep ocean circulation pumps). Much of the Earth's surface is effectively managed by 2200.

Extreme climate change and species destruction required of her more human intervention to avoid total environmental disaster. Remaining wilderness areas are more like large parks and zoos. Nearly all arable land is devoted to post-industrial agriculture or megacities, Earth's population is twenty-five billion with one billion on Mars and space settlements. Forests are planted, maintained, and harvested by drones. Most sources of human protein are now produced in factories, grown from cultures, and are indistinguishable from the fish, poultry, or beef produced two centuries earlier. Almost all food is genetically modified in some way (GMOs are OK!)

Tesla-GE by mid-twenty-first century dominated the space and automobile sectors and established the first solar power satellites in Earth orbit that began producing energy, particularly for the developing world. That marked the beginning of the end for fossil fuels as an energy source, and the perfection of fusion and a Singularity in the manipulation of magnetic fields had almost immediate impacts on transportation and energy transmission. Coupled with those advances and quantum computing, general artificial intelligence became increasingly important in managing the complex and sometimes contradictory systems supporting human life on the planet. Fortunately, there was a concerted effort to limit the development of what was once called “super machine intelligence.” It was decided that sentient machines posed too great an existential threat to human consciousness.

WORK ON CONSCIOUSNESS AND HUMAN POTENTIAL WAS ALSO AN ESSENTIAL PART OF THE DEVELOPMENTS OF THE TWENTY-SECOND CENTURY, WHILE ATTEMPTS TO USE CRYONICS TO SAVE BODIES OR BRAINS FOR FUTURE REANIMATION UNIFORMLY FAILED, UPLOADING CONSCIOUSNESS, OR AT LEAST ONE’S MEMORY AND PERSONALITY HAS BECOME POSSIBLE, EVEN EASY.

Of course, the social and legal implications of having two copies of oneself have remained challenging, and especially now that cloning not only body parts but entire adult bodies are also possible.

The diaspora to outer space is accelerating, with the colonisation of Mars and Luna, with a domed settlement on Venus devoted to terraforming our sister planet. The asteroid belt and Jovian systems have growing numbers of miners and explorers. Rumours continue to circulate that alien artefacts and technology have been discovered on more than one of the larger asteroids. That coincides with a number of private ventures that have already launched or will soon send colony ships to nearby habitable earth-like planets. Some are generation ships, and others have plans for sending most of the colonists in cryo-sleep/hibernation. Humanity seems intent on taking its species to the stars. Already, genetic alteration has been occurring on Mars and Luna to better adapt humans to non-trust real gravity.

What justification do we have for the total artificialisation of the Earth and our becoming Dyson’s Children?

Transhumanism is the flavour of posthumanism that potentially evolves from or is transformed from the present Continued Growth future, with ample illustrations in Hollywood movies and corporate advertising. It sees technology as a means to improve humans, to expand our abilities, reduce our vulnerabilities, and go beyond the limitations of human minds and bodies. This image of the future is popular in mass media and particularly in Silicon Valley. Advocates for this future

are those who are extending the limits of longevity, seek to be able to use cryogenics to someday rejuvenate brains that have succumbed to injury or disease, upload human minds or personalities to computers, create artificial humans or androids, clone humans, and otherwise enhance human bodies with direct brain – computer interfaces, and augment humans with other types of technology.

These visions of alternative futures are supported by the advances in technology, particularly genetics, molecular biology, robotics and automation, computers, telecommunications, and space development. Collectively, they support arguments for a coming Singularity, a supposedly transformational scientific event or period when a quantum leap in human or scientific capabilities is reached. It might be the development of an entirely new biological species, the emergence of super intelligent machines, or some unforeseen development that will have significant implications for the continuation of homo sapiens as we are currently configured. As noted previously, these trends are consistent with the observation that evolution is accelerating (Platt 1981), and with the emergence of postnormal times [36]. Barring climate catastrophe, this leads to plausible alternative futures scenarios of a high technology transformation. The potentiality of these potential Earths and the artificial nature of civilisation is becoming less a plausibility and more a probability nearing the order of fate or destiny.

Artificial civilisations were categorised by Soviet astronomer Nikolai Kardashev who created a scale of advanced technological civilisations: [37]

- Type I civilisation, a *planetary* civilisation, that can use all the energy available on its planet.
- Type II civilisation, a *stellar* civilisation, that can use all of the energy of its sun.
- Type III civilisation, a *galactic* civilisation, that can control the energy of an entire galaxy.

The Kardashev scale has also been the subject of science fiction and astronomy, particularly the search for extraterrestrial intelligence (SETI) programs. [38] Along the same lines, astronomer Carl Sagan argued for a scale related to the information available to the civilisation, aerospace engineer Robert Zubrin argued for a scale measuring the spread of civilisation across space, rather than its control of energy, and mathematician John Barrow reversed the scale downward, basing his scale on our ability to manipulate increasingly smaller scales and dimensions. [39] The striking notion is that humans are manipulating nature at ever larger and ever smaller scales, extending the boundaries of natural and artificial reach into our reality.

The scales going in both directions are reminiscent of the Powers of Ten exercises and videos that tend to reinforce the anthropic principle, that we are ideally positioned for technological and consciousness evolution given our material and evolutionary “sweet spot.” We have been extremely successful as a species, in a relatively short time, geologically speaking. On one hand, our evolutionary biology

niche expanded thanks to our tools. More recently, according to the historian Yuval Harari, myth-making gave our species more reasons to use tools accelerating the use, sophistication, and complexity of our tools over the last dozen millennia. [40] Our technological sophistication has lagged considerably in our political, social, and economic systems. We appear to hang on to Newtonian myths and metaphors that glorify the machine. We appear not to have passed into the postindustrial worldview suggested in Alvin Toffler's *Third Wave*: we are still embedded in what he called *industreality*. Politics, particularly in the USA, is mechanical: it is still governed by checks and balances, separation of powers, and industrial mass education. Even the word "govern" is borrowed from the governor mechanism on a steam engine. [41] Our politics have not caught up with the metaphors and memes of the digital, electronic, photonic, and quantum age.

In spite of the evidence that other models of knowing and reality exist, relativity, quantum interpretations of reality, and organic biological paradigms that question the machine metaphors continue to be marginalised. However, there are emerging shifts on the periphery, for example, neural networks and quantum computing that may be points of departure from our lingering industrial and Newtonian models of reality. As it has throughout history, reality changes and the new reality that we will see in the not too distant future is becoming increasingly irreconcilable by our present models. The mechanistic and organic are not simply being superseded, but morphed into something that is equal parts hopeful as a continuation of human progress and nightmare in facing the potential end of the human race. Either way, it appears the notion of *artificial* is becoming more and more *natural* by the day.

Our planet and its surface environment are as artificial as ever. Will it always be so? The Earth is being remade, in a sense, but the jury is out on whether the creative destruction of Mother Earth will be beneficial only to humans, to most of Earth's species, or only the hardiest insects and microorganisms that will exist long after we go extinct. Will we end up closer to nature, whether we want to or not? These are among some of the great conundrums of postnormal times. Will our futures lean to a posthuman or transhuman existence? Hopefully, we will come to our collective senses and our collective wisdom to envision and actualise preferred futures, not those driven by corporate greed, ideological certainty, or worse, cultural and political whims. I want my grandchildren to inherit futures that we set in motion over the next decade or two that give them hope and opportunity to make their own decisions about the complexion of artificial and natural in their own lives. I worry that an increasingly artificial planet will leave them impoverished rather than liberated and transformed. But I hope that we will not make it too easy for the future geologists to label this epoch.

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BUILDING SCENARIOS IN POSTNORMAL TIMES

Jordi Serra del Pino

Even though postnormal times theory was conceived by futurists and meant to be used for futures studies projects, the futures community at large had little faith that it could be used to truly do futures work. Some argued that it was more about the present than the future, others that it was actually a postmodern approach under a new disguise, while a few noted that the theory did not really offer a way to engage in futures research. That seemed to change with the 2016 publication of “The Three Tomorrows of Postnormal Times” by Ziauddin Sardar and John A. Sweeney. The authors presented the *Three Tomorrows* as the first postnormal method. [1] Yet, despite their best intentions, the Three Tomorrows are not, strictly speaking, a method; and they cannot be. If we understand a method as the ordering of several techniques to achieve a particular purpose, the Three Tomorrows are not it; but they can work as an approach. In the following pages I will present a structured process to use the Three Tomorrows for building future scenarios, a three-stages process for building postnormal future scenarios using the Three Tomorrows. As an approach, the tomorrows provide guidance and insight as to which particular method can be applied to every case, or tomorrow, while keeping theoretical and methodological consistency in line with the postnormal principles. They act as an epistemological structure that offers both orientation and support regarding how to proceed and which technique to use when building scenarios within Postnormal Times Theory.

But before getting into the actual construction of the scenarios, it is necessary to understand that, in postnormal times it is not enough to improve our comprehension of reality if we are not equally and simultaneously capable of upgrading our ability to process this understanding. The executive management professional Venkatesh Rao's concept of the manufactured normalcy field (MNF) plays a key role in this process. Rao essentially postulates that our mind is continuously working to normalise any situation we find ourselves in. [2] Beyond this, the MNF has developed a set of cognitive strategies, developed by humans over many centuries, that have become problematic when we try to understand (and anticipate) change in a postnormal context. In synthesis, what happens in postnormal times is that a particular phenomenon will increase its postnormal potential by raising its complexity, its chaotic behaviour and its contradictions through a development

known as postnormal creep. Once the creep is set, there is little chance of avoiding or mitigating it and every chance of accelerating and/or aggravating it. The odds of being able to manage it properly depend on understanding the development and its effects; however, what frequently happens is that the *MNF* makes it extremely difficult to perceive the scale and implications of what is occurring. Climate change is a good example of this; just consider all the time that has been spent on trying to deny it and discredit it, pretending that what was happening was normal. Claiming that what we were experiencing fell within the bounds of normalcy became the best way to prevent more effective action sooner. Such a response is much harder to maintain when using the three tomorrows as it forces us not only to improve our capacity to perceive reality, but our capacity to process and make sense of what we perceive as well. Not only that, but such a complacent normalcy also makes us question the foundation of our conclusions.

THE THREE TOMORROWS APPROACH ALLOWS US TO EXPERIENCE AND ENGAGE WITH CHANGE AS IT TAKES PLACE. CRUCIALLY, THE TOMORROWS APPROACH GIVES US DEEPER AND MORE SOPHISTICATED SCENARIOS BECAUSE WE PROGRESS THROUGH THE CHANGE FROM ONE TOMORROW TO THE NEXT.

The First Tomorrow

Futures research resembles the various other kinds of academically rigorous investigation. First, we establish a goal: a question to be answered or a hypothesis to verify. In order to attain that objective, we start by identifying the most relevant field or fields of inquiry to the object, and then we compile information and data that are potentially pertinent or useful. At this point, we try to gather knowledge that will allow us to reach our objective. In many cases, that will entail resorting to similar cases or analogous situations that could accelerate the process. If you think about it, ultimately, the intention is to extract the necessary knowledge on the basis of experience (whether our own or someone else's). And this means that we are working on the premise that what is going to happen is similar, comparable, or equivalent to other cases that have already been experienced. In other words, the past is the source of knowledge about the future.

This has been and remains the standard and most used way in which we generate new knowledge. It is also the departing point for learning, and within postnormal times theory, it is conceptualised as *plain ignorance*. In the postnormal approach, ignorance is not solely the lack of knowledge; it is also the embodiment of our cognitive structure at any given time, including the relation between what is known and what it is not. And there can be no doubt that plain ignorance has

allowed us to come a long way. The problem lies in the way in which plain ignorance produces knowledge and the intellectual tools it uses in the process. Let us examine four of the main ones:

1. Linear thinking: linearity was born the day our ancestors discovered that certain events preceded others. In some cases, this was a valuable discovery which gave them a competitive advantage. Linear thinking led us to the development of causality, and this in turn allowed us to explain and predict. But in a context that becomes ever-more complex, linearity, finding a univariate cause and expecting it to provide us the explanatory keys we seek can be, if nothing else, risky. Additionally, this kind of approach is prone to intellectual rigidity or even arrogance, the Maltese physician Edward De Bono was one of the first ones to pinpoint it. [3] Similar conclusions have been derived in other fields: physicians James S. Hernandez and Prathibha Varkey emphasize the shortcomings of this approach in medicine, [4] while complexity and management expert Thomas G. Johns poses a similar case for management. [5]
2. Induction: the inference of a general category on the basis of a limited observation. Being able to extract a universal principle from the examination of particular cases allowed major advances in science. The problem has arisen when we lost sight of the fact that the observation that is at the root of the induction is limited and as such, open to being rendered false by another improved or more extensive observation. Hume signalled the problems of induction in his 1739 book *A Treatise of Human Nature*: 'if reason determined us, it would proceed upon that principle that instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same'. [6] He makes a more relevant case for Futures in the later 1748 work, *An Enquiry Concerning Human Understanding*: 'we have said that all arguments concerning existence are founded on the relation of cause and effect; that our knowledge of that relation is derived entirely from experience; and that all our experimental conclusions proceed upon the supposition, that the future will be conformable to the past'. [7] In other words, our knowledge derived by induction is contingent, and all the more so in a world that is evermore chaotic with seemingly insignificant changes leading to major impacts and turnarounds.
3. Dichotomous thinking: a notion based on two premises: firstly, that our object of analysis is composite of two parts that, jointly, cover all the object's possibilities and secondly, that these two parts are mutually exclusive. Thus, the implication is that when something is true or right, the opposite must be false or wrong. And just because of that, analytical effort is cut in half. Once one part is established, it follows that the other part must be the opposite. This reasoning worked quite well when our understanding of the world was simpler, Newtonian, and the cosmos worked on the basis of action and reaction. But today we live in a quantum world and things no longer are or are not, as sometimes they can also

be both or neither – even all the above simultaneously! In fact, evidence for this can be seen in the broad prevalence of contradictions nowadays.

4. Specialisation: as accumulated knowledge grew more and more, some way to order or classify knowledge became necessary. Not only that, but different kinds of people have also focused in distinctive intellectual fields and thus, be it by interest, affinity, or enforcement, most of us have traded scope for depth. The point here is that this cognitive arrangement made it easier for an analysis approach in which objects are decomposed into its constituting parts. Something that, in turn, lets us examine each of them in great detail but, very frequently, in a rather decontextualised manner. An exercise that could be akin to trying to make sense of a forest by studying each one of its trees discretely. For the nineteenth century French philosopher August Comte, specialisation was the *sine qua non* condition of progress (although it could also endanger social cohesion). German philosopher Max Horkheimer, one of the main members of the “Frankfurt School,” articulated a strong criticism to specialisation, objecting that ‘the danger of focusing on technical minutiae is that researchers become insulated from one another and lose the ability to use one another’s resources. The result is a lack of unification and overall direction’. [8] Yet, it cannot be forgotten here that specialisation works extremely well within a linear thinking perspective, and both reinforce each other making it harder to consider alternative approaches or ways of thinking.

The use of some (or all) of these pillars of plain ignorance may be problematic in a postnormal change context. And despite this, plain ignorance is still the dominant (and often the only) way of researching. But can we rely on plain ignorance in postnormal times?

This question cannot be answered with a simple yes or no. Firstly, we must examine in which situations plain ignorance might be valid. Clearly, if we are faced with a situation that is objectively similar to another that occurred in the past or somewhere else, knowledge obtained in those analogous events may be useful and valuable. In those situations where the evolution of the object under examination is incremental, it may also be useful to analyse previous change. As such, plain ignorance may be a suitable way of tackling those situations in which we know enough to predict the direction and, up to a certain point, the impact of the change we are experiencing. In postnormal times theory, this combination of comprehension and incomprehension is characterised as *surface uncertainty*. This is the kind of uncertainty that may be experienced upon the imminent launch of a new iPhone or regarding the result of the next election. There will be things we do not know, but the situation and what we know about it will allow us to establish a working hypothesis of what is likely. Under the conditions of plain ignorance we must rely, as much as possible, on empirical evidence. Thus, all estimates of future phenomena have to be based on (past and present) data and information. This, however, makes the first tomorrow prone to produce scenarios that include

a great deal of continuity with regard to the present. And this is precisely why this tomorrow has been given the name of the *extended present*.

In order to make the three tomorrows more accessible to students, I started drafting some instructions that, after extensive testing, evolved into the process that I am presenting here. The three stages are meant to help people using the tomorrow by a recurrent procedure: firstly, what are the key items we have to focus in every tomorrow; secondly, the triggering questions that will indicate how to do it and; thirdly, the scenarios' steps to actually build them. In the case of the extended present, we address the key items with the first instructions:

1. What do we *know* about current change and the present situation?
2. What do we *not know* about current change and the present situation?
3. Therefore, what do we need to *learn* about current change and the present situation?

The extended present dwells in plain ignorance; therefore, learning is the required action here. Still, it is not always easy or evident how to address these items; this is why some triggering questions, the second stage, may help us to get started for extended present:

1. Where is current change heading?
2. What is going to be the impact of this current change?
3. How big is this impact going to be?

In order to address the items and answer the questions presented, there are several methods that can be used.

**MAINTAINING THE EXTENDED PRESENT LOGIC, WE HAVE TO FOCUS ON
THOSE TECHNIQUES THAT SEEK TO GENERATE KNOWLEDGE ON THE
BASIS OF INFORMATION ABOUT THE PRESENT AND THE PAST.**

The obvious example is trend analysis. The analysis of time series can provide useful information regarding the direction and dimension of change. Despite its apparent simplicity, trend analysis remains a hugely popular method in futures analysis and beyond because of its deep-rooted compatibility with the mechanisms of MNF: it is based on a linear approach, and it is consistent with inductive (as it is rare to have access to a complete temporal series, extrapolation is often necessary), specialised, and dichotomous approaches. It is a good place to start futures research. Trend analysis has a long and wide tradition in futures, evidenced by the sheer number of authors who have included this as one of their referenced methods. To name a few: Wendell Bell, [9] Joseph F. Coates, [10] Eleonara Masini, [11] Ziauddin Sardar, [12]

Jordi Serra, [13] and Kess van der Heijden [14]. Many others have also added trends in their methods taxonomy: Peter Bishop, Andy Hines, and Terry Collins [15], Lena Borjeson, [16] and Mats Lindgren and Hans Bandhold [17]. Naturally, cases may arise for which no data is available; then, a qualitative approach will be required. But the aim will be the same: to seek and distil answers about the future based on the lessons of the past and the present. To do this, we will be able to use other methods such as surveys, in-depth interviews, focus groups, and even Delphi. Delphi also has a long and distinguished list of mentions, being another core method in futures work: Bell, [18] Coates, [19] Martha J. Garrett, [20] Masini, [21] Sardar, [22] or Serra [23]; although, the best historical view of Delphi is probably the one by Andrew Flostrand, Leyland Pitt, and Shannon Bridson. [24]

In any case, when the need arises to refine the results obtained via extrapolation (especially extrapolation of trends analysis), we might contemplate the use of another group of methods. For example, if we are able to determine, with reasonable certainty, what the two most influential trends are, with regards to the investigation at hand, then we can cross compare them using a 2×2 matrix (also named the Schwartz or the Global Business Network (GBN) approach), which will provide us with four possible outcomes (we could also cross compare the two trends which present us with the highest uncertainty, but this process will take us to the subsequent tomorrows beyond the extended present, as we shall see next). If we want to combine more variables, other methods can be included that will allow us to pass from a univariate approach to one that is multivariate such as a cross impact analysis, [25] structural analysis, [26], morphological analysis, [27] or, if we focus on the behaviour of human groups, a set of actors. [28] In all of these cases, the selection of variables is critical, and the estimation of their behaviour is even more salient.

The point is that once we have obtained the information, we can begin the actual building of the scenario. The process's last stage, scenarios steps, offers a path to build the extended present:

1. Use the trends you have identified to project change.
2. Look for the combination of trends with high-impact potential.
3. Build the future stories that lead to each scenario.

In my experience, extended present scenarios are not a real challenge for students or researchers. The first tomorrow is so connected to standard research procedures that all sorts of scholars can master it relatively quickly. It is worth noting though that the extended present is the only tomorrow that has a singular name. This is intentional to denote that these kinds of scenarios are rooted in the idea that the future is a projection of the present. But it also signals its main problem: using experienced change to anticipate future change entails assuming that the forthcoming change will maintain the direction, speed, and momentum of that preceding change. And this simply does not happen. If there is one thing we have learned in futures, it is

that the least likely future is the one in which nothing changes. Therefore, we can establish an inversely proportional relationship between continuity and probability of occurrence. But the fact is that we are also in postnormal times, and if we accept that change is accelerated, expansive, incremental, and simultaneous, expecting the future to move within the parameters of the extended present is deeply naïve, at least beyond the short term.

And this is why we must progress towards another tomorrow that is able to include a higher level of change, the *familiar futures*.

The Second Tomorrow

The main difference between the first and the second tomorrow is its willingness to explore more disruptive situations. We are no longer looking for indicators or any basis for connecting the future to the present. Now, the working assumption is that the future will (in whole or in part) be different and new. This premise will inevitably place us beyond the scope of surface uncertainty, initially at least, because we will no longer be able to determine, with any level of certainty, which direction change will take. We will know even less about what its impact might be. These parameters place us squarely within the territory of *shallow uncertainty* and require us to change how we work because plain ignorance will be of no use here.

**IF WE ACCEPT THAT WE ARE FACING SOMETHING NEW, TO WHAT EXTENT
WILL OUR PAST EXPERIENCE OF OTHER EVENTS BE ABLE TO HELP
US? AT BEST, PARTIALLY. MOST LIKELY, THERE WILL BE GREAT DOUBTS
REGARDING WHICH FIELDS OF KNOWLEDGE ARE RELEVANT OR WHAT
DATA OR INFORMATION WE SHOULD BE LOOKING FOR.**

In these cases, trying to rigidly apply a plain ignorance approach to a situation of shallow uncertainty could cause bigger problems or lead us to conclusions that are profoundly wrong, or at least problematic. Another approach is required, and that is why we must resort to *vincible ignorance*. Vincible ignorance, as opposed to plain ignorance, requires us to undergo a prior step: to become aware of our ignorance. In other words, vincible ignorance cannot be applied unless we are conscious of what we do not know. Therefore, before heading off to find references, information, or data, it is necessary to spend time considering what parts of the subject under examination we know, or are known, and what parts we do not know or are unknown. Subsequently, we will need to establish what kind of obliviousness we are dealing with. It may be that a particular behaviour is inexplicable from an economic outlook but perfectly understandable from a psychological or biological viewpoint. In this first case, our cognitive perspective will have to expand to incorporate other disciplines, theories, methods, or ideas in

order to overcome the initial ignorance. But we may also come across situations that are so recent that no perspective whatsoever can be gained in order to appreciate the full extent of the situation. In this case, there will no option but to accept that we lack experience, and we will have to speculate as to how it might evolve and what impact it might have. For example, we do not fully know what the long-term impact of climate change, or of the introduction of self-driving vehicles in cities, will be, but we can produce reasoned speculation about them. We can use insight from other sources, like transition studies, to see how changes have developed in the past on the basis of some comparable criterion. And we can also study how this possibility has been viewed in art, design, or science fiction. We must take into account that very often the first explorations of new possibilities (whether technological, social, or cultural) come from artists, designers, or peripheral activists of various kinds. The use of imagination has very bad press when it comes to envisaging the future, probably because it forces the MNF beyond its comfort zone. However, the fact is that we are only just beginning to realise that imagination and intuition are other ways of generating knowledge which, in the case of the future – and possibly because they transcend plain ignorance – can work well. In any event, we must always bear in mind that the MNF constantly tends to move back to its comfort zone, its default setting of plain ignorance and surface uncertainty; and this is why we will not be able to operate within the new parameters (shallow uncertainty and vincible ignorance) unless we have completed the preliminary stage of gaining an awareness of our ignorance (or, more to point, of our level of ignorance).

AND GIVEN THAT THE MAIN OBJECTIVE OF THIS TOMORROW IS TO BE ABLE TO DESCRIBE SITUATIONS OF PROFOUND CHANGE, IT IS OFTEN VERY USEFUL TO RESORT TO REFERENCES THAT HAVE BEEN MADE POPULAR BY THE MEDIA, THE ARTS, OR SCIENCE FICTION.

Many people may find it difficult to understand, intellectually, the implications of the interaction between human beings and artificial beings, but they may be able to make a more emotional connection thanks to films such as *Blade Runner* (the 1982 film and the 2049 sequel), *Her*, or *Robot & Frank*. The fact is that we are subjected to a constant barrage of future images, and there is nothing wrong with taking advantage of them in our pursuit of a more profound understanding of the consequences of certain future options. This is why the second tomorrow is called familiar futures; because there is often a certain familiarity with the future that is presented (artificial intelligence, post-human beings, flying cars), but it is partial, noncritical, and in most cases, disempowering. Familiar futures seek to use that knowledge base to promote a broader and more profound reflection on the possible effects of these changes or situations.

A new tomorrow, yet a familiar starting point. Once again, the first stage of our analysis begins with listing the new key items that need to be met:

1. Where does novelty come from?
2. What other perspectives, theories, or disciplines do we need to bring in?
3. How can we enhance our awareness?

Awareness is the key word in familiar futures; we need to abandon the rigidity of plain ignorance and be open to new inputs and perspectives, and in order to get us in the right mindset, we can proceed to the second level with a new batch of triggering questions:

1. How can we expand our comprehension of change?
2. What new elements or ideas can we or do we need to bring in?
3. Where can we get these new elements or ideas from?

In order to find the answers, we will have to resort to new methodological tools. But – and this is very important – we should not discard or repudiate preceding trends. The results of the first tomorrow may be an excellent basis for developing second tomorrows. We simply have to try to work out where the weak points in the previous scenarios are, or rather, what are the postnormal weak points? For example, do the scenarios of the first tomorrow adequately reflect the complexity of the analysis's subject? Have we managed to capture the tapestry of relationships or connections between the various components of the scenario? Or have we oversimplified the situation? Another point: have the aspects with the highest potential for chaotic behaviour been identified? Has it been possible to determine in what circumstances the system under analysis may experience a chaotic leap? This is something that an extended present finds very hard to do because it takes itself right where it does not want to go. Finally, a relevant point from a postnormal perspective: do the preceding scenarios contain contradictions? This may be more difficult to detect because, in principle, a scenario ought to be consistent and coherent; nevertheless, many extended presents are based on logic that is unsustainable or contradictory in the long run. In other cases, the contradiction will be implicit or simply the result of not taking into account the possibility that the change will accelerate, expand, increase, or happen simultaneously to other phenomena. In all of these cases, it will be relatively easy to build a second tomorrow using the first tomorrow as a base.

Fortunately, there is no shortage of methods to introduce novelty or to disrupt trends in futures. Trend analysis may be enriched by trying to identify emerging issues. Jim Dator may be the main promoter of the use of emerging issues analysis, [29] but the work of Javier Carbonell, Antonio Sánchez-Esguevillas, and Belén Carro provides a more contemporaneous approach to analysing emerging issues. [30] Yet, the important question when dealing with new things is to assess their potential impact. And, to estimate this impact, we can use techniques like the

futures wheel, originally conceived by Jerome Gleen and Theodore Gordon, [31] or the middlecasting as proposed by Dennis List. [32] In some cases, it may be that our attention ought to, perhaps, be on pursuing the most uncertain or disruptive aspects of our investigation. In this case, a 2x2 matrix using Peter Schwartz's approach or a morphological analysis [33] (Guy Duczynski's insights can also work very well here). [34] Nevertheless, here we have to understand that the game has changed. Instead of trying to ground estimates on empirical evidence, the aim is to argue for speculations on the basis of any possibility that may occur (no matter how improbable). Evidently, qualitative methods can also function in an optimum manner here: interviews, surveys, Delphi and even in approaches that are openly participatory: future workshops, focus groups, and a variety of other, creative techniques. Finally, it may turn out, initially at least, that it is difficult to articulate alternatives to the extended present. In such a case, it may be useful to resort to incasting archetypes, as defined by the Manoa School. [35]

Whatever methods we decide to use, it should be able to respond to the triggering questions and, in doing so, provide the elements to build scenarios. In this case, the third stage of my process proposes the following scenario building steps:

1. Look for emerging issues that convey a substantive or relevant impact for previous trends or scenarios.
2. Look for alternative ideas or perspectives from other disciplines or fields.
3. Reassess the relevance or validity of the extended present trends:
 - a. Under the impact of those emerging issues.
 - b. From the perspective of other disciplines or theories.
4. Generate new scenarios based on greater departures or disruptive impacts.

Familiar futures can be more difficult for people with a more rigid mindset and very easy for imaginative and creative participants. However, they usually denote the boundaries of what we deem as conceivable. Over the years, we futurists have learned that, despite our best efforts, some future options are seldom truly included or considered in our stock of scenarios. Something that the American critic Fredric Jameson captured in his famous quote: 'it is easier to imagine the end of the world than to imagine the end of capitalism'. [36] The point is that, in a fairly systematic and implicit way, we tend to prefer or privilege certain future images at the expense of others. It is not unusual to find ourselves in situations that have previously been considered to be unlikely, if not directly impossible, to happen, and despite everything, they occur. How is this possible? Can our futures knowledge be so defective to let us make such blatant mistakes? Or are we so dim-witted that we fail to see what is in front of our eyes? To resolve these problems is precisely why the next tomorrow – *unthought futures* – exists.

The Third Tomorrow

The third tomorrow, *unthought futures*, allows us to deal with certain questions that the extended present and familiar futures cannot resolve:

1. Identifying and then properly dealing with these preference mechanisms, which are implicit and integrated in our cognitive systems and which end up privileging certain future options.
2. Being able to process those situations that go beyond shallow uncertainty and cannot be resolved with vincible ignorance while never overlooking the fact that the MNF always seeks to process any question via its default settings (plain ignorance and surface uncertainty), something which we judged to be risky for the previous tomorrow and which now is nothing short of reckless.

TO ADDRESS THE FIRST SITUATION, POSTNORMAL TIMES THEORY HAS DEVELOPED THE POSTNORMAL MENAGERIE, A COMBINATION OF ITS OWN AND BORROWED CONCEPTS, TO CONFIGURE A SYSTEM THAT ALLOWS COGNITIVE BIASES TO BE DETECTED.

There are three members in the postnormal menagerie:

1. The first is the *black elephant*, first cousin of the elephant in the room. According to the CPPFS, this refers to 'events that are highly likely and widely predicted that are usually ignored either by many or by society as a whole'. [37] As such, black elephants are used to recognize those cases where preferences (whether positive or negative) are allowed to prevail over reason. To a certain extent, they describe those situations where, more or less explicitly, we choose to think in a particular way with regard to the future because it is less contradictory with our future preferences. Once again, the case of climate change is relevant, and another good example was the scarce credibility given to forecasts of the 2008 financial crisis. Even though both situations were preceded by numerous warnings, some of which were based on extensive empirical evidence, many people preferred to believe that they would never happen, and when they started to occur, many appeared surprised and spoke of *black swans*. It should be understood that black elephants work because, once again, they fit with the MNF. Ultimately, we believe them because they are consistent with what our field defines as 'normal'.
2. The second member of the postnormal menagerie is the black swan, a concept coined by Lebanese American analyst Nassim Nicholas Taleb in his book of the same name. Black Swans are things totally outside and way beyond our observations (...) they are not perceptible or articulated, even by experts; they appear as 'outliers' and come 'out of the blue'. [38] They are the proverbial exception, except that they no longer serve to prove the rule, but rather signal the shortcomings and cracks in the rule. A little like those extreme values that traditional futures studies schools would advise us to disregard because they were just 'noise'. Now, we know that they may be indicative of deeper or less

visible questions that need to be tackled. What happens is that, as opposed to elephants, with swans, there is little or nothing to be seen, even if we try really hard. We are instead talking about the opposite, voids or gaps, failures or glitches in the system, elements that do not fit, absences, or silences that clash with the whole. They are often the direct result of cognitive short-cuts, of believing that our knowledge is errorproof and of allowing the MNF to convince us that what we have in front of us works according to plan or within the bounds of normality.

3. The third and last member of the postnormal menagerie is the *black jellyfish*. The animal that alerts us to phenomena and events that have the potential of going postnormal. That is, events which, in certain circumstances, may undergo sudden and exponential escalation like jellyfish, challenging our knowledge and prior behaviour. [39] Their essence is the appearance of normality, of things we think we know and understand but which turn out to be more complex and uncertain than we expect. Jellyfish warn us of the dangers of our intellectual arrogance, of taking things for granted or believing that we have the situation under control. Under this view, black jellyfish allow us to identify which elements or situations may be more sensitive to the effects of postnormal change.

Thus, the main feature shared by all members of the postnormal menagerie is their resolute opposition to uncritical acceptance of any notion of normality. Ultimately, what may be deduced is that the idea of normality is, of itself, toxic from a postnormal viewpoint.

IN ORDER TO TACKLE THE SECOND QUESTION – PHENOMENA WHICH FALL BEYOND SHALLOW UNCERTAINTY AND VINCIBLE IGNORANCE – THE POSTNORMAL TIMES THEORY ESTABLISHES THE NEED TO CONCEIVE OF A NEW KIND OF UNCERTAINTY THAT ALLOWS US TO CONCEPTUALISE THOSE SITUATIONS OR EVENTS FOR WHICH WE HAVE NO ANSWERS AND IN THE FACE OF WHICH WE ARE SOMETIMES NOT EVEN ABLE TO FORMULATE THE QUESTIONS.

These are questions such as the emergence of (genuine) artificial intelligence (that which is self-conscious), the collapse of the European Union, the rise of global fascism, or a new mass extinction. The common trait running through all these questions is that no sooner do we begin to perceive them than they split into multiple ramifications and impacts which demonstrate how little we understand them and/or how unreliable the little we think we know about them is. We are facing *deep uncertainty*, but unlike previous uncertainties, which may be seen as a quantitative gradation with regard to what we do not know about the subject under

examination, deep uncertainty is not just simply the fact of knowing very little; it also has a qualitative aspect. In other words, it affects the value or reliability of what we think we know, and this is connected to another postnormal times theory nuclear concept, the unthought. Originally conceived by the Algerian philosopher Mohammed Arkoun, the unthought refers to what lies beyond the situations or axioms of our worldview. [40] Even so, it should be pointed out that it is not unthinkable, but it is difficult to comprehend because it is beyond the realm of our imagination, which is in turn determined by our worldview. For instance (and following the previous example by Jameson), for a convinced capitalist, the end of capitalism is an unthought, not because he cannot conceive of such a possibility, even hypothetically, but because a significant part of the construction of his worldview is based on the principles of capitalism. Likewise, a true believer cannot truthfully consider that God does not exist; it may be an argument in a theoretical debate, but it cannot be something he countenances with all of its implications. If we consider it carefully, we realise that the conclusions of all kinds of futures works are often conditioned by implicit unthoughts, which by not having been made explicit, become transparent, invisible to criticism. Questions such as the superiority of science over other forms of knowledge, the inevitability of the laws of market forces, the omnipresence of heteropatriarchy, the intrinsic evil of terrorists (and that they are never us), and so on. The deep uncertainty associated with these examples often does not derive from what we do not know about them, but precisely from what we believe to know about them and, also, from a rigid inability to conceive credible alternatives in the form of future scenarios.

How can we face this uncertainty? Firstly, by accepting that both shallow uncertainty and plain ignorance are not going to be enough, and that a new approach, *invincible ignorance*, is needed. And as in the case of the uncertainties, this is not just a difference of degree, but once again a qualitative shift. Normally, when we first tackle an issue, we will use a plain ignorance approach (remember, the MNF default mode) and just try to learn whatever we do not know. At a posterior stage, and maybe because we are aware of a postnormal creep, we may find ourselves willing to advance towards the approach of shallow uncertainty; then, we will have to determine the limits of our knowledge, consider alternative sources for the generation of new knowledge and if all this fails, find ways to speculate in a reasoned manner, *vincible ignorance*. But when we reach *invincible ignorance*, it is an entirely different game, and it is no longer about being aware of the scope of our understanding, but rather about asking what it is that we truly comprehend. The one thing that we cannot forget is that the MNF will bestow any fact that can be empirically corroborated with huge credibility, making sensorial perception the main criterion for accepting any information. However, when we arrive at the third tomorrow, it is vital to ask oneself this question: do we think what we think because of what we see, or do we see what we see because of what we think?

This is not a word game. The more we know about how our mind works, the more we discover about its ability to make us believe things that are not real. This

is the basis of prestidigitation, and it works because our brain is always trying to save energy. Thus, if our perception is in line with our MNF, it will be much more difficult to fight that perception, no matter how mistaken it may be. Furthermore, by the mere fact of being social beings, with our culture engrained in a specific social context, many of the implicit axioms and premises of our worldview will be the basis of the unthoughts that affect our futures analysis. And this is why, in invincible ignorance mode, most of the times, the problem is not so much what we do not comprehend, but rather what we actually think we understand. Therefore, having reached this point, we have no option but to call into question that part of our knowledge that prevents us from making progress. In order to emphasize that this third tomorrow requires a deeply different way of engaging with it, it has been labelled unthought futures.

And how can unthought futures scenarios be developed? As usual, the proposed process will start in its first stage by identifying the key items in this tomorrow:

1. Are we under the effect of a cognitive bias?
2. Could it be that our worldview's implicit assumptions and axioms are limiting our capacity to anticipate the future?
3. Is there a part of our knowledge that we need to unlearn?

If we accept that our knowledge is part of the problem, we need to be ready to question and deconstruct it. But this kind of reflection can be hard for some people. Therefore, the triggering questions, the second stage, propose a more circular approximation to unlearning:

1. Are the trends, emerging issues, and scenarios we have used so far tuned with this new reality and change?
2. Could it be that our worldview somehow limits our future perspective?
3. Are we, consciously or unconsciously, leaving out any future options?

There is not an easy way to directly answer these questions. But I have found that the application of the postnormal menagerie helps, and it does not really require the use of a particular method. It is more a matter of retracing our steps and seeking to discover if some of the preceding scenarios may contain black elephants, black swans, or black jellyfish. If we believe they do, then the question is to focus on establishing in what way the existence of one of these animals alters our previous conclusions; what possibilities they require us to include or to discard. In most cases, the postnormal menagerie will allow us to enrich or enhance the sophistication of the preceding scenarios and even generate new sub-scenarios that may expand our perspective.

But in order to detect the unthoughts at work in our scenarios, we might need specific techniques. In this regard, the postmodern methods of genealogy and deconstruction may be useful to demonstrate or expose the implicit parts of our

worldview, or to put it another way, the sources of our unthoughts. Again, there is no shortage of futurists that have engaged in the application of postmodernism to futures, but Sohail Inayatullah is an obvious choice. He not only pioneered this endeavour, but he also later developed causal layered analysis, a technique that can be very useful here. [41] This layered analysis allows for a progressively deeper exploration of the roots of our position with regard to the future evolution of any given subject. Having said this, we cannot ignore that most postmodern methods are very effective for critical analysis, but frequently, they are not equally suitable for building scenarios. In other words, these techniques can help us to identify the unthought, but once we have managed to detect it, using other techniques may be more operative. For example, if an unthought is characterized as a 'what if...?', then List's middlecasting might work very well. [42] In other cases, it may be good to contemplate new alternatives in a morphological analysis. Or, if it helps us to understand how a specific agent might react, a set of actors may be improved. In other words, this is not so much about there being specific methods for exploring the unthought, but rather about incorporating the unthought into our scenarios.

At this stage we may be in disposition to build the scenarios that in my process would be the third stage with the following steps:

1. Identify the unthought in the previous tomorrows.
2. Articulate the unthought as a divergent futures hypotheses.
3. Use the menagerie to double-check against cognitive bias.

It is not uncommon that the development of a new tomorrow provokes the need to reform or change the previous one. I do not forbid it, but it is not really necessary.

THE FUNCTION OF THE FOLLOWING TOMORROW IS NOT TO REFUTE THE PREVIOUS ONE. EACH TOMORROW ALLOWS US TO CAPTURE A DIFFERENT PERSPECTIVE OR SHARD OF THE FUTURE. IT IS BY HAVING ALL OF THEM, ACTUALLY MANY OF EACH, THAT WE CAN HAVE A MORE COMPREHENSIVE PERSPECTIVE OF THE FUTURE.

What is shocking from an extended present viewpoint may be logical from an unthought futures one and vice-versa. At the end of the day, the only real legitimation of the three tomorrows is if they really let us attain a more comprehensive and insightful perspective of what may happen next and how we can best navigate postnormal times.

My teaching and lecturing work prove that despite the three tomorrows not being a method, it works very well as an approach. As such, the tomorrows provide a structure within which it is easier to build each scenario; they define an

epistemological framework that allows us to select the most suitable methods in accordance with both the object and each tomorrow's logic. As an approach, the tomorrows are not only useful in tackling the generation of scenarios, it provides a way to analyse how these scenarios have been created as well. In other words, they do not just determine the best way of deciding how to generate the scenarios; they also help us to understand why our scenarios will go in particular directions, and most importantly, how we can acquire a deeper understanding of the future. In a typical postnormal dynamic, the three tomorrows require us to examine both our perception of reality and the cognitive processes we use to comprehend this reality. Finally, the progress from one tomorrow to the next tomorrow is not just a way of increasing the sophistication of our future anticipation; it is also a suitable way of understanding and foreseeing postnormal creeps, and as such, the tomorrows become a holistic way of studying the evolution of any subject.

The three tomorrows's last function is to aid us in transcending or elude the notion of normal in our futures analysis. Normalcy is problematic for two reasons:

First, it tends to obscure and hinder the influence of the MNF and will nudge our conclusions in a particular direction (the one that fits the most with our MNF). And because we will see it as 'normal', it will make it a lot harder to uncover if we are in shallow or deep uncertainty.

Second, because normalcy becomes the Trojan Horse for slowing down, silencing, or side-lining the crucial debates on the future. What better way of avoiding a future option than to denounce it as abnormal? The concept of normal is too influential, too biased, too overvalued (often implicitly), and tends to conceal a particular status quo. And the fact is that a futures analysis that cannot criticize or put forward alternatives to the status quo that does not live up to its name.

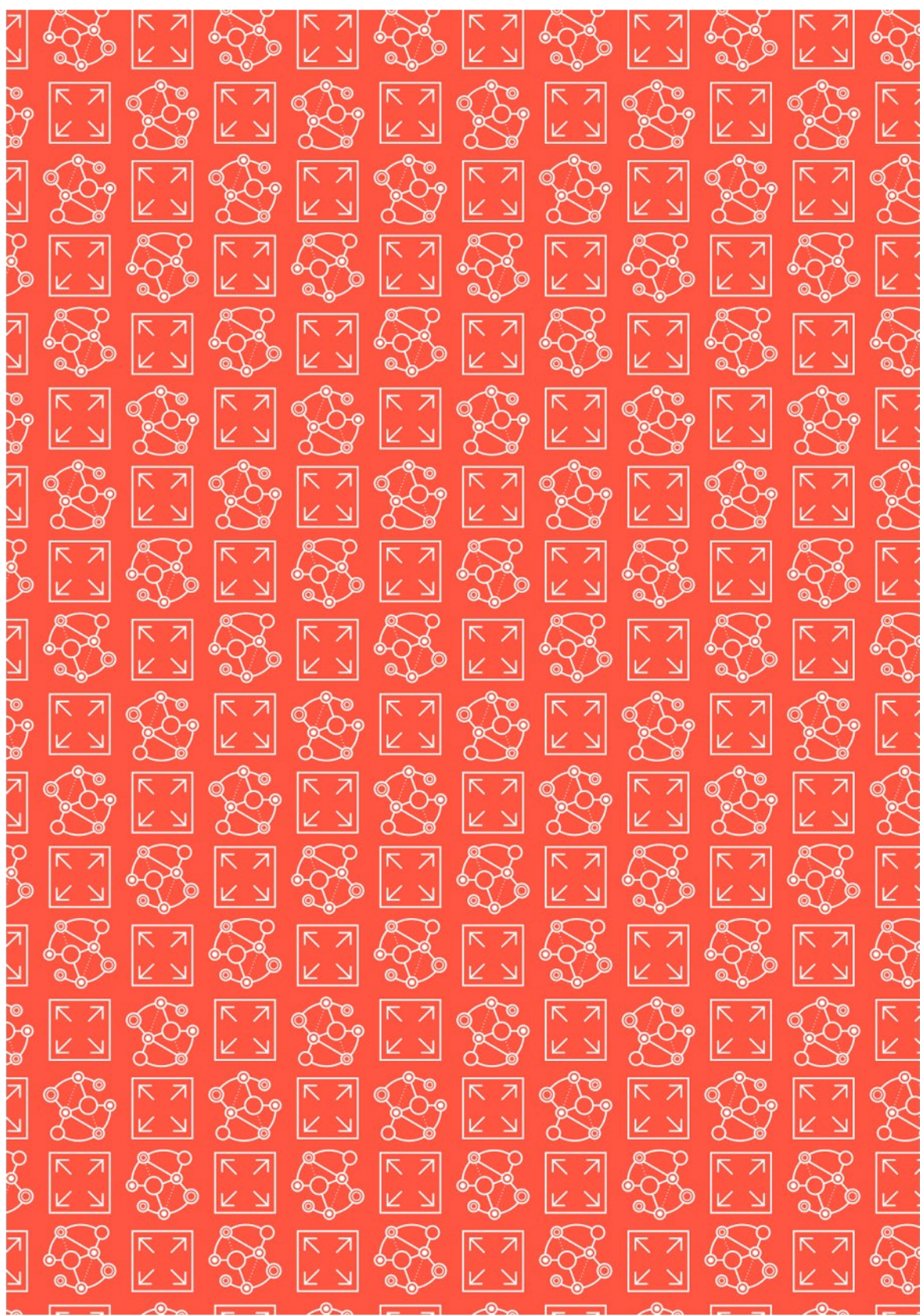
The three tomorrows do not preclude the addition of new methods that can be developed in the future or the use of disruptive knowledge. It simply gives a path to engage in futures in these postnormal times. My proposed three stage process goes a bit further by providing a workable manner to use the three tomorrows in futures research. By moving from key items to triggering questions and then the steps to build scenarios, the process offers an accessible way to build scenarios within a postnormal perspective.

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KNOWLEDGE & EDUCATION

THE SMOG OF IGNORANCE

Ziauddin Sardar

All our knowledge brings us nearer to ignorance,
All our ignorance brings us nearer to death,
But nearness to death no nearer to God.
Where is the Life we have lost in living?
Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?
The cycles of Heaven in twenty centuries
Bring us farther from God and nearer to the Dust.

T S Eliot, 'Choruses from The Rock'

When T S Eliot published his pageant 'play with words and music' in 1934, the world was in a different place: politically, culturally, technologically, and in almost every other way. But even between two World Wars, there was 'endless invention, endless experiment' and 'endless cycles' of change and 'progress'. Yet, we could distinguish the difference between information and knowledge, and knew that wisdom, even if we could not actually pin it down, was something to truly be desired. Indeed, discourses of knowledge and wisdom go all the way back in history to Plato and Aristotle and classical Muslim civilisation.

For Plato, knowledge was something to be searched for and acquired. Hence, in 'Socratic Dialogues' we have Socrates searching for truth, and the meaning of such notions as justice, goodness, and virtue. Knowledge had to fulfil three criteria: it had to be justified, true, and believed. Aristotle saw knowledge, as philosopher of religion Barry Kogan puts it, 'as the knower's complete appropriation of the intelligible content of the known, which is of course its form or structure. The appropriation, in fact, is carried to the point of identity. The knower is what he knows'. [1]

In Muslim civilisation, the conceptualisation of knowledge was a major intellectual activity from the tenth to the fourteenth centuries, spurred by the fact that knowledge (*ilm*) and related terms such as observation, reason, reflection, study of natural and social phenomenon occur in some 750 verses in the Qur'an. Muslim philosophers, such as ibn Rushd, al-Ghazali, ibn Sabin, and ibn Hazm,

who were obsessed with the notion of knowledge given its religious significance, produced over 500 definitions of knowledge from a plethora of pluralistic perspectives – human knowledge and Divine knowledge, scientific knowledge and spiritual knowledge, propositional knowledge and knowledge as practice, attitude, and/or doubt. [2] For Ibn Rushd, knowledge is a combination of sense perception and ‘intellectual intuition’; an amalgam of essence and being. [3] Al-Ghazali suggested true knowledge reveals the reality of things as they are and transforms the knower. [4] Ibn Sabin defines ‘knowledge as that which clarifies the truth and gives information without leaving (the need for) anything to be investigated’. [5] Ibn Hazm saw knowledge as the certainty of a thing as it is; a knowledgeable person epitomises four cardinal virtues: justice, understanding, courage, and generosity. [6]

The exploration of wisdom too has a long history, particularly in Eastern cultures. Confucius told us that we may learn wisdom by three methods: first, by reflection, which is noblest; second, by imitation, which is easiest; third, by experience, which is the bitterest. He also regarded wisdom as one of the ‘universally recognised moral qualities of men’. [7] In Islamic theology, wisdom – *hikma* – is a key term occurring a number of times in the Qur’an. It is seen as the best of all virtues given by God to ‘whom He wills, and whoever has been given wisdom has certainly been given much good’ (2:269). Not surprising that a legion of theologians, Sufi mystics and philosophers discussed wisdom at great length. Ibn Sina put the definition of wisdom in verse:

The soul is like a glass lamp, and knowledge
Is light (giving fire), and the wisdom of God is the oil.
If it is lit, you are alive,
And if it is darkened, you are dead. [8]

Al-Farabi defined wisdom as ‘power of excellence of deliberation and production of the things which are most excellent and best in what is done to procure for a man a really great good and an excellent and noble end, whether that is happiness or something which is indispensable for obtaining happiness’. [9] Al-Ghazali argued that knowing by itself was not enough; wisdom was necessary to act morally and distinguish right from wrong. Wisdom is also needed to go beyond sensate knowledge based on speculation and ignorance. Mullah Sadra talked of ‘transcendent wisdom’: knowledge was a mode of existence; wisdom takes a quantum leap to another dimension. [10] Other Sufi mystics illuminated the notion of wisdom through deep spiritual explorations, such as Ibn Arabi’s *The Bezels of Wisdom*, or moral stories, such as Rumi’s *Masnavi*.

Unlike knowledge, wisdom has received scant attention from contemporary scholars and thinkers. It is interesting to note that the Wikipedia entry on wisdom contains no contemporary citations! Indeed, the British philosopher Nicholas Maxwell argued that wisdom has been largely forgotten. Most of the problems of academia – fossilised disciplines, bunker mentality, inertia of institutions – are an

indication of the absence of wisdom. The late British philosopher Mary Midgley, who was seriously concerned with the (lack of) social responsibilities of scientists, concurred. Wisdom that is valued and loved, Midgley suggested, is difficult and requires time to search for. [11] She considered wisdom to be an 'intellectual virtue' with flawless moral dimensions. [12] Wisdom integrates and unifies the knowledge and values of a person, it cannot be abused, and a wise person cannot be immoral.

IN MODERN TIMES, DEFINITIONS, THEORIES, AND APPROACHES TO KNOWLEDGE HAVE COME UNDER CONSIDERABLE SCRUTINY AND HAVE BEEN A MATTER OF INCESSANT DEBATE. PLATO'S CLASSICAL DEFINITION HAS BEEN FOUND WANTING; AND A NUMBER OF PHILOSOPHERS, INCLUDING EDMUND GETTIER, ROBERT NOZICK, KEITH LEHRER, THOMAS PAXSON, AND SIMON BLACKBURN, HAVE ADDED EXTRA CONDITIONS.

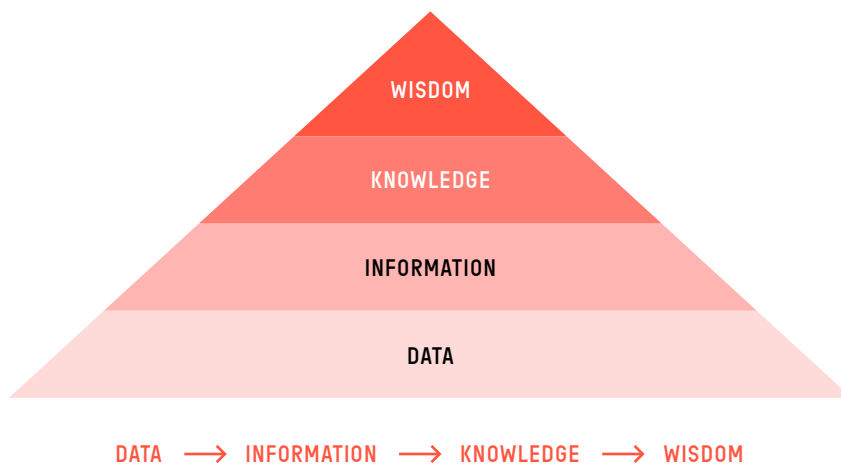
The second half of the twentieth century, questioned the objectivity of scientific knowledge with the publication of Jerome Ravetz's attack on 'industrialised science' in his boldly titled 1971 book: *Scientific Knowledge and Its Social Problems*. Science was facing a string of social and ethical problems, Ravetz argued, its ideological foundations had eroded, it was becoming 'vulnerable to corruption', and quality control was being seriously compromised. [13] There followed a heated debate between the supporters of what the Austrian British philosopher Karl Popper called Objective Knowledge and those who emphasised the subjective side of scientific knowledge such as philosophers Thomas Kuhn and Paul Feyerabend: the various sides of the arguments are well presented in the celebrated book, *Criticism and Growth of Knowledge*, edited by the philosophers Imre Lakatos and Alan Musgrave. [14] The debate was intensified with the postmodern onslaught on knowledge beginning with French philosopher Jean-Francois Lyotard's, 1984 book *The Postmodern Condition: A Report on Knowledge*. Postmodernism produced a string of disciplines and subdisciplines, not just critical theory but also sociology and anthropology of knowledge, as well as the academic movement of social construction of knowledge. [15] Under postmodernism, not just knowledge but truth itself became relative, and reason too lost its lustre. Feyerabend insisted that it was time to say *Farewell to Reason*. In *Laboratory Life*, French philosopher Bruno Latour and British sociologist Steve Woolger showed that subjective concerns were not altogether absent from 'the construction of scientific facts'. [16] What came to be known as 'Science Wars' followed with all sides taking an entrenched position on science and knowledge and the issues remain unsolved! [17]

While Popper worried about the growth of knowledge and introduced his theory of falsification to ensure its progress, knowledge itself was said to be moving from linear to exponential growth. The American architect and futurist Buckminster

Fuller noted that knowledge doubled every century but, by the end of the Second World War, knowledge was doubling every twenty-five years. [18] Along with knowledge, information too was increasing rapidly: during the 1980s and 1990s, terms such as ‘information overload’, which itself has a long history, and ‘information glut’ began to gain common currency. We had entered an ‘information age’. Information theory, first created in the 1950s to bridge mathematics, engineering, and computer science, now proliferated through a string of disciplines and fields including cybernetics, systems sciences, cryptography, and communication. The old fashioned ‘computer science’ now became ‘information and communication technologies’; and computer science departments rebranded themselves as computer and information science departments. It was against this background that the notion of Data-Information-Knowledge-Wisdom hierarchy first appeared.

DIKW Hierarchy

The idea that data leads to information, which leads to knowledge, which in turn leads to wisdom was introduced by the organisational theorist Russell L. Ackoff, a management consultant, in his 1989 paper ‘From Data to Wisdom’. Ackoff argued that there was a causal and hierarchical relationship between the concepts. [19] Through a process of filtration, reduction and transformation, data, which was in plentiful supply, moved upwards to information, knowledge, and, eventually, wisdom which was almost non-existent. Ackoff’s formula has been presented both as a pyramid and as a linear progression.



Data came in three varieties: fact, signal, and symbol. Information was processed, organised, structured, sequenced, and arranged data that provided relevance and context, and could be objective or subjective, functional or symbolic, and it resolved uncertainty and provided order. ‘Data’, Ackoff explained, ‘are symbols that represent

the properties of objects and events. Information consists of processed data, the processing directed at increasing its usefulness. For example, census takers collect data. The Bureau of the Census processes that data, converting it into information that is presented in the numerous tables published in the Statistical Abstracts. Like data, information also represents the properties of objects and events, but it does so more compactly and usefully than data'. [20]

In this scheme, knowledge was processed, analysed, or synthesised information that could be procedural, propositional, experiential, philosophical, objective, or subjective. It provided theoretical, practical, or experiential explanation or understanding of a subject. Together information and knowledge increased efficiency but not what in management terms is called 'effectiveness': that is doing the right thing. For that one requires wisdom. Ackoff saw the difference between the two in terms of development and growth. You do not need value to grow; but value is needed for development which requires information, knowledge, understanding as well as wisdom. Efficiency can be automated; but not effectiveness.

Wisdom, noted Ackoff, 'involves the exercise of judgment'; it cannot be programmed. While 'we are able to develop computerised information-, knowledge-, and understanding-generating systems, we will never be able to generate wisdom by such systems. It may well be that wisdom – which is essential for the pursuit of ideals or ultimately valued ends – is the characteristic that differentiates man from machines'. [21]

Ackoff's Data-Information-Knowledge-Wisdom (DIKW) scheme has been severely criticised for being too simplistic. American logician Martin Fricke suggests it is anchored in positivism, [22] Information and communication scholars Max Boisot and Agusti Canals argue that the two terms, data and knowledge, are 'unwittingly brought into a forced marriage by having the term information act as an informal go-between'. [23] British information scientist Jennifer Rowley suggests that the distinction between the terms is not adequate. Others have suggested the hierarchy is unsound and methodologically undesirable. [24] Yet, DIKW scheme has survived extensive criticism and has become the standard model in information management, information systems and knowledge managements, and information library science literature. It can be found in textbooks on management, information systems and knowledge management. And, for the purpose of our analysis, it provides a good starting point and template to show how data, information, and knowledge are being radically transformed in postnormal times and what it implies for wisdom. [25]

Evidently, DIKW does not deal with ignorance. But ignorance has been a silent partner of both knowledge and wisdom. It was recognised as an integral component of knowledge in Greek philosophy as exemplified in the famous Socratic paradox: I know that I know nothing. Both Plato and Aristotle argued that we can make bad choices out of ignorance, and ignorance was a major hinderance to sound judgements. For classical Muslim scholars, recognition of ignorance was a key component of wisdom. The Muslim sage, al-Sijistani, who wrote a book on wisdom,

declared: 'suffice it for the value of knowledge that the one lacking it boasts of it; and suffice it for the worthlessness of ignorance that the one who knows it shies away from it' [26]. Al-Sijistani, much like al-Ghazali and ibn Khaldun, regards ignorance as a limitation of reason. Often, we are led by the wonder of reason to overlook our ignorance. Ibn Hazm associated ignorance with the three capital vices of inequality, cowardice, and avarice. [27]

THE ENLIGHTENMENT BANISHED IGNORANCE. BUT IT HAS RETURNED WITH A VENGEANCE MORE RECENTLY – NOT LEAST BECAUSE OF IGNORANCE PERPETUATED BY CERTAIN CORPORATIONS: DENIAL OF HARMS BY SMOKING, ASBESTOS, LIVING IN CLOSE PROXIMITY TO NUCLEAR POWER PLANTS, DENIAL AND SUPPRESSION OF CLIMATE CHANGE SCIENCE, AND THE REJECTION OF EVOLUTION BY CREATIONISTS.

In modern science, ignorance often emerges through the suppression of what Steve Rayner, a scholar of science and civilisation, calls 'uncomfortable knowledge' – knowledge that does not support dominant theories and hypotheses or cannot deal with complexity or 'wicked problems', which is excluded from policy debates. [27] Yet, ignorance is a natural product of every advance in knowledge; it comes, 'after knowledge', [28] the more we know the more our ignorance comes to the fore. 'Even as knowledge knows no bounds, so does ignorance'. [29]

We can define ignorance, as is the convention, simply as lack of knowledge. But that does not take us very far as 'there are many sorts of ignorance as there are sorts of things to be ignorant about' which makes it 'difficult to obtain a taxonomy of ignorance. For the realm of ignorance is every bit as vast, complex, and many faceted as that of knowledge itself'. [30] Nevertheless, the German sociologist Matthias Gross offers a threefold taxonomy. Nonknowledge: lack of sufficient knowledge which is acknowledged for future planning. Negative knowledge: acknowledging about what is not known but ignored or considered dangerous. [31] Extended knowledge: 'new knowledge based on planning and/or research with nonknowledge' which 'can lead to new ignorance by uncovering limits of the newly gained knowledge'. [32] The emphasis here is on the relationship between ignorance and knowledge.

In contrast, postnormal times theory deals with ignorance per se. Ignorance is associated with increasing uncertainty and with complexity, contradictions, and chaos – the 3Cs' of postnormal times – and categorised as Plain, Vincible, and Invincible. [33] Plain ignorance is not just the absence of knowledge but also common prejudices like anti-Semitism and Islamophobia, deliberate manufacture of falsehood and lies, denial of established truth or scientific research, and their weaponization. Plain ignorance can also arise in complex or contradictory

situations, with different actors making contradictory demands or perceiving ‘truth’ from different perspectives. Vincible ignorance has three basic components. The knowledge that there are things we do not know, such as how consciousness works, or why dreaming is important, or why moths are attracted to light. Constructed misrepresentation based on knowledge, which would not only include Rayner’s ‘uncomfortable knowledge’ but also Orientalism, epistemological bias of western disciplines, [34] literary ignorance, ignorance generated by rigid disciplinary boundaries, and the weaponization of disciplines. [35] Ignorance that requires knowledge that can only be acquired in the future, such as the impact of genetic engineering on society or geoengineering on the planet. It is vincible because it can be overcome, overtime, with serious, conscious effort; and what we do not know in the present we may know in the future. Invincible ignorance is unknown unknowns; things we do not know we do not know. It is essentially a product of our Unthought: what lies outside our central mode of thinking, beyond the parameters of our confined imaginations, external to the dominant paradigms of all our disciplines. It is invincible because it cannot be tackled with existing, conventional tools of our worldviews. ‘It is the ignorance that compels us to action with a false sense of confidence in existing paradigms and modes of knowing, being and doing. We can only grapple with invincible ignorance by questioning our axioms, by critiquing our basic and long cherished assumptions, by totally rethinking our worldview’. [36]

The movement of ignorance from the periphery to the centre of knowledge production, as well as the emergence of postnormal times, has, and continues to drastically alter the relationship between data, information, knowledge, and wisdom. The beginning of the twenty-first century saw major shifts in the DIKW scheme. It all began with the arrival of big data.

Big Data

The S-curve for data had been rising steadily over the twentieth century. In his 1961 book, *Science Since Babylon*, the American historian of science, Derek de Solla Price, showed that scientific knowledge, and hence scientific data, was growing exponentially. Concerns about increasing quantities of data were regularly expressed during the 1960s and 1970s – particularly after the emergence of Algorithmic Information theory with merged information theory and computer science. But the first use of the term data appeared in an August 1999 paper by Steve Bryson and a team of fellow computer scientists entitled ‘Visually exploring gigabyte data sets in real time’. [37] Bryson and his colleagues pointed out that powerful computers were generating data of around 300 gigabytes which researchers were finding difficult to handle. The numbers were just too large. But it wasn’t just researchers and scholars who were producing data. Individuals too were generating raw data. In 1999, original data created by individuals and stored on paper, film, CDs, DVDs, and magnetic tapes hit 1.5 exabytes, around 250 megabytes per person. And it was growing rapidly: there was an explosion in the quantity, and sometime quality, of

available, and potentially, relevant data. In 2003, the estimated data humanity had accumulated had reached approximately 12 exabytes. [38] By 2007, stored data was estimated to be 300 exabytes. 'Between them', observes Matthew D'Ancona, 'Google, Microsoft, Apple, Facebook and Amazon – the "Big Five" – outstrip by a huge margin all the databanks, filing systems, and libraries that have existed in human history'. [39] Big Data had arrived.

But big data is different from the conventional data which basically consisted of facts, signals, and symbols; or as knowledge management scholars Thomas H. Davenport and Laurence Prusak define it 'a set of discrete, objective facts about events'. [40] To begin with data on a humongous scale enables us to gain new insights and create new values that radically change markets and organisation, relationship between individuals and communities, and citizens and governments. The era of big data, 'challenges the way we live and interact with the world' and 'overturns centuries of established practices and challenges our most basic understanding of how to make decisions and comprehend reality'. [41]

A good way to see the difference between conventional notions of data and big data is to compare a page from an old Atlas and Google Maps. The data on the atlas fulfils the criteria of the old definition: it consists of names, 'sets of characters, symbols, numbers' and 'visual bits' represented in the raw form. It is discrete, static, and localised. The Data on Google Maps contains all the necessary symbols, signals, and facts but provides a whole range of new facts: weather condition, how long a journey takes by various means, and indicates what goods and services are available in the area you are exploring. The map adjusts itself as you change your position (walk or drive) and updates itself almost instantaneously. And it is available throughout the planet at all times. In contrast to the data on the page of the old atlas, the big data that drives Google Maps is dynamic, instantaneous, global, and complex.

Big data also captures what we have conventionally not regarded as data. To the conventional varieties – facts, signals, symbols – big data captures behaviour, emotions, actions, and attitudes as raw data. Consumer behaviour is captured as data routinely collected by online shops. Mood and emotions in images, videos, audio, and other digital media can be recognised and inventoried as data. Whereas laborious surveys gathered data on attitudes, now it is instantly acquired simply by clicks. All of our interaction on such platforms as Facebook, Instagram, Twitter, our language and expressions, our likes and shares, are turned into data.

Indeed, almost every aspect of what makes an individual truly individual, a community, the fundamental properties that define their identities are quantified and seized by big data. In short, big data incorporates the essence of individuals, groups, and communities.

Data, as we have known for centuries, can also be made up. In the most extreme case, says Daniel Levitin, researchers 'report data that were never collected from experiments that were never conducted. They get away with it because fraud is relatively rare among researchers and so peer reviewers are not on the guard. In

other cases, an investigator changes a few data points to make the data more closely reflect his or her hypothesis. In extreme cases, the investigator omits certain data points because they don't conform to the hypothesis, or they select only cases that he or she knows contribute favourably to the hypothesis'. [42] To this type of data manipulation, we can add a string of new entrants.

AS THE BRITISH JOURNALIST PETER POMERANTSEV NOTES, 'WE LIVE IN A WORLD IN WHICH THE MEANS OF MANIPULATION HAVE GONE FORTH AND MULTIPLIED, A WORLD OF DARK ADS, PSY-OPS, HACKS, BOTS, SOFT FACTS, DEEP FAKE, FAKE NEWS, PUTIN, TROLLS, TRUMP'. [43]

There are a whole variety of fakes: fake news and 'alternative facts', fake science manufactured, for example, by climate deniers and anti-vaxxers, alternative, none the less fake, history promoted by white supremacists in US and Europe and Hindu nationalists in India, fake individuals on Facebook, and fake followers and 'likes' on numerous social media platforms harvested by bots. Not to mention the vast network of conspiracy theories – there are even conspiracy theories about conspiracy theories – which are essentially political in nature and advanced to promote ideological objectives. [44] All this is scooped up as data in Big Data.

Lies and falsehood have existed since the beginning of history; and propaganda has become more and more sophisticated over time. But in the post-truth age lies have taken a quantum leap. Lies have been industrialised, incorporated: an ever expanding industry now exists 'to create and disseminate fictitious public policy "facts" on behalf of business and ideological interests will to pay for them' – designed and strategically coordinated 'to hide the truth, confuse the public, and create controversy'. [45] Indeed, there are specific media outlets devoted to propagating lies. The American Fox News serves as 'a conduit for conservative lies and propaganda, manipulating the political process on behalf of the Republicans Party and right-wing organisations'; the breadth of lies the network spreads is truly 'astonishing'. [46] The Russian RT network does the same on behalf of President Putin and his administration. In Britain, as the former editor of *The Guardian*, Alan Rushbridger notes, newspapers like the *Telegraph*, *Express*, *The Sun* and *The Daily Mail* routinely spread 'front-page falsehoods' and journalists on these papers have turned propagandist. [47] Then there are countless online platforms, from 'InfoWars' to 'Breitbart News', whose sole function is to spread lies.

It is not unusual for politicians to lie but the lies have not only become omnipresent but have also changed in nature. 'The traditional political lie was designed to cover up an unpalatable fact', writes the French British political analyst Catherine Fieschi. There was contrition when they were caught, and often a public racking. But contemporary political lying, which Fieschi dubs 'populist lying', is 'designed to be seen – it is the opposite of cover up'. It is lionised, employed

as sedition, and used as an open declaration that ‘the liar will stop at nothing to “serve the people”’. Lies are used to demonstrate that the populist politicians are authentic and ‘instinctively connected to the experience of “the people” who are authentic’. [48] Lies are paraded to demonstrate the audacity of the politician; he or she rejoices in the falsehood itself.

In addition to ubiquitous lies, there is also bullshit. In his celebrated short essay ‘On Bullshit’, American philosopher Harry Frankfurt points out that liars and truth tellers are both playing the same game: the latter accepts the authority of the truth and responds to it, while the former refuses to accept its authority. Both care about their respective positions. But a bullshitter does not reject the authority of the truth – he does not care at all. Frankfurt regards bullshit as much more dangerous – ‘the greater enemy of truth’. Bullshit often emerges when a person speaks on a topic with limited or no knowledge; a common occurrence in democracies where everyone is required to have an opinion on everything. But there is also a deeper source for the spread of bullshit: ‘various forms of scepticism which deny that we can have any reliable access to an objective reality, and which therefore rejects the possibility of knowing how things truly are’. [49]

Big Data does not differentiate between facts and ‘alternative facts’, truth or lies, knowledge or bullshit, news or fake news, politics or conspiracy theories, legitimate concerns of dissidents or the paranoia of anonymous online mobs, genuine comedy or racism and bigotry masquerading as ‘earthy humour’, irony, and sarcasm. All is shovelled up. As such, Big Data is a repository for plain ignorance: blatant lies, obvious bullshit, and all the dark paraphernalia we find on social media, online platforms, and other digital apparatuses. Big Data serves as an engine for plain ignorance – enticing it, generating it, and multiplying it geometrically.

All this means that Big Data is far removed from the conventional notion of data as defined by Ackoff: ‘symbols that represent properties of objects, events and their environment’. It is essentially a postnormal phenomenon. The main drivers of postnormal times – the 4S’s – are clearly exhibited by Big Data: Speed (it is instantaneous), Scope (it is global), Scale (it reaches not just the individual level but also extracts the very essence of what makes an individual truly unique); and Simultaneity (it works simultaneously across all aspects of human and planetary life). As such, Big Data incorporates the 3C’s of postnormal times. It is complex: interconnected and networked. It is contradictory: it accumulates widely diverging truths, falsehoods, behaviours, orientations, ideologies, and worldviews. And it is chaotic: there is constant potential of feedback loops leading to chaos. Big Data radically changes the nature of information which acquires a gargantuan dimension.

Gargantuan Information

As big data processes, organises, categories, and orders information instantaneously and simultaneously across a number of fields, the conventional distinction between data and information dissolves. It is transformed both quantitatively and

qualitatively. The sheer magnitude of information that is constantly gathered on a global level is truly dumbfounding. The subtitle of American historian of science James Gleick's, 2012 book, *The Information*, sums up the situation: *A History, A Theory, A Flood*. [50] But more than a flood, information has now acquired gargantuan dimensions.

**'WITH INFORMATION', NOTE INTERNET GOVERNANCE SPECIALIST VIKTOR
MAYER- SCHÖNBERGER AND JOURNALIST KENNETH CUKIER, AS WITH
PHYSICS, SIZE MATTERS.**

Hence, Google is able to identify the prevalence of the flu just about as well as official data based on actual patient visits to the doctor. It can do this by combing through hundreds of billions of search terms – and it can produce answers in near real time, far faster than official sources. Likewise, Etzioni's Forecast can predict the price volatility of an air plane ticket and thus shift substantial economic power into the hands of consumers. But both can do so well only by analysing hundreds of billions of data points. [51]

The qualitative transformation is just as profound. If information is data processed to provide meaning, as conventionally defined, then what meaning is it actually conveying? The meaning gargantuan information conveys is that it can be bought and sold: in other words, information is nothing more or less than a commodity. And as a commodity, information acquires three main properties that differentiate it from all other products and services. It can perform contradictory functions: it can be used by people holding divergent views to support their arguments and justify their positions. It is all consuming and does not differentiate between, say, private or public domains. And it can be reproduced, passed on, and proliferated ad infinitum at (almost) zero cost. Moreover, gargantuan information evolves continuously from interconnected local and global networks. It is therefore complex. As such, far from reducing uncertainty it actually increases uncertainty.

Gargantuan information has two additional dimensions. The first emerges thanks to the instruments of 'surveillance capitalism'. Surveillance apparatuses – cameras, drones, CCTV, gait recognition technology (that can recognise individuals from their shapes, movements, or silhouette from up to 50 metres away, even if their face is hidden) – record every movement, every action, every gesture, of a person. Racial profiling pins down the race and ethnicity of a person. Thus, gargantuan information can record:

- Biology – the natural physiology, function, and development of a person
- Race – the physical characteristics of a person
- Ethnicity – the cultural identity of a person
- Orientation – the religious, political, sexual, and health of a person

In other words, it collates and commodifies the absolute reality of individuals, groups, and communities – or even their very being. How gargantuan information imbibes the beings of individuals is well summed up by Consumer Report: ‘welcome to the age of ordinary objects that stealthily spy on us – from inside our cars, our homes, and our office. That smartphone game you play in a waiting room, the mobile app that gives you a weather forecast, the photo you share with online friends – all have the ability to reveal intimate details about your life.’ [52] The smartphone knows where you are and where you have been, what you bought and what you did, and who you were with and what you ate and did when you were with them. Surveillance technology charts your every move and every gesture. The logical consequence of the entrapment of being in gargantuan Information can be glimpsed from China where surveillance technology is being employed to monitor citizens on a mass scale. In addition to an estimated 170 million CCTV cameras – the equivalent of one for every twelve people in the country, flocks of robotic birds equipped with high-resolution cameras, and gait recognition is being used to observe citizens. The extensive surveillance network feeds into the country’s social credit system, which gives citizens a ranking based on their behaviour. If you get a low ranking, you suffer the consequences: anything from being turned down for government jobs to denial of desired schools for your children.

**THE SECOND DIMENSION IS ANOTHER LAYER OF IGNORANCE –
VINCIBLE IGNORANCE. UNLIKE PLAIN IGNORANCE, WHICH IS LARGELY
MANUFACTURED, THIS NEW LAYER IS BOTH CONSTRUCTED AND
INTRINSIC TO THE NATURE OF GARGANTUAN INFORMATION.**

It is socially constructed not just to distort truth and justify erroneous beliefs, but to promote political and ideological goals; and it works just as well as a work of scholarship as one of fake news. In gargantuan information, there is no such thing as causality; there are only simple correlations, which can be used to validate everything and anything. Mass racial profiling, for example, can be used to reinforce racial stereotypes. The behaviour, movements, needs, and gestures of migrants can be analysed, structured, and ordered in the form that can be used to demonise them. The way governments can control, manipulate, limit, or suppress access to information can leave the citizens in a state of complete ignorance; the citizens may not even be aware of their ignorance. The denial of truth itself becomes a form of information that generates more correlations that further enhances ignorance. Indeed, a nation state can construct ignorance to specifically make its citizens docile and compliant. Gargantuan information continuously produces predictions and forecasts on problems and issues we face today but whose potential answers can only be discovered sometime in the future – that is, information on known unknowns, which can be true or false but can be taken as knowledge.

Much of scientific research is based on investigating, hypothesising, and testing a known unknown. But gargantuan information masks the known unknowns and continuously projects predictions and forecasts based on complex correlations. It thus reinforces current trends, amplifying our prejudices, and pushes us towards disturbing futures. Vincible ignorance can be overcome provided we are aware of its existence. But gargantuan information makes it difficult to recognise; and since gargantuan information is a product of interconnected, complex systems, complex strategies are required to overcome it.

Big data and gargantuan information have radically transformed modes of the production of knowledge as well as the nature of knowledge itself.

Emergent Knowledge

Knowledge is no longer what it used to be. Given that the structure of information has radically transformed, the hierarchical and linear distinction between data and information is evaporating, and far from increasing certainty, information actually increases uncertainty. Knowledge itself is set to transform fundamentally. To the conventional sociological definition, 'knowledge is any set and every set of ideas and acts accepted by any one or another social group or society of people – ideas and acts pertaining to what they accept as real for them and for others', [53] we must now add big data driven information as 'a collective process that emerges as discordant symphony of humans, machines, violent and non-violent histories, symbols, and algorithms, not to mention our fantasies about the future'. [54] It is 'discordant' because the process of generating knowledge is complex and full of contradictions: big data incorporates all the elements of plain ignorance – the lies of the post-truth age, fake news as well as deep fake, fake science, and fake history – into the knowledge system; and gargantuan information transforms vincible ignorance into knowledge, racism, xenophobia, politically and ideologically motivated constructions about citizens and other people are correlated as knowledge patterns and structures. As such, the notion of 'consensual knowledge', 'the sum of both of technical information and of theories about it that command sufficient agreement among interested actors at a given time to serve as a guide to public policy' is increasingly becoming obsolete. [55] The modernist idea of autonomy of knowledge – 'the conviction that some beliefs do not stand in need of any explanation, or do not need a causal explanation' is simultaneously enhanced and disbanded: the autonomy now belongs to AI which generates knowledge solely on the basis of patterns and correlations. [56]

We describe big data and gargantuan information driven knowledge as emergent because it is a product of interconnected, networked, evolving components: that is to say it is a complex system, that can spontaneously generate order, adaptation, feedback loops. Emergent knowledge has no borders: it is intrinsically multi-, inter-, and transdisciplinary; it is simultaneously global and local; it codifies both the external and internal features of its subjects and objects. It incorporates and commodifies both the essence and being of individuals, groups, and communities.

It is contradictory and chaotic. And it can produce totally new manifestations of itself – which cannot be predicted, or indeed bear any relation to its component forms. Emergent Knowledge is an amalgam of three distinct but interconnected components.

First: what we may (still) call true knowledge – that is, objective knowledge as defined by Popper that can be verified again and again and survives the test of falsification. [57] There will still be scientists working in laboratories collecting data, processing it into information, testing hypotheses, developing theories, and solving puzzles within paradigms, and publishing in refereed journals. Researchers will still gather data in conventional ways to produce new insights: such as the work done by the Climate Accountability Institute to show ‘how fossil fuels companies have driven climate crisis despite knowing dangers’. [58] Much of clinical work is still based on the ΔΙΚΩ system. Data is often a clinical measurement and a descriptor, for example, heart rate = 50 beats per minute (bpm). It has to be contextualised; a heart rate of 50 bpm gives some information to the clinician about the child. The clinician structures and organises this information as knowledge and provides written guidelines for treatment. What is different is that the availability of large amounts of data enables the clinicians to look for information and relationships that may not be obvious. Often, datamining in medical datasets reveal large amounts of ‘new knowledge’. And in the future, Scottish anaesthetist Paul Cooper suggest, ‘mining of large, complete, well-structured datasets to reveal previously unrecognised knowledge is likely to become important as the gold standard of double-blinded randomised clinical trials in discovering medical knowledge’. [59] There will always be journalists of integrity, with appreciation of truth and objectivity, who will stand against all that is false. As such, emergent knowledge will preserve a core of what is – historically seen as – true, real, objective, rational.

Second: what we may call toxic knowledge – that is knowledge based on plain and vincible ignorances as well as emerging technologies that will transform the human landscape. This includes what Shattuck describes as Forbidden Knowledge, that is knowledge that scholars, philosophers, novelists, and most particularly religious thinkers have cautioned against – attempts to create a perfect human being, or weapons of mass destruction, or to cheat death. The concerns expressed by science journalist, Tom Wilkie, about the ‘Human Genome Project and its implications’ in *Perilous Knowledge* are on the verge of being realised. [60] Advances in genetic engineering, synthetic biology, neurobiology/technology, even 3-D body printing will transform our notion of what it means to be human. A display in the Barbican’s exhibition, ‘AI: More Than Human’, announces: ‘The US, China, Israel, South Korea, Russia, and the UK are developing increasingly autonomous weapons’. Lethal Autonomous Weapon Systems (LAWS) or Killer Robots, over which humans could have no meaningful control, which can cause mass destruction or target people on the basis of their race, ethnicity, or culture, are a product of toxic knowledge. But toxic knowledge also include technologies that undermine statecraft, democracy, and accountability: algorithms, data targeting, techno monopolies, and the types of technologies used by Cambridge

Analytica; [61] and the use of opaque and uncontested mathematical models to produce absurd products (for example, subprime mortgages) and reinforce discrimination and cultural, ideological, and political bias, weaponised disciplines (such as anthropology), [62] and deliberate creation of chaos to disturb an existing system in order to gain financial or political advantage. [63] Toxic knowledge is based on the 'confidence of the cognitive powers' of 'the automation of calculative reason'; on the fantasy that machines can imagine a better future; it is the psychopathology of The Madness of Knowledge. [64]

Third: emergent knowledge adds yet another layer of ignorance, invincible ignorance – ignorance that is the outcome of our Unthought – things we have never thought simply because they are out of the framework of the dominant paradigms, disciplinary ignorance due to myopic boundaries, theories, principles, assumptions, and axioms that are the basis of both: true knowledge and toxic knowledge. As such, all emergent knowledge contains ignorance – including the ignorance of our ignorance – as its integral component. This ignorance is invincible because it cannot be overcome within the existing dominant paradigms that shape all varieties of knowledge. Alternatives, and sane futures, are located far, far beyond the predominant paradigms that shape our thought and actions in postnormal times.

THUS, EMERGENT KNOWLEDGE IS TRIGOXIC: A COMPLEX, EVOLVING ENTITY THAT COMBINES TRUE AND TOXIC KNOWLEDGE THAT IS SHROUDED BY THE SMOG OF IGNORANCE.

It will be shaped less and less by humans and more and more by AI, a form of intelligence we have never encountered before. We do not know how AI systems actually make decisions; indeed, we may never know. They have a huge data point and carry out massively complex statistical analysis. What we do know is that AI is 'everywhere and nowhere. Often hard to see, AI has the potential to find its way into every aspect of our lives. It can be defined in different ways, but fundamentally, AI is the endeavour to understand and recreate human intelligence using machines'. [65] It is changing how we live, how we relate to each other, how we perceive ourselves and others. It is amplifying our biases and prejudices. It is affecting our privacy, freedom, and truth. It can predict our behaviour before we know it; and it has knowledge of what we will do before we will do it. It is both shaping and defining our future.

Thus, AI will determine not just how we know but what we know. The very fabric of what we regard as knowledge will be transformed profoundly. TRIGOXIC knowledge is the logical culmination of historical and continuous merger of knowledge with power. [66] It is the apotheosis of the postmodern experience of the last few decades, a direct product of the total relativisation of truth and

morality. Whereas postmodernism was ‘the new imperialism of Western culture’ that aimed to consume and regurgitate non-Western culture, the postnormal embodiment of knowledge aims to commodify the very essence and being of all on the planet. [67]

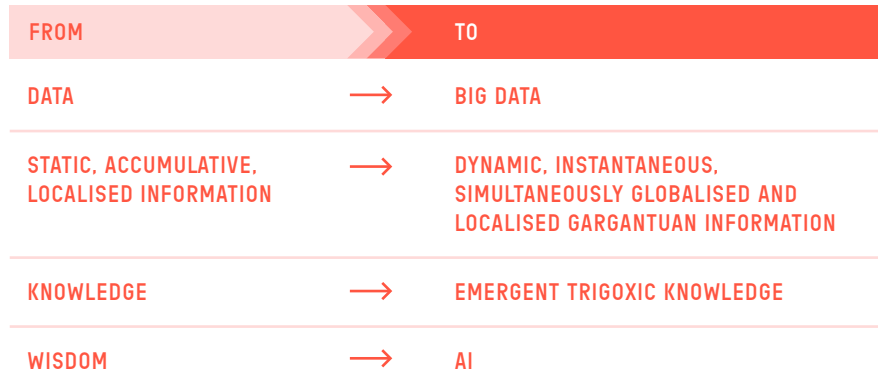
Wisdom

So, how do we, ‘talk (more wisely) about wisdom’ in the face of such gigantic changes and challenges? ‘If our world is too complex, our knowledge too broad, our information too great for one person to fully understand, what is another option for wisdom?’ [68] If we accept the conventional definition of wisdom, dating back to antiquity, as the quality and exercise of good judgement and sound decision making, and the ability to think and act using knowledge, experience, understanding, and insight, what exactly is required of a wise person? I would argue it requires an appreciation of uncertainty and some capability to navigate the 3Cs’s of postnormal times: complexity, contradictions and chaos. It also entails an awareness of various varieties of ignorances and ability to negotiate the smog of ignorance. It necessitates using what we do know to engage with what we do not know. And, as British Futurist Laila Varley suggests, ‘wisdom necessary for a wise future does not lie in knowing’ but ‘in the ability to take disparate pieces of knowledge, sometimes incomplete, and see a bigger picture’. The ‘big picture’ involves seeing the whole elephant. Valey recalls Rumi’s story, told in the *Masnavi*, in which blind men touch and feel an elephant in the dark. Depending on where they touch and what they feel, they believe the elephant is like a pillar (leg), a waterspout (trunk), a fan (ear). ‘Unlike the blind men, wisdom would have been to recognise that each perspective could be partially correct and find a way to perceive the elephant: taking into account the collective information’. [69] Finally, it involves stepping out of the dominant ways of knowing, being, and doing into the Unthought, to anticipate the unknown, and imagine and create more desirable futures.

All this is perhaps too much to place on the shoulders of individuals. The capabilities and competences required are truly monumental; and it cannot essentially be the characteristic and prerogative of ‘knowledgeable’ and experienced individual minds. Ramirez rightly asks: even if an individual could be wise at one level, could he also be wise at other, lower, or higher levels? [70] The postnormal condition suggests not.

Perhaps AI could come to our rescue. If wisdom, as Swartwood suggests, is ‘the same kind of epistemic achievement as expert decision-making skill in areas such as firefighting, and military tactics’, then AI would be perfectly suitable for the task. Indeed, there is emerging literature that argues that AI can, and should, be the repository of all wisdom. [71] As the American philosopher Shannon Vallor points out, ‘the current trajectory of computerised automation, driven by advances in new algorithmic techniques for machine learning and mobile robotics, risks gradually displacing human wisdom from many of the roles it has historically occupied in the moral and intellectual order of society’. [72] Thus, in postnormal times, the

DIKW pyramid ceases to be a pyramid. The hierarchy evaporates as AI gathers data, processes information, synthesises knowledge, and dispenses wisdom. The postnormal shifts now become clear. We move from:



But there are a couple of nefarious ghosts in the machine.

First: AI operates under the smog of ignorance. AI contains all the biases, prejudices, and ethnocentric judgements of those who produce them in the first place; and it utilises plain, vincible, and invincible ignorances – the toxic component of emergent knowledge – in its judgments and decision-making processes. We saw that when Microsoft chat bot, tay.ai, released on 23 March 2016, acquired racist and misogynistic overtones a few hours after its release; it had to be shut down within sixteen hours of its launch. A year earlier, Google's photo app happily labelled African-Americans as 'gorillas'. Google's BERT, launched in 2018, demonstrated similar gender and racial bias. Indeed, almost all AI's such as ELMO, ERNIE and GPT-2 have faced similar issues. The very fact that these AI's are named after the characters in American children's show, Sesame Street, indicate the problem here: AI's pick up prejudices and biases 'in the way a child mimics the bad behaviour of his parents'. [73]

This paternalism is the very foundation of Eurocentric hegemonic epistemological and ontological orthodoxy. The West has conventionally seen the non-West as a child to be disciplined, taught and told how to behave and think. So, AI not only retains all the dominant and totalising discourses but also enhances and makes them prevalent. Ultimately, AI would have the power to define everything, every idea, every concept, in the image of its creators. Not only will AI engendered knowledge and wisdom enhance the conventional dichotomy of us and them, West and East, rich and poor, but it will also outlaw – and define out of existence – pluralistic perspectives, tacit knowledge, situated experience, mystical understanding and other ways of seeing, being, doing, and knowing.

Second: if wisdom is simply a mechanical endeavour, based on knowledge and a certain set of rules, how then can we actually measure AI wisdom? How

would we judge that AI has actually made a wise decision? There are, as human intelligence researchers Nic M Weststrate, Michael Ferrari, and Monika Ardel tell us, three scientific methods of examining and measuring implicit claims to wisdom: ‘descriptor-rating, person based, and experimental methods’. [74] The first simply ‘asks individuals to rate, rank, or sort adjectives or short statements potentially indicative of wisdom’. The second, person-based approach, asks a selected group to nominate wise individuals and provide an example of their wisdom in action from their biography. The third, so-called ‘experimental approach’ asks ‘individuals to judge the wisdom of fictional characters who differ in age, gender, or other characteristics’.

IN OTHER WORDS, IT IS HUMAN BEINGS, EVEN IN SCIENTIFIC EXPERIMENTS, WHO ARE THE ULTIMATE ARBITRATORS OF WHAT CONSTITUTES WISDOM AND WHO ACTUALLY POSSESSES IT. SO, WE MAY SAFELY CONCLUDE THAT, IN THE FINAL ANALYSIS, WISDOM IS ESSENTIALLY A HUMAN ATTRIBUTE; ONLY HUMANS HAVE THE ABILITY TO JUDGE WHAT IS AND WHAT IS NOT TO BE WISE!

This point was made amply clear in a 2018 workshop at Nordich11, a biennial conference that functions as the main Nordic forum for human-computer interaction research. A multidisciplinary group of researchers, academics, philosophers, and ethicists explored the role of AI and Human Computer Interaction (HCI) in the future of wisdom during the coming decades. ‘What will be the long-term consequences of HCI, AI, IoT, Big Data and Smart Technologies 50 years from now – in 2068?’ [75] Wisdom, the concept paper for the workshop stated, ‘relates to the ways in which we make decisions and act, based on our experiences, knowledge and reasoning. As a critical lens on computing, it includes both questions on our epistemologies (i.e. ways of knowing) and our ontologies (i.e. what is and can be). For instance, Augmented Reality proposes new forms of “hybrid” objects that are both “real” (i.e. we can interact with them), and “imagined” (i.e. they are not physical), that interact with our environments and change our perceptions and sense-making in those environments’. As a Design Fiction workshop, the participants had to utilise fictional abstracts ‘from research papers that have yet to be written’ so they could ‘explore possible consequences of the technologies they themselves are developing by conducting critical thought experiments’. [76] The fictional abstracts describe futures where AI replaces human decision-making, encourages humans to make wiser decisions, and uncovers the impact of wiser decision-making on the environment and resources. However, the participants found that the technologies they described ‘may not have been that wise’, ‘there is no abstract where wisdom lies in the technology in itself’, and ‘we didn’t find any of the technologies that our

abstracts were talking about to be wise. The closest was the one that depicted [AI] trying to get people back involved with science'. The conclusion: 'the gut feeling from the workshop was that wisdom is primarily found in humans'. [77]

So, wisdom may not be an attribute that could be transferred to a machine – however 'intelligent' it may be. It is one thing to provide selected traits of wisdom to AI and quite another for AI to actually act wisely. And if we are teaching wisdom to AI, exactly what kind of wisdom is being imparted? Is it the philosophical wisdom of Socrates? Or the practical wisdom of Aristotle? Or the compassionate wisdom of Jesus and Mohammad? Or the paradoxical wisdom of Buddha, who never made a judgment in his life, but dispensed wisdom through enigmas and maxims. Or the wisdom of Rumi who taught with parables and moral stories. Or should we emulate the metaphysical wisdom of ibn Arabi?

Wisdom cannot be simply reduced to a set of rules. There are certain key aspects of wisdom – often absent from the discourse that focuses solely on rules and logical components – that are specifically human: empathy, compassion, love, forgiveness, sincerity, humility, patience, gratitude, courage, modesty, introspection, contemplation – the old fashioned, time honoured, virtues so essential for acting wisely but so demanding to teach a machine. The very virtues we need to navigate postnormal times. [78] Moreover, human wisdom also incorporates the rather essential notion of responsibility. As Vallor notes, AI cannot take responsibility for its decisions and judgments; only humans can take responsibility, and can be held accountable, for the decisions and judgments made by AI. [79] Responsibility and accountability are essential moral components of the virtuous state that is wisdom. So, the wisdom of AI is as artificial as its intelligence. AI may help us tackle so many intricate, interconnected, contradictory, and rapidly changing 'wicked' problems we face in these postnormal times. It would help us discover new treatments for dreaded diseases and dangerous cancers. It may even augment and encourage humans to make better decisions. But for real and authentic wisdom we will have to look elsewhere.

Postnormal Wisdom

Navigating postnormal times requires a new order of wisdom. It is quite clear that the depth of knowledge, and insight to circumnavigate the smog of ignorance, required at any one level is far too much for an ordinary human being. We thus have to rethink wisdom not so much as an individual but as a communal virtue. We need to move from the conventional notion of wisdom as a repository of individual quality, the prerogative of sagely individuals to a more profound understanding: wisdom as a collective, communal, enterprise. In postnormal times, wisdom has to be seen as a collective moral acumen; a rational cooperative learning how to live sustainably; a communal effort to create what is truly of significance; what enhances quality of life, human well-being, and augments the health of the planet; and what plants the seeds for a genuine future of justice and equality. Maxell provides a wide-ranging definition of wisdom more suitable for our age:

Wisdom includes knowledge and understanding but goes beyond them in also including: the desire and active striving for what is of value, the ability to see what is of value, actually and potentially, in the circumstances of life, the ability to experience value, the capacity to realise what is of value for oneself and others, the capacity to help solve those problems of living that arise in connection with attempts to realise what is of value, the capacity to use and develop knowledge, technology and understanding needed for the realisation of what is of value. [80]

Maxwell suggests that such wisdom can be institutional and social; but I would argue it has to also be communal and networked. Just as knowledge is nowadays acquired in communities of researchers and scholars, wisdom too must be spawned by communities that share common norms, values, and goals.

SUCH COMMUNAL WISDOM WILL HAVE A COUPLE OF EXTRA LAYERS OF GENUINE KNOWLEDGE THAT AI COULD NEVER REQUIRE: TACIT KNOWLEDGE AND WHAT WE MAY CALL HANDHELD KNOWLEDGE.

Tacit knowledge is culturally embedded, it makes sense, and provides a sense of direction, within a particular cultural milieu. It is the knowledge of indigenous cultures, traditional societies, and scholarly communities, where it is passed from generation to generation. It is possessed by individuals, who may not even be conscious that they hold it, and shared in communities. Like the ability to speak Urdu, play the sitar, or design buildings and cities, it is complex, abstract, embedded, deeply causal, difficult to articulate, and as such cannot be transferred to other people. The only way to acquire it is to join the community. Handheld knowledge is knowledge of a more intimate nature: knowledge we acquire through deep listening, inner reflection, or metaphysical speculation, or numinous elation, or communion with nature – ethereal insight and understanding we can all possess in the palms of our hands. It is the kind of knowledge that brings people together for mutual erudition, caring, healing, and for growth. ‘And it is just this gathering, which enables spaces to open up between people, for people to learn from one another. Through the hands, sharing a wisdom so old yet so contemporary – a wisdom capable of creating networks between people and land, and between cultures. Handheld knowledge unpacks what it means to deeply listen, growing a “slow-time-space” that is more in alignment with our inner thoughts. [81]

Besides well-established old virtues, wisdom communities will also have a complex, holistic virtue essential for postnormal times: what Vallor calls ‘technomoral virtue’ – the ability to see the moral dimension of accelerating technological change. Technomoral virtue is somewhat different from established virtues such as honesty, flexibility, humility, and self-control in that it is not a precise temperament but ‘a general condition of well cultivated and integrated moral expertise’. [82] It functions as a lens through which we contextualise and cultivate

old virtues 'with a new and explicit adaptation to our emerging global technomoral environment'. [83] Technomoral virtue then serves as a collective intellect that enables us to see what is really good in a changing context and choose viable and wholesome futures from a plethora of destructive and inhuman options.

We have to consciously create wisdom networks and communities where the collective can provide a modicum of capabilities and competences to see through the smog of ignorance and navigate postnormal times. That is, networks and communities bound together with aspiration to transcend contradictions, with intellectual acumen to raise ethical and moral concerns, to appreciate that complex issues require complex approaches, and to act, when necessary, with, as the advocate of Extinction Rebellion say, 'love and rage'.

But communal wisdom is not just about when to act but also when to stay still: questioning the perpetual quest of arrogant and toxic knowledge, of the lust, fantasies, and dreams of intoxicating knowledge – 'the madness of knowledge' – and gathering together the knowledge and capability of stillness. [84] Communal wisdom is about how communities learn not just when to speak, but also when to stay silent: for the more we express ourselves in postnormal times, the less we say and the less power we have; the more information we generate the more agency and independence we lose, the more dysfunctional our communities and societies become.

History, said ibn Khaldun, moves in cycles. So, we return to Eliot's lament, written over eighty years ago, and the opening verses of 'Choruses from The Rock':

The Eagle soars in the summit of Heaven,
 The Hunter with his dogs pursues his circuit.
 O perpetual revolution of configured stars,
 O perpetual recurrence of determined seasons,
 O world of spring and autumn, birth and dying!
 The endless cycle of idea and action,
 Endless invention, endless experiment,
 Brings knowledge of motion, but not of stillness;
 Knowledge of speech, but not of silence;
 Knowledge of words, and ignorance of the Word.

Wisdom is the quest for the life we are losing in postnormal times. It is discovering ways of transcending such modes of life and living, of seeing through the smog of ignorance, learning to navigate postnormal times towards safer, more desirable futures for all our diverse communities as well as the Earth, the very abode of our terrestrial journey.

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REIMAGINING EXPERTISE FOR POSTNORMAL TIMES

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In December 2020, news has just been broken that Covid-19 vaccines have been approved and mass rollout will begin shortly. Hailed as a miracle of science, this undoubtedly ground-breaking medical achievement confirms once again the epistemic authority of science and its power to return our lives to normal. Yet, as Arundhati Roy concisely pinpoints, it is exactly this ‘normality’ that lies at the core of current entangled problems:

‘our minds are still racing back and forth, longing for a return to “normality”, trying to stitch our future to our past and refusing to acknowledge the rupture. But the rupture exists. And in the midst of this terrible despair, it offers us a chance to rethink the doomsday machine we have built for ourselves. Nothing could be worse than a return to normality.’ [1]

While Covid-19 is the greatest global crisis the world has faced since World War II, this pandemic is merely the most recent manifestation of historic, continuous, and contiguous crises that have been subtly unfolding but are now clearly manifesting in all their extreme severity. This view departs from the triumphalism of commentators and medical experts waving ‘vials of liquid hope’ to signal the end in sight, and instead focusses on the complexity of a syndemic constituted of interlocking and mutually reinforcing socioeconomic and environmental variables, addressing which requires more than ‘medical miracles’. [2] This raises the inevitable question of what and whose knowledge is or should be providing answers, which is being side-lined through the choice of particular framings and discourses, and with what consequences for the creation and implementation of expert-driven ‘evidence-based policy’.

The question of scientific expertise is central to the Covid-19 pandemic. It also propelled the systems, institutions, and processes of science advice to unusual public prominence and scrutiny. Press conferences led in regular intervals by political actors have ensured that the visual ‘parade’ of leaders’ daily briefings also included physicians, public health officials, epidemic modellers, and other perceptibly

neutral 'experts'. The language of science has permeated political discourse and is being used to build trust, reassure the public, and justify government policy.

It is evident from the unfolding of policy turns and u-turns since the beginning of the pandemic that 'following the science' is a less than straightforward and deeply politicised slogan. It implies that there is 'one' science to follow that is almost always transmitted in a very specific and acknowledged form of assumedly neutral and objective expertise. Yet, as we see from the different science-based strategies that countries have adopted (consider for example Sweden and New Zealand), there is not just one science and 'evidence' is always open to interpretation. During this process, objective, neutral, but also uncertain, data become inevitably intertwined with political worldviews, values, and interests. If political action is always values-driven, so is the science that advises it.

For the Australian philosopher, Heather Douglas, acknowledging the importance and role of values in science brings front and centre the moral responsibility of scientists and science advisors to communicate scientific uncertainty and its societal consequences – undoubtedly the defining feature of crises such as Covid-19. [3] But, it also brings to the fore the inescapable reality that science advisors and other experts cannot (and, according to Douglas, should not) divorce their understanding of reality from their experience of it. The latter underpins the ideologies, assumptions, and values that inform the framing of problems and possible solutions experts offer, directly or indirectly, to policymakers, ultimately making them accountable to society. Much of the public scrutiny directed at science advice focuses on the 'credibility of the data', but there is little debate on the worldviews informing the interpretation of the data and models that have fed so heavily into the critical policy decisions made at this time.

**IT IS NOT ENOUGH TO ONLY CRITIQUE THE ASSUMED NEUTRALITY OF
'SCIENCE' AS SUCH, BUT WE NEED TO MORE CLOSELY LOOK AT WHERE
'SCIENCE' COMES FROM.**

To do so, we must consider the current structures of local and global expertise and ask to what extent they reproduce particular ideological and epistemic commitments that narrow the policy horizon for postpandemic/crisis reconstruction. Governments around the world have had to walk the very tight rope of saving lives and livelihoods, repeatedly framed as a trade-off. Efforts to restart the economy through stimulus packages to restore pre-pandemic patterns of consumption have resulted in second and third waves throughout much of Europe, demonstrating the incompatibility of protecting health and protecting the economy (or at least the current economic model). This highlights that political imagination is very much tied to a normative ideal of modernity and a commitment to individualism, capitalism, urbanisation, technological progress, and growth.

We will critically approach the question of what and whose knowledge dominates public discourse and influences decision-making, particularly in the context of Covid-19. In order to re-imagine notions of 'expertise' our point of departure is an understanding of Covid-19 as the latest manifestation of a slow burning 'crisis of modernity'. Policy advice and political action are grounded on particular epistemic and value commitments that risk narrowing the range of possible solutions to address the root causes of this pandemic and the other multiple crises connected with it. Covid-19 has placed humanity on the edge of an epochal shift that offers an opportunity for long-term changes so that we can truly build back better. This demands new understandings and framings, possible only if expertise in general, and science advice in particular, are reasserted and transformed through a new commitment to epistemic pluralism.

The analytical framework of wicked problems will reveal the problems arising from a monopolisation of expertise, namely the exclusive possession and/or control of cultural capital – recognized as legitimate competence and authority – by a small number of elite players. [4] Drawing from postcolonial theory, we interpret the monopoly of expertise as both a function and product of historic processes of epistemic narrowing resulting in the dominance of certain voices and institutional structures that have come to symbolise 'trust', rigour, and knowledge. We argue the monopoly of expertise along three lines of epistemic narrowness: disciplinary, geographical, and ideological. These different forms of narrowness in 'expertise' and values concur to (re)produce the premises of modernity towards which resources are disproportionately directed: individualism, capitalism, urbanisation, and belief in the possibilities of technological and political progress. In the context of the current pandemic, this is seen in the strong emphasis that countries across the so-called industrialised world have placed on technoscientific solutions (e.g. tracking apps), even in the face of proven low-tech community-level strategies successfully deployed across Africa during Ebola and now throughout the present pandemic. [5] This technology-focused approach is not value free; it responds to a historic narrative of progress as inextricably linked to science that devalues other (nonmainstream, peripheral) forms of knowledge and expertise. It may also explain the ascendance of a particular cadre of scientific experts to the unprecedented levels of recognition and authority seen during this pandemic.

Covid-19 has been construed as a unique and genuine 'global health' crisis, with science at its centre. Throughout this pandemic, leaders have relied predominantly on biomedical expertise. Yet, if we accept that this is only one among multiple ongoing crises – social, environmental, intergenerational, political and economic – addressing Covid-19 will require not just medical solutions, but, above all, addressing the interrelated inequalities exposed by the pandemic. [6] For this, we cannot simply reproduce the same old paradigms of unsustainable consumption and unequal growth that have opened societal chasms almost everywhere but must create spaces for new frameworks to emerge.

Policymaking in the post-Covid era will need to be creative and unconstrained by old models and rigid path dependencies. Scientific advice can support this process only by overcoming its historical epistemic narrowing and embracing greater pluralism: disciplinary, geographical, ideological. Grounding our argument in post-normal science (PNS), we suggest that in order to reimagine policymaking in the post-Covid era, scientific advice, though one among the multiple perspectives needed, must harness a diversity of experiences and knowledge, avoiding narrowly defined conceptions of expertise. [7] Science advice in times of crises, but more so in post-crises times, must encompass a plurality of voices beyond those already amplified by power and privilege. This is essential to identify and frame alternative solutions that lie outside individuals' field of vision, due to the blind spots created by the moral values, worldviews, or interests that become inevitably entangled with myriad scientific processes.

Narrow expertise has profound implications for public policy and therefore our argument is fundamentally normative. Following the British philosopher Miranda Fricker, we frame the monopoly of expertise as an epistemic injustice. [8] It consists in the persistent side-lining of relevant forms of knowledge and experiences that results, through their exclusion from public discourse and policy debates, in a dismissal of needs. Understanding and challenging epistemic injustices, especially where ideas come from, who embodies them, how expertise is framed, interpreted and ultimately acted upon has never been more pressing than in the age of Covid-19 the world over, when life and death decisions are being made in the name of science. Challenging the accepted imaginaries of knowledge and expertise means also, and perhaps more fundamentally, challenging the premises and values that determine what knowledge and which experts are relevant to society and its problems. Drawing from PNS, we conclude that in these unique times the co-creation of knowledge needs plural, diverse and inclusive epistemic global communities, operating with openness and transparency.

Epistemic Narrowing and the Monopoly of Expertise

One of the most salient features of the current pandemic in countries around the world has been the increased reliance on experts to guide decision-making, a paradoxical reversal of the post-truth, postmodern contestation of expertise. This 'return of the expert' brings into focus the entangling of knowledge with authority, legitimacy, and power in the struggle to re-imagine and define contemporary societies. The reaffirmation of the pre-eminence of scientific expertise at play in this pandemic suggests that, notwithstanding the postmodern contestation, science still holds sway as the exclusive and exclusionary voice of progress.

The linking of some forms of knowledge with progress, science, and the future that, at least superficially, underpins the idealised pursuit of 'evidence-based policy' has its roots in nineteenth century Western knowledge narratives. [9] Progress was envisioned in deterministic, crudely imagined linear journeys from a state of backward, under-developed rural subsistence to diversified and self-regulating

market-based knowledge economies. [10] Technological advances contributed to the self-portrayal of Europe as 'developed' against the 'under-developed' rest of the world – a narrative used to justify the colonial enterprise. [11] Science also became culturally biased, for the questions that came to count as "scientific" were those that contributed to increasing Europe's expansionist powers, whilst other aspects of reality remained unchartered. [12]

This 'imaginary' is itself perpetuated by the codification, validation, and dissemination of disciplinary silos of narrowly defined techno-scientific 'expertise'. The professionalisation of both what and how we 'know' has contributed to the hegemony of certain ideas and has delimited both who is an expert and also how that expertise is both sought and expressed. [13] In other words, 'progress' entails considerable homogenisation of what is considered 'knowledge', often defined through techno-scientific paradigms, but also through who is considered a knowledge expert. Knowledge is communicated through common languages, maps, or 'grammars' which have both intrinsically gendered and racialised dimensions. [14]

AS AMERICAN SCHOLAR DONNA HARAWAY ARGUES, THERE IS AN OBJECTIVELY KNOWABLE 'TRUTH' THAT IS UPHELD BY 'MASCULINIST SCIENTISTS'. OBJECTIVE, RATIONAL SCIENCE IS, IN SHORT, THE PROVINCE OF MEN.

A similar discursive exclusion occurs in how knowledge becomes 'raced'. [15] The particular world view that led to the primacy of white Europeans as 'civilised' or 'advanced' against the 'backward' or 'poor' 'negroes', [16] which persists in the racial tensions that still pervade our modern societies, may be the philosophical and political antecedents to the current gendered, racialised, and exclusive system of expertise that has the 'male white expert' as its key referent. [17]

We suggest that the 'science' guiding the political response to Covid-19 is to a great extent the product of these historic processes of epistemic narrowing of how we make sense of the world and whose consequence has been the development of a monopoly of expertise. This is manifest in the predominance of certain disciplinary framings and interpretations of reality over others and in the gendered and racialised expertise that continues to influence leaders around the world (Figure 1). Lack of diversity, both disciplinary and experiential, matters epistemologically. Besides the obvious exclusion of talent, an exclusionary, elitist, and homogenous monopoly of expertise makes it more difficult to escape scientific bias. For disciplinary perspectives, values, life experiences, and interests all condition the hypotheses, background assumptions, models, and explanations offered, as well as the choice and framing of questions that are studied – and ignored. [18] But lack of diversity and the epistemic narrowness it brings, also matters morally. For it 'create(s)

spaces in which those who already manipulate the world can further strengthen their power position, and then impose (or reaffirm) a pattern which allows them to continue manipulating the world'. [19] Lack of diversity in science in general, and scientific advice in particular, produces blind spots to the needs and realities of those sectors of society most underrepresented, as well as the impact of policies on these groups, further disempowering them. In the context of the current pandemic, it is then pertinent to ask: through whose lenses are our decisionmakers making sense of reality? Whose worldview is producing and interpreting the evidence that influences the decisions upon which our lives and livelihoods depend? What knowledge is being considered and what knowledge is being excluded from the decision-making process?

A Wicked Problem

There is no doubt that Covid-19 is a complex crisis or, to borrow from Rittel and Webber, a *wicked problem*. [20] Wicked problems arise in situations of uncertainty and cannot be easily defined because multiple and often incompatible characterisations are possible depending on the agents' perspectives and underlying values. Since there is no single definition of the problem there can be no single answer but a variety of multiple and often contradictory solutions. We saw this at play during the early phases of the pandemic, for example, when disagreements regarding asymptomatic transmission translated into confusing public health responses, [21] including the controversial pursuit of herd immunity. [22] It is in this context of uncertainty caused by an information deficit typical of wicked problems that scientific expertise and politics intersect.

Despite their fuzzy edges, wicked problems demand action. Decision-making requires introducing some sort of logical structure that allows the problem to be defined, making it manageable, so that solutions can be identified. This entails simplifying the problem by reframing it as a bounded problem and not as one that exists within, and interacts with, a broader ecosystem. In Rittel and Webber's terminology, this means turning a 'wicked' problem into a 'tame' one. [23] Simplification and reframing – taming – facilitate the transfer of powers to a few actors or decisionmakers. In the case of Covid-19, defining it as a health crisis has meant that overall responsibility for the pandemic response has sat predominantly with health ministries. [24]

Establishing problem boundaries also allows realignment of the problem along the lines of the available forms of expertise – matching the problem to the tool rather than the other way round. [25] Particularly when dealing with highly technical or novel issues, this may involve the creation of a technical independent agency or epistemic community (in the context of the current pandemic, a prime example of such epistemic community is the UK Scientific Advisory Group for Emergencies, or SAGE and its various technical subcommittees). The question is not so much what expertise or knowledge is necessary to address the problem but who has the most relevant expertise that can be readily deployed. However, while

this may be necessary to effect action, this results in a disciplinary narrowness that limits participation to those perceived to have knowledge relevant within those boundaries. It also constrains debate and risks setting aside competing perspectives. Narrow expertise can produce tunnel vision neglecting the complex problem interdependencies and favouring quick shallow fixes. Crucially, it entails an epistemic commitment to the particular framings (and solutions) favoured by the small monopoly of experts. Because any given problem definition implicitly binds us to a specific set of solutions, who influences how problems are framed matters. For those who see this pandemic primarily through a public health lens, reducing the rate of infection is above all other priorities, in contrast to those who perceive the problem to be mostly about food and job security and for whom economic resilience is paramount. Framings are a powerful tool to shift our perspective, but they are not morally neutral.

The global management of the current pandemic conforms to the characterisation of 'tamed' wicked problems. Rather than addressing it as a complex problem with multiple characterisations and requiring multiple perspectives, the political response has been consistently narrow and lacks a 'whole-of-government approach'. This was identified in Iran as one of the causes of the country's inadequate response to the pandemic. [26] Lack of cross-government coordination can be also seen in countries characterised by siloed, fragmented systems such as the US where the primary responsibility for managing the outbreak was placed with local health agencies. [27] In the UK, cross-government organisations such as the National Security Council (NSC), whose role is to coordinate the different parts of government on issues of national security, have had a limited role during the pandemic. [28] Instead, key decisions were made by a tight decision-making group involving a few senior ministers. Reduced cross-government coordination and siloing also means reliance on a narrow body of expertise, that which is seen as most relevant to the agency/group with overall responsibility. By 'taming' Covid-19 as a health crisis, governments have overwhelmingly drawn scientific advice from the biomedical community, with an overrepresentation of modellers, epidemiologists, and virologists. Epistemic narrowing and lack of disciplinary diversity resulting from the strong biomedical framing of the pandemic may be responsible for the scientific biases that in the early phases underestimated the difference between Covid-19 and flu and led to a pandemic response based on influenza modelling. The same disciplinary narrowing of (biomedical) expertise may explain the conspicuous lack of understanding of the economic cost of the policies advocated, as the UK Chief Scientific Officer (who chairs SAGE) admitted in front of a parliamentary committee. [29]

Our concern here is not to belittle the incredible contribution of science to the current situation, nor to question the right focus on the immediate public health response. Our aim is to highlight how taming Covid-19 has been both a political choice and a function of the epistemic narrowing of expertise, and this may affect the policy direction as societies emerge from the pandemic. Governments (perhaps influenced by their scientific advisors) continue to construe Covid-19 as a unique,

unprecedented, and exceptional 'health' situation and not, as we argue, the latest of the many complex, interconnected, and interdependent 'crises of modernity'. In the UK, this exceptionalism is reflected in the setup of bespoke management arrangements (for example, for test and trace) outside the usual government structures (such as the National Health Service), which can be rolled back once the threat is removed and 'business as usual' resumed, suggesting that the government views Covid-19 as a transient, unique event. The narrow health focus is also seen in the penetration of epidemiological terms (peak of infection, fatality ratio, R-number, etc.) in political discourse and everyday language, and contributes to the portrayal of Covid-19 as an acute problem of rapid and unexpected onset while distracting attention from its long-term drivers: this has long been a crisis in the making. [30] Mathematical models and narrow technoscientific expertise may provide powerful number-answers for policymaking during crises, but they entail simplification, and value-laden framings.

**TAMING A WICKED PROBLEM MAY BE HELPFUL IN THE SHORT TERM
WHEN THE PRIORITY IS CLEARLY TO SAVE LIVES, BUT IT LEAVES
UNRESOLVED THE QUESTION OF HOW TO TACKLE THE BIO-SOCIAL,
POLITICAL, AND ECONOMIC DETERMINANTS OF PANDEMICS: POVERTY,
CLIMATE CHANGE, FOOD SECURITY, UNIVERSAL HEALTHCARE,
URBANISATION, ETC.**

The question of what post-Covid era we should strive for requires other types of normative approaches and expertise.

How problems are framed constrains the possible range of solutions identified. If we perceive Covid-19 as a unique and transient episode in history that demands a time-limited set of responses, then once decisionmakers decide the goal has been achieved the response can be rolled back, allowing a return to 'business as usual'. If, on the other hand, we look at the interconnectedness of this pandemic with other crises of, for instance, climate change, populism, racism, or intersectional inequality, then it becomes apparent that this moment in history might offer a turning point for recalibrating our values and rethinking the domestic and global structures that lie at the root of our current predicament. Which of these two visions ultimately prevails might depend, albeit only in part, on the expertise available to decisionmakers.

Privilege and Prejudice

It would be mistaken to think of science advice as disembodied expertise. We think it is important to consider not only what expertise informs the decision-making process but also who embodies such expertise, who is recognised and who is excluded. For besides the disciplinary dimension, there is also an ideological

dimension that becomes manifest in the political tactics of selective use and commissioning of expert advice to support particular agendas. [31] Epistemic narrowing occurs through the exclusion of qualified advisors whose views do not fit, or the appointment of experts 'on the right side', with the greatest social capital, or of trustworthy background (be it educational, social, or political). [32] The 'expertise' that governments seek when appointing advisors may be therefore less meritocratic and more ideological.

Understanding ideological narrowing necessitates more detailed insights into how expertise is constituted, legitimised, and how it relates to power by becoming the product and preserve of certain social groups. Expertise is a relational concept constituted both through exclusion and recognition. I can only be an expert if others are non-experts, and my standing depends on the demands that others place upon my knowledge. As a relationship of exclusion, expertise implies a dichotomy between experts and non-experts and a knowledge differential that often runs alongside other social differentials: of power, privilege, and prestige. [33] These experts (individuals and groups) become invested with an authority bestowed by a self-regulating community of peers with its self-determined standards of excellence, norms, and structures of inclusion and exclusion, exempt from public accountability. In the case of academic experts (one among different forms of expertise available to governments), peer-review, citations indexes, and availability of resources (in the form of grants, access to networks, etc) are some of the indicators that measure an individual's esteem by the community of peers and, therefore, their standing as an expert. These indicators may look like a particular set of value-neutral judgements, but they are in fact a kind of credentialism that serves to perpetuate the entrenched inequalities that help preserve both the expert's recognition and their exclusionary status quo.

The technocratic approach to Covid-19 uniquely reveals this exclusionary status of scientific experts which has left critical questions of public health outside the scope of democratic deliberation. Governments 'following the science' have sought to ensure a rational approach to decision-making and ensured the flow of scientific information to ordinary citizens to increase compliance. However, this has hollowed out public discourse, perhaps contributing to a growing sense of disempowerment and disaffection, as seen in the decreased compliance to government advice during the second wave of infection. Talk of R-numbers, virus transmissibility, or infections curves glosses over the difficult moral and political questions that are at the heart of the Covid-19 crisis and which remain away from the headlines: the social and economic determinants of disease vulnerability directly linked to a capitalist model of economic growth and neoliberal health policies of recent decades, the pervasive individualism and diminished sense of the connectedness that characterise modern societies, and which more than misinformation undermines the solidarity that underpins public health measures. These are not technical questions to be answered by experts but questions about justice and morality, which is to say they are questions for democratic deliberation.

As a relationship of recognition, expertise only exists in a demand-supply relationship. While the drive to create/acquire knowledge may be driven by a range of 'push' factors (funding, opportunity, urgency), the ascendance to *expert* only becomes manifest at the request of someone (an individual, an organisation, a government). [34] Expertise is, to a great extent, in the eyes of the beholder. Personal recommendation via established networks (peer recognition) or media presence (public recognition) are among the primary mechanisms by which policymakers identify experts. [35] Those who accrue the greater social capital in the form of 'more or less institutionalised relationships of mutual acquaintance and recognition' are often those who have a seat at the inner circle of policy advisors at the exclusion of others. [36] However, social capital, which is often internalised by policymakers as a proxy for expertise in their selection of advisors is, according to Bourdieu, irreducibly linked to class and other forms of social stratification. The consequence is that instead of a spectrum of views and diversity of experience, a virtuous circle of influence is established consisting of a monopoly of experts, a continuation of the epistemic narrowing of colonial knowledge systems. And because it is usually easier to recognise and trust those with views and other characteristics similar to one's own, experts tend to be sought among those 'on the right side' [37] or those whose expertise may be perceived to lend credibility to a pre-conceived policy agenda. [38] To illustrate this, consider a recent journalistic investigation that revealed how tensions within the UK government in the face of a second wave of Covid-19 infections were resolved by the Prime Minister following a secret meeting with health experts. Faced with competing demands from ministers in favour of tougher public health measures and those in favour of protecting the economy, the Prime Minister is said to have sided with scientists advocating the controversial 'heard immunity' approach, side lining the official scientific advice. [39] Heard immunity is a fringe view that promotes a *laissez-faire* management of the pandemic which allows people greater freedom to pursue social and economic activity, a view more consistent with ministers concerns over the economic downturn caused by the pandemic as well as the alleged libertarian instincts attributed to the Prime Minister. [40] Not just privilege is perpetuated (in the exclusionary selection of experts) but ideological narrowness is magnified by the creation of scientific echo chambers (policy-based evidence) and the inequitable exclusion of relevant knowledge and constructive criticism.

Alongside the ideological narrowing and related to it, sits a geographical narrowing that manifests itself in the apparent unwillingness of the so-called Global North, or those countries considered 'rich' and/or 'developed', to avail themselves of the experiences and knowledge preserved in the collective memory of countries already tested by deadly infectious outbreaks. [41] The geographic narrowness of knowledge and expertise are a symptom of a pervasive narrative – or rather, a prejudice – that continues to portray the so-called Global South, 'poor' and/or 'developing' world mostly as the location of problems, the source of infections, rather than the possible source of knowledge or solutions. This is not a failure to

recognise that knowledge and expertise exist outside the Europe-North America axis; rather, it is a failure to see the relevance of these diverse sources of knowledge and expertise to the problems of the North. Western exceptionalism underpins the historical credibility excess of ‘international expertise’ and the concomitant credibility deficit of local, situated, expertise which, despite the rhetoric of partnership and equality, still characterise international cooperation. [42] In the context of the current pandemic, ideological and geographical narrowness may well be one of the root causes of the millions of individual stories of loss and suffering behind the Covid-19 statistics and the persisting inequalities within and among societies globally, a theme to which we will return shortly.

Epistemic Injustice and the Dismissal of Needs

The epistemic narrowing caused by a monopoly of expertise that is constituted through selective exclusions and inclusions of knowledges both at the local and global levels is not morally neutral: it amplifies deep-seated ‘epistemic injustices’, that is, the enduring side-lining of relevant forms of knowledge and experience. [43] Epistemic injustices occur when ‘someone is wronged specifically in her capacity as a knower’ [44] or when ‘socioepistemic structures’ [45] converge to marginalise certain groups and exclude them from the process of knowledge production. In Fricker’s account, the former is described as ‘testimonial injustice’ (someone’s account of reality lacks credibility) and the latter as ‘hermeneutical injustice’ (some people’s experiences are not understood or rationalised due to their historic exclusion from the structures and activities that shape knowledge creation). [46]

BOTH FORMS OF EPISTEMIC INJUSTICE ARE TIED TO IDENTITY-BASED PREJUDICE THAT RESULT IN CREDIBILITY DEFICITS OF CERTAIN INDIVIDUALS/GROUPS AND THE CONCOMITANT CREDIBILITY EXCESS OF OTHERS.

They harm most directly those whose interests and voices are the least powerful. When seen through the lens of epistemic justice theory, the narrowing of knowledge, through exclusionary forms of expertise, intersects with broader discourses of race, power, and discrimination within and among societies. The narrow way in which we have become accustomed to ‘know’ the world creates barriers for systems-level learning and change in the face of systemic crisis.

Fricker’s account of epistemic injustice provides us with a lens to interpret some of the ethical consequences of the monopolisation of expertise by local elites associated with discipline-bound forms of knowledge in the context of Covid-19. For example, the behavioural assumptions made by the UK government’s Behavioural Insight Team, which applies nudge theory to public policy, wrongly predicted

poor population compliance with strict and protracted quarantine measures and led to the delayed government response during the critical early phases of the pandemic. [47] This was not just a question of narrow use of expertise, side-lining decades of public health knowledge in favour of behavioural models and theories, it was an epistemic injustice involving a credibility deficit of public health experts costing thousands of avoidable deaths. The male dominance in Covid-19 advisory and decision-making boards around the world and the exclusion of women from the collective sense-making process is a form of hermeneutical injustice, which has resulted in the overlooking of the gender-based inequities that have been amplified by Covid-19. [48] Acting upon the advice of these non-inclusive, non-diverse bodies, governments have adopted response measures such as lockdowns and work from home policies that did not consider women's higher levels of income loss and increased caring responsibilities. The inability to understand and articulate the lived realities of particular groups can exacerbate pre-existing injustices affecting those groups. The experience of Ebola and Zika epidemics shows that affected countries experienced higher levels of maternal mortality, gender violence, unwanted pregnancies, and unsafe abortions because policies failed to account for intersectional needs and implications of measures. Achieving inclusion and representation in advisory boards is essential to provide decisionmakers with a diversity of knowledges, views and perspectives that ensures no-one is left behind. Epistemic justice is a pre-requisite for social justice.

Post-Normal science

Our analysis positions the current system of homogenous expert elites within historic processes of epistemic narrowing, wherein a universalising cosmovision grounded on an epistemic commitment to the normative ideals of modernity becomes associated with particular monocultures of disciplinary expertise, and where the 'othering' of people outside white Europeans continues in the present-day exclusion of knowledges (and needs) from the decision-making process. [49] We frame this monoculture of expertise as a form of epistemic injustice, by which the dominance of particular individuals, groups, and/or forms of knowledge results in the hegemony of certain framings of reality that, when translated into policy, disproportionately affect the most disadvantaged groups in society. The over-representation of biomedical experts (mostly white, mostly male, and mostly from elite institutions) and notable lack of representation of social sciences, female, BAME or other traditionally overlooked perspectives in science advisory groups may have well contributed to the dominant narrative of the pandemic as a 'health crisis' and the failure to recognise its socioeconomic determinants. The 'medical gaze' that sanitises pandemics through epidemiological models supporting quarantine measures, school and business closures, or travel bans without attending to their long-term, social and economic costs renders invisible once more the structural injustices that underlie the disproportionate burden this pandemic specifically, and capitalist accumulation generally, has placed and continues to do so on groups

marginalised or neglected. [50] It is the same gaze that in the UK helped legitimise eyewatering investments in underutilised hospital infrastructure, undelivered ventilators and other underwhelming ‘moonshot technologies’, while low-income families were left struggling to feed their children [51] – an issue taken up not by experts but by soccer stars [52]. Where expert knowledge was silent, another type of knowledge grounded on experience provided answers.

Counteracting a monolithic culture of science advice requires diversifying expertise to foster the pluralism that is inherent to the pursuit of knowledge. This is nowhere more important than in the context of wicked problems, where ‘facts are uncertain, values in dispute, stakes high, and decisions are urgent’. [53] In this context of informational uncertainty and system complexity that the philosophers of science, Silvio Funtowicz and Jerome Ravetz, call ‘post-normal science’ (PNS), trust in a unified science as the universalising voice of reason and progress is delusional. [54] Rather, PNS demands an extended epistemic community, one that reaches beyond disciplinary boundaries and limited sets of technocratic and institutionally-privileged forms of expertise to encompass all those who have a stake in the problem – a socially distributed knowledge system.

BECAUSE IN PANDEMICS THE NATURE OF THE PROBLEM IS NOT ONLY SCIENTIFIC IN NATURE BUT IS ALSO ABOUT THE VALUES, PARADIGMS, AND POLITICAL AND CULTURAL FRAMEWORKS THAT CO-EXIST IN PLURALISTIC SOCIETIES AND WHICH MUST COME TO TERMS WITH EACH OTHER DURING THE CRISIS AND BEYOND.

If pandemics conform to the characterisation of wicked problems inhabiting a PNS space, a deliberative, inclusive, and consensus building approach is needed. [55] For this we must seek epistemic justice recognising not just science’s plurality but also seeing scientific expertise as only one among the various types of relevant knowledge. This, in turn, entails refashioning the structures and systems of scientific advice built on institutionalised practices of knowledge production by expert elites. But more fundamentally, it involves interrogating our understanding of the very notion of expertise and questioning the accepted norms by which those claiming to own it are judged. For an extended epistemic community is, by definition, a snapshot of the diversity of experiences, values, and knowledge characteristic of pluralistic democracies.

The inclusion of diverse disciplinary and social perspectives ensures that the consequences of policies on different groups is understood. Diversity of expertise sharpens our understanding of the stakes, which in turn informs political decisions. [56] Pluralism also makes visible the complex interplay between different groups in their struggle to influence the narrative, counteracts the concentration of

power (and the knowledge enabling it) and, in the context of postcrises recovery, allows alternative frameworks to emerge.

Yet, pluralism on its own is not sufficient, it must go hand in hand with openness. Expertise (whether disciplinary or experiential) needs to be actively challenged. For science is never uniform but always contested, never more so than during this pandemic where premature conclusions (on quarantine, masks, contact tracing, schools, ventilation) were reached often on the basis of data not yet peer-reviewed, and where facts were interpreted (and counter-interpreted) time and again through the lens of ideology. Debate, therefore, helps scrutinise the implicit disciplinary assumptions, blind spots, and value commitments that filter into policy advice. [55] The polarisation unleashed by competing declarations by world-leading scientists advancing diametrically opposing pathways to manage the pandemic could be seen as a healthy exercise of open debate exposing the entanglement of science, politics, and ideology. The Great Barrington Declaration, sponsored by a libertarian think tank with links to the oil industry and the anti-climate change movement, advocated a ‘focused protection’ approach that was soon co-opted by the far-right. [57] The John Snow memorandum, published by The Lancet under the title ‘Leading consensus on the Covid-19 pandemic’ [58] and endorsed by over twenty mainstream public health organisations, was accused as pro lockdown. [59] Meanwhile, the official expert bodies with real power to influence policy remained shrouded in secrecy for months, not just about their operations but also their membership. [60]

For those who see this pandemic primarily through a public health lens, suppressing transmission is above all other priorities, whereas those who perceive the problem to be mostly about economic resilience favour management strategies.

**POLARISATION MAY BE INEVITABLE WHEN THE STAKES ARE HIGH,
BUT IS A PRIZE WORTH PAYING FOR AN INCLUSIVE, PLURALISTIC, AND
TRANSPARENT PROCESS OF DELIBERATION AND DECISION-MAKING.**

Returning to Funtowicz and Ravetz’s PNS scenario, the normative prescription for wicked problems is an ‘all hands on deck’ approach that prioritises open, inclusive, and distributed expertise. And when we do this, we might see this exceptionally unique Covid-19 pandemic in a completely different light.

Expertise for Global Wicked Problems.

The question of what expertise (and experts) governments and society at large need in postnormal times is interrelated with the question of whether we continue to frame the Covid-19 pandemic as *the* crisis which can be overcome as a singular event, or whether we recognise it as one of multiple, interrelated crises that bring to the fore the injustices, inequalities, and racisms that are not new, but continue to persist. Global wicked problems range widely, encompassing ‘the crisis in

global leadership; the global capitalist economic crisis; ecology, the environment, and climate change; the ongoing scramble for African natural resources; and epistemological and cognitive justice issues'. [61] That the current Covid-19 crisis might instead be a manifestation of a broader crisis of 'modernity' implies a need to move beyond the binaries of the current knowledge order. This requires us to challenge two premises: universalism and normality.

Firstly, 'modernity' has exacerbated inequalities within and between countries by requiring adherence to a capitalist, and largely Eurocentric, model of 'progress' everywhere. The expertise sought by policymakers around the world is one that helps achieve and conform with this orthodoxy. This expertise is located almost exclusively in the homogenous and exclusive institutions and systems of expertise. The assumption prevails that there is a universalizable solution applicable to all. To understand the implications of such universalism we do not have to look far. The disproportionate rate of deaths of BAME people in the UK, and the underrepresentation of these groups in the circles of experts that, at least in our respective countries, are predominantly white and male is not incidental. It is a function of historic epistemic narrowing and epistemic injustices resulting in the systematic exclusion of needs. The avoidable health and socioeconomic inequalities exacerbated by this pandemic are a direct consequence of the application of a universalising orthodoxy legitimised by a system of expertise lacking the epistemic and social diversity necessary to form a lived understanding of the realities of poor and marginalised people. [62] The same exclusion holds true for not able-bodied, LGBTIQ and other minorities.

Covid-19 may be a universal problem at this moment, but its impact and implications are not the same everywhere. Likewise, the assumption that the solution is also universal is as equally flawed as thinking the pandemic is a singular event. It is, in fact, quite the contrary; we are predicted to experience more and more devastating epidemics and pandemics, an evolution directly interlinked with an exploitative and extractive way of life. [63] In fact, the extreme increase in Covid-19 infections among precarious immigrant labourers in meat mass producing slaughterhouses in Germany showcases interrelations and impacts of exploitation and extraction, of labour and resources, and the global divisions of work and production. [64]

Secondly, as the impending promise of a Covid-19 vaccine intensifies hopes for a 'return to normal' [65] that unleashed euphoria in stock markets around the world, [66] we are reminded of a tweet by a Chilean activist that made its rounds in social media in March 2021: 'we can't go back to normal, because normal was the problem'. While the slogan referred to earlier domestic protests in Chile, it perfectly grasps the current predicament. Who is defining what normality is? Normality for whom? Here it becomes even more obvious the implications of a monoculture of knowledge. The 'normal' in this new discourse mainly refers to 'restarting the economy' on the previous terms. Governments around Europe are kick-starting economic stimulus packages and the climate crisis, whose urgency

seemed to have gained some traction in 2019, is side-lined in favour of the same economic growth narratives that brought us here in the first place. This underlines ideological narrowness.

The expertise needed to 'build back better' in the post-Covid age is one that critically questions the yardstick we have been regarding as 'normal': excessive consumerism, exploitation of resources and labour across space and time, deepened inequalities, racism, misogyny, and discrimination of minority groups. The fact that now especially Black, Indigenous and People of Colour (BIPOC) migrants and working classes are suffering exponentially from the impacts of the crisis is not a surprise, but a result of policies of recent years: the impact austerity politics have had on health systems, the privatization of social welfare and social protection, working conditions for immigrant labourers, and the list goes on.

Politicians claim they are 'following the science'. 'The science' in that sense refers to a particular type of knowledge. A kind of knowledge that is firmly rooted in a Cartesian reductionism blind to the holistic and organic interconnectedness of life, having disengaged mind from matter and whose ultimate expression is the false dichotomy of nature and culture. [67] This is the particular way of viewing the world, rooted in historic processes of epistemic narrowing, that has become recognized as expert knowledge, simultaneously resulting in reification of an individualised extractive (neo-)liberalism and the delegitimization of knowledges that place emphasis on life in harmony and community with human and non-human beings. 'The science' is never neutral and never objective, but firmly rooted in a very particular worldview, that, despite claiming universal applicability, is far from being the only way.

Given the unfortunate frequency of large-scale disease outbreaks in many parts of the world, more than ever international cooperation is needed to step up global preparedness. Global action is only possible if countries move beyond national interests and towards global solidarity. Solidarity does not mean merely international assistance (necessary as it may be) but, fundamentally, the recognition of the equality (including epistemic equality) and interdependence of all global actors which creates shared responsibilities. Global preparedness must overcome epistemic narrowing and find new respect for the diversity of knowledge and expertise of individuals and groups, especially in the Global South, which have been serially overlooked at the global level. Some of this accumulated expertise is attributable to the efforts of scientists and physicians whose contributions have been largely written out of history but continue to be active at local/regional level. Take the case of Dr. Jean-Jacques Muyembe Tshumbe, the Congolese physician who was the first to collect a sample of the Ebola virus in 1976. [68] In a recent feature for the public service broadcaster in the US, National Public Radio (NPR), NPR East Africa correspondent Eyder Peralta tells Dr. Muyembe's story, which includes the revelation that if you 'Google "Who discovered Ebola?" you get a bunch of names – all of them white Western males'. Peralta interviewed Peter Piot, the young Belgian doctor who received Muyembe's samples and is now Professor of Global Health and

Director of the London School of Hygiene and Tropical Medicine (LSHTM). [69] When asked if he feels ‘responsible for writing Muyembe out of history?’ he responds by saying ‘that’s a fair comment’.

Imagining Alternative Futures

Covid-19 has placed us in a PNS space that calls for intersectional and epistemically diverse knowledge. This is necessary not only at the height of the infection threat when immediate decisions of life and death must be made, but equally important (and our focus here) in the aftermath, when societies must grapple with the question of what the post-Covid world might or should look like and who has a say in shaping it.

We wanted to highlight why questions of knowledge, expertise, and the way we individually and collectively imagine futures, especially in countering immediate crises, are interlinked. We have shown the expertise at play in the face of Covid-19 has been narrow and not inclusive of diverse worldviews, experiences, and perspectives. [70] This applies at the local level, where science advisory boards are a reflection of non-inclusive and non-diverse monocultures of knowledge, as well as the global level. After all, to our knowledge no European government has accepted advice from Global South epidemiologists or learnt lessons from Global South leaders. [71] Inevitably wicked problems are often conceptualised, framed, and simplified in biased ways, and Covid-19 is no exception. But if we accept it as one of many interrelated crises, it becomes an imperative to be open to truly inclusive and deliberative processes of knowledge production and modes of living, being, and relating.

HISTORY WILL TELL US TO WHAT EXTENT COVID-19 REPRESENTS A WATERSHED MOMENT AND AN OPPORTUNITY FOR NEW PARADIGMS TO EMERGE. WE ARGUE THAT THIS SHOULD BE A TIME OF RECKONING, REQUIRING PUBLIC DELIBERATION ON THE UNDERLYING MORAL VALUES THAT GUIDE NATIONAL AND INTERNATIONAL POLICY.

We need a long-term, 360-degree vision underpinned by global solidarity that ‘understands and addresses the interrelated inequalities that have been laid bare by this outbreak’. [72] As its two predecessors, the SARS-CoV-1 outbreak in China from 2002 and the MERS-CoV outbreak in Saudi Arabia from 2012, Covid-19 is the direct consequence of modern capitalism. Epidemics and pandemics are not ‘natural phenomena’ but a biological process interweaved with a social, political and economic context. Aggressive agricultural practices, excessive and messy processes of urbanisation, habitat disruption, and unsustainable resource extraction, all taking place within hyperconnected communities, are all well documented causes

of zoonosis and outbreaks. Covid-19 exposes the fault lines of modern capitalism and presents us with a stark choice between continuing to trust the 'invisible hand of the market' to trickle down solutions to societal problems or a new social contract that reaffirms human dignity and, on that basis, builds the alternative social structures we need. [73]

We do not wish to overstate the role of science advisors and other experts in this process. After all, what model of society should prevail is a matter of public deliberation in which we are all implicated. However, echoing the words of European scholars Corinna Burkhart, Nina Treu, and Mattias Schmelzer, we need to envision alternatives to capitalism, growth, and environmental degradation. [74] This vision cannot emerge from the epistemically narrow forms of expertise which still shape how we and our leaders see and know the world. The tragic consequence of 'epistemic narrowing' is groupthink and the 'policy narrowing' that often culminates in the embodied exclusion of needs. [75] The neglect and even dismissal of localised, diverse, and intersectional knowledge creates blind spots to the lived realities and demands of those left behind. Worse still, it precludes the possibility to imagine alternative futures to the detriment of all. We are experiencing crisis at the moment, but more specifically, it is a crisis of a very particular mode of being in the world. [76]

We are not advocating for a rejection of all that is usually associated with the Western ideal of modernity, including the techno-scientific paradigms that have much improved the lives of millions worldwide and now ground our hopes for a vaccine to relieve us from the coronavirus. This would be to replace one exclusion with another. Rather, we are arguing for epistemic justice, which, at a local level, calls for diverse epistemic communities of science advisors, and at a global level entails the provincialisation of the West and its belief in the universality of its mode of being.

It would be mistaken to rely only on technoscientific expertise to relieve us from our current predicament. A vaccine may well end Covid-19 but will not prevent future zoonosis developing into global pandemics unless alternatives to its root causes, such as extractivism – destruction of habitats and growth at all costs – are found. The solution to Covid-19 is not technological but a 'new normal' that can only be imagined by opening up to pluralistic visions of the good life and can only be realised by overcoming the monopoly of expertise that limits political action far more than it legitimises it. In the words of Pope Francis I, 'anyone who thinks that the only lesson to be learned was the need to improve what we were already doing, or to refine existing systems and regulations, is denying reality.' [77] The worldview that brought us today's crisis is hegemonic and homogenising, the solution must be the opposite.

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SCIENCE AND MATHEMATICS EDUCATION IN UNCERTAIN TIMES

Kjellrun Hiis Hauge and Richard Barwell

Contemporary society faces a range of complex and urgent challenges characterised by a high degree of uncertainty. Examples include climate change, global pandemics, and new technologies like genetically modified organisms. The renowned duo philosophers of science, Silvio Funtowicz of Argentina and Jerome Ravetz of the UK, argue that such challenges require post-normal science. Post-normal science is distinguished from 'normal' science, characterised as a kind of puzzle solving activity where scientists choose solvable problems and produce knowledge associated with a high level of certainty. The quality of this work is assured through a peer community that usually consists of other scientists. [1] On issues where uncertainty and stakes are low, in terms of costs, impacts, or risks, experts can feed decision makers with solutions based on a relatively value-free idea of science. Although there is an increased awareness of the limitations of science on complex issues, research suggests that the idea that policy should be informed by objective science is still strong. [2]

Problems like climate change, global epidemics, and new technologies require a different approach, for which Funtowicz and Ravetz proposed the term post-normal science. [3] These kinds of problems have several features, including high degrees of complexity, uncertainty, and risk. These factors arise in the context of non-linear dynamics, multiple actors, and contested values. For example, while the creation of a GMO crop strain in the laboratory may be considered normal science, the question of how to deploy GMO crops in commercial agriculture is much more complex. The release of GMOs into an ecosystem is difficult to model and may have unforeseeable outcomes. The use of GMOs may implicate farmers, agroindustrial companies, governments, aid agencies, local communities, protest movements, and various other groups. Each set of actors brings different values to the problem, leading to different ideas about what information is significant, what forms of data should be collected, and what impacts should be considered serious, to get things started. In this sense, quality in knowledge production for policy has a strong connection to

relevance; it must consider pluralities of knowledge perspectives and values as well as uncertainty, and its characteristics must be placed at the centre of debate. In the culture of normal science, by contrast, only expert voices count. A key feature of post-normal science, therefore, is the idea of extended peer communities:

the evaluation of scientific inputs to decision making requires an 'extended peer community'. This extension of legitimacy to new participants in policy dialogues has important implications both for society and for science. With mutual respect among various perspectives and forms of knowing, there is a possibility for the development of a genuine and effective democratic element in the life of science. [4]

In effect, Funtowicz and Ravetz are calling for the involvement of a wide range of stakeholders, not only in discussing the results of research, but ultimately in the conduct of science itself:

The relevant peer community is thus extended beyond the direct producers, sponsors and users of the research, to include all with a stake in the product, the process, and its implications both local and global. This extension of the peer community may include investigative journalists, lawyers and pressure groups. [5]

By extending the peer community to include a much wider range of stakeholders, including those directly affected by the situation in question, both science and solutions are likely to be enhanced through, by way of an example, an extended sense of what information should be taken into account ('extended facts') as well as a more broadly-based treatment of risk and uncertainty.

The extended peer community is a persuasive idea, but it also raises questions. As researchers in the field of mathematics education, we are aware that any understanding and interpretation of complex scientific problems requires some degree of mathematical literacy. [6] Participation in an extended peer community clearly demands an ability to interpret texts relating to advanced mathematical ideas (think, for example, of public discussion about climate change, or about restarting nuclear power production in Japan). These texts, even if simplified for a 'non-scientific' reader, may include or refer to data, graphs, and charts, statistical analysis, probability and risk, use of mathematical models, and the list goes on. Moreover, the presentation of these ideas is never neutral; it represents particular positions and interests, and uncertain risks may impact stakeholders differently. Yet to participate in extended peer communities, citizens need to be able to engage with these mathematical texts and to some extent the ideas and techniques to which they refer. The question we explore here is: how can citizens be mathematically educated so that they can participate in extended peer communities?. In order to keep our

discussion focused, we specifically examine the place of uncertainty in post-normal science. Uncertainty is a key feature of postnormal situations. Participation in extended peer communities (and in democratic debates more generally) therefore requires a critical understanding of uncertainty. To theoretically advance the previous work on post-normal science and mathematics, we draw experiences from this limited previous work, going more into depth on how uncertainty, as a central feature of post-normal science, can be addressed within mathematics education so that the development of critical citizens can be better supported.

Our approach to mathematics education is based on the Danish mathematics educator Ole Skovsmose's critical mathematics education, which we discuss later in further detail. We will show how post-normal science and critical mathematics education are partly complementary perspectives, before going into more depth on the topic of uncertainty. [7]

WE FOCUS ON UNCERTAINTY SINCE IT IS A CHALLENGING TOPIC, PLAYS A CENTRAL ROLE IN UNDERSTANDING POST-NORMAL SITUATIONS, AND IS ONE OF THE PRIMARY REASONS THAT EXTENDED PEER COMMUNITIES ARE NECESSARY IN SUCH SITUATIONS. WE INCLUDE EXCERPTS FROM CLASSROOM DISCUSSIONS CONDUCTED IN NORWAY TO ILLUSTRATE OUR IDEAS.

Critical Mathematics Education

Both the UN and the OECD suggest that mathematics and, in particular, mathematical literacy are important for critical reflection and democratic participation in society. [8] The OECD's Programme for International Student Assessment (PISA) defines mathematical literacy as: '[. . .] an individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen'. [9] PISA has been criticized, however, for emphasising the individual in its definition of mathematical literacy, while paying less attention to democratic values. National curricula are in some instances more specific about the democratic value of critical citizenship. For example, the Norwegian National Curriculum states a need for citizens' competence to 'understand and critically evaluate information, statistical analyses [. . .] to understand and impact processes in society'. [10]

The appearance of references in curriculum and education policy texts to mathematical literacy linked to critical thinking and society may seem promising for post-normal science and the participation of future citizens in extended peer communities. Mathematics curricula, however, have largely failed to

embrace these ideals. Mathematics teaching often appears to foster a view of mathematics as an activity that produces either a correct or an incorrect answer. This ‘traditional’, procedurally oriented view is challenged by many mathematics education researchers, professional associations, and curricula who often advocate an alternative approach broadly focused on problem-solving. While this ‘reform’ approach may encourage students to develop more productive forms of mathematical thinking, it is not necessarily any better at promoting the kind of critical thinking that we suggest is necessary for participation in extended peer communities, or, indeed, in the broader political debates surrounding postnormal situations.

**WITHIN THE ACADEMIC FIELD OF MATHEMATICS EDUCATION,
HOWEVER, THERE ARE MORE CRITICAL PERSPECTIVES ON THE ROLE
OF MATHEMATICS IN EDUCATION IN WIDER SOCIETY.**

Some question the role of abstract mathematics in education and promote ethnomathematics for a discussion; [11] some promote mathematics as a tool for students to achieve insights into (their own) problems of social justice; [12] and others promote mathematics education where students reflect on how mathematics shapes their lives, as well as society, in often invisible ways. [13] These areas have come to be known as critical mathematics education. Skovsmose’s work and the theoretical program it originated have established some key ideas about the role of mathematics and mathematics education in society, as well as useful concepts for tackling these ideas in mathematics classrooms. [14] Here, we show how these ideas complement post-normal science. We argue, in fact, that ideas from critical mathematics education can form the basis for preparing students to participate in extended peer communities. Indeed, Ubiratan d’Ambrosio, a Brazilian mathematics educator, has argued that the field has a ‘responsibility for the future’; that is, he argues, faced with the enormous challenges and threats to environmental, social, international, and individual peace, mathematics educators must act. [15] Preparing students to participate in extended peer communities can be part of a program for mathematics education for the future.

Critical approaches to mathematics education are concerned with how students can learn to participate in a democratic society, through an emphasis on critique. A critical approach to mathematics education includes students learning and using mathematical methods to examine social, environmental, or economic problems as well as students learning about the nature and role of mathematics in modern society. Mathematics is seen as political, both in the sense that mathematics is an essential part of political debate, and in the sense that mathematics is one of the key tools in the construction of a technological-industrial society and is implicated in every kind of problem, from warfare to computer viruses to environmental

crises. [16] A link with post-normal science is already apparent. Mathematics is necessary to understand and debate many aspects of postnormal situations; but mathematics is also implicated in the existence of these situations, through its central role in the design and use of modern technology.

While a number of authors have contributed to the development of critical mathematics education, the most elaborated approach comes from the work of Skovsmose. [17] Here, we summarise some key ideas derived from Skovsmose's work, highlighting their particular relevance for the task of preparing students to participate in extended peer communities. It is important to understand that critical mathematics education is neither a method for teaching mathematics, nor a curriculum of what to teach. Rather, it is a philosophy of mathematics education, offering concepts and ideas with which to think or rethink the more pragmatic concerns of mathematics teaching.

The role of mathematics in shaping society is strongly mediated by technology. Skovsmose discussed different perspectives on the nature of technology. [18] One view is that technology consists of tools, through which humans can act on nature. This view of technology is based on a separation of humans from nature, indeed, on the idea that humans can 'overcome' the limitations of nature. This separation is arguably implicated in the many environmental problems with which we are faced. A second, more critical view, however, is that technology is a social force.

Technology concerns all aspects of social life, it becomes an absolute for social organisation. Not only the form of production but the whole 'civilisation' undergoes a technological reconstruction. Nature in its original sense disappears, and we become inhabitants in a technological reconstruction of our social reality. [19]

This view of technology describes how technology is used to organise labour, production, and human behaviour and changes the way in which these things are understood. From government surveillance to Facebook, our lives are structured by different forms of technology. In fact, the clearest examples are all forms of information technology.

Information technology is driven by mathematics; more specifically, it depends on mathematical models. Internet search engines, to give one example, work through the use of sophisticated algorithms, which encode a mathematical model of some aspects of the internet. There are two important points about this marriage of mathematics and information technology. First, mathematical models are designed by human beings. Mathematical models are not simply neutral representations of the world; they encode choices, values, interests, etc., reflecting the interests and preferences of the human designer, as well as the limitations of mathematical methods. Search engine algorithms may reflect commercial or political interests, highlighting some sources rather than others. Moreover, technology renders this human dimension invisible. We tend more easily to see

search engines as sophisticated tools (which they are), rather than human choices, values, and interests. Second, through technology in particular, mathematical models undergo an important shift. Mathematical models are designed to describe or model aspects of the world. As such, they are powerful and useful. Models of weather systems allow us to make reasonable forecasts of weather in the short term. When information technology is built into the fabric of society, however, the mathematical models that drive them no longer describe reality, they become part of reality – they become prescriptive. [20] Search engines do not simply describe what is available online, they influence what we look at (and what we buy). There is, therefore, a significant, but largely invisible role for mathematics in structuring society and influencing human behaviour. Skovsmose calls this role the ‘formatting power of mathematics’. [21]

The idea that mathematics formats our society is in line with the philosophy of post-normal science, where emphasis is put on what is often denoted as uncertainty in the problem framing. [22]

THE FORMATTING POWER OF MATHEMATICS IMPLIES THE SIGNIFICANCE OF MATHEMATICS IN BOTH THE EMERGENCE AND THE RESPONSE TO POST-NORMAL SITUATIONS. OUR UNDERSTANDING OF CLIMATE CHANGE, FOR EXAMPLE, IS ALMOST ENTIRELY DERIVED FROM MATHEMATICAL ANALYSES AND MATHEMATICAL MODELS, WHICH ARE ASSOCIATED WITH UNCERTAINTY.

There are clearly real social effects of how climate change is modelled and understood, and the question of how mathematics-based analyses of climate change should be transformed from descriptive to prescriptive is an important one. The need to pay attention to such things is part of the Funtowicz & Ravetz’s argument for extended peer communities. [23]

So far, we have summarised the idea that mathematics plays a significant role in shaping social reality. The next step is to consider what students need to know about mathematics from the point of view of critical mathematics education. In this regard, Skovsmose proposes three kinds of knowing in mathematics. [24] *Mathematical knowing* refers to the ability to use various mathematical skills, such as producing mathematical expressions, developing mathematical justifications or proofs, and performing calculations and procedures. *Technological knowing* refers to the ability to apply mathematics and mathematical methods in the context of technology. Technological knowing includes the construction and application of the models and algorithms that drive technology. Finally, *reflective knowing* refers to the ability to consider the impact of mathematical and technological knowing, including consideration of the aims of technology, as well as associated social and

ethical issues. Although all three forms of knowing are inter-related, attention to reflective knowing is a distinctive aspect of critical mathematics education. Skovsmose gives a more extended definition for reflective knowing as:

the competence needed to be able to take a justified stand in a discussion of technological questions. In this sense we may relate reflective knowledge to the general competence needed to be able to react as a critical citizen in today's societies. The possibility for the public to be not only subjects, i.e. geared only to receive outputs from the 'system', but also to provide inputs to the 'system', presupposes reflective understanding. [25]

Thus, a critical mathematics education includes reflective knowing as an important dimension. Learners should not only learn the methods and applications of mathematics; they must learn about its consequences. They must learn about the formatting role of mathematics in society.

This position has important implications for how the mathematics of postnormal situations might be addressed in educational contexts. It is not sufficient to teach the statistical techniques used to, for example, calculate global temperature increases. Nor is it sufficient to teach how to apply these techniques, using computers, to run analyses of temperature data. Such tasks do not require students to engage with the broader issues or to participate in the related political processes. To teach for reflective knowing would involve discussion of the meaning and consequences of calculations of global temperature changes, discussion of possible actions, and discussion of the role of mathematics, such as the limitations of the statistical methods. Such discussions might lead to political action, whether at a local informal level, or through participation in formal political processes. Fostering reflective knowing, then, is an important aspect of critical mathematics education of direct relevance to education in the context of post-normal science. In particular, for citizens to participate in extended peer communities, they need some degree of mathematical and technological understanding but, we argue, most crucially, they need reflective knowing, in order to be able to critically engage with the information they receive or generate for themselves.

Finally, we need to consider the nature of students' participation in critical mathematics education, since this will also have implications for their potential participation in extended peer communities. The question of participation, however, turns out to be related to epistemology. In essence, Skovsmose argues against a monologic perspective on mathematical knowing. Transmission models of teaching and learning are clearly monologic, in the sense that they assume a fixed body of knowledge that is simply transmitted to learners 'as is'. There is little room for reflective knowing in such a perspective. There are, however, few mathematics educators who explicitly subscribe to a transmission model. A more common approach is the constructivism derived from Swiss psychologist Jean Piaget's genetic

epistemology. Skovsmose argues that this approach is also monologic, though in a more subtle way. In Piagetian-inspired teaching, students are assumed to construct mathematical knowledge and thus the teacher's role is to provide appropriate experiences in order that they may do so. [26] The nature of the mathematics to be constructed is not really open to challenge, however. It is in this sense that Skovsmose characterises teaching inspired by constructivism as monologic.

Skovsmose argues instead for a dialogic approach, by which he means something more than simply allowing students to engage in discussion during mathematics class. Skovsmose's explanation of a dialogic epistemology in mathematics education is, in fact, an important basis for our proposed link between critical mathematics education and post-normal science. This link highlights the treatment of competing knowledge claims, which Skovsmose refers to as 'knowledge conflict':

my use of the word 'dialogue' has much in common with the term 'negotiation'. The establishing of 'dialogue' as an epistemic concept is implied by giving up the thesis of the homogeneity of knowledge, and accepting that contradictory knowledge claims can rightly be made with the consequence that knowledge conflict becomes a reality. [. . .]

Knowledge conflict is a sensitive epistemic phenomenon, and cannot be solved by adding new information, collecting more observations or by performing more careful calculations. Knowledge conflict has to be handled in a different way. Critique and reflection are needed. From knowledge conflict, we may hope to develop new concepts and to be able to reflect upon knowledge already held. If knowledge conflict is to enter into a dynamic process, its critical and dialogical nature has to be emphasised [. . .] The upheaval of a knowledge conflict cannot be the result of pure reasoning or of some carefully carried out experiment. The only way forward is negotiation. [27]

The notion of dialogue as a feature of critical mathematics education means that teaching mathematical facts and procedures is insufficient. Mathematical knowledge itself must be open to challenge. In the case of climate change, for example, there is no absolute method with which to measure the temperature of the planet. Temperature measurements are made in different places and at different times and then combined using statistical methods. The choice of locations, of statistical methods, of corrections and so on have become popular in public debates about climate change, illustrating how knowledge conflict can arise and have important consequences for public understanding and policy. Mathematical knowledge, then, is in relation to human activity and, as such, open to uncertainty, values, and power. [28]

There is a clear link between the notion of dialogue in critical mathematics education, post-normal science, and the idea of extended peer communities.

Post-normal science emphasises precisely issues of uncertainty and the need for negotiation through extended peer communities. Postnormal situations are precisely those in which more information, observations, or calculations will not in themselves lead directly to solutions. Rather, postnormal situations require dialogue, and with it, the creation of new concepts and ideas.

Uncertainty

Post-normal science includes a particular attention to uncertainty and its role in knowledge production and in policy making. The theory of post-normal science includes distinctions between different sorts of uncertainty:

- *Technical uncertainty*: inexactness arising in particular methods and techniques, which can be dealt with through standard methods, such as statistical measures of error or the use of probability.
- *Methodological uncertainty*: unreliability arising from the choice of methods, data, where, for example, judgment and academic traditions play a role. For instance, connections between system components are basically known, but cannot be accurately quantified.
- *Epistemic uncertainty*: the 'border with ignorance', arising from lack of knowledge, information or suitable methods, or the lack of awareness of some features of the situation. This sort of uncertainty is in particular related to complex issues with conflicting stakes. [29]

These categories are conceptual, rather than material, and in many situations are likely to co-occur. A central idea here is that postnormal situations are characterised by epistemic uncertainty and should be dealt with by post-normal science, where an extended peer community contributes to the knowledge base, to values perspectives and to evaluate the quality of expert knowledge. A specific uncertainty can be characterised as a mix between the three sorts. While the size of a technical uncertainty can be assessed, it is not possible to know whether an uncertainty of the other sorts is large or small. The dimension of the sort of uncertainty is rather characterised by the level of control through quantification. An epistemic uncertainty may be small, but there is not sufficient knowledge to determine that this is the case. An essential feature with these sorts of uncertainty is that there is no objective way of deciding which sort is dominant. On the contrary, the sort of uncertainty and the level of conflict and stakes are interdependent. Uncertainty does not matter much if it does not have implications for values and interests.

Funtowicz and Ravetz divide science based problem-solving strategies into three ideal zones: applied science (technical uncertainty and low conflict level), professional consultancy (methodological uncertainty and medium conflict level) and post-normal science (epistemic uncertainty and high conflict level). [30] It is noticeable that these zones can be linked to Skovsmose's types of knowing in mathematics. Both theories make distinctions between a basic level,

or zone, involving fairly routine methods, tools, and techniques; a second level involving decision-making within the mathematical and/or scientific process; and a meta-level, requiring critical consideration of the choices and effects of these processes. [31] Technical uncertainty can be handled sufficiently through mathematical knowing, as quantifications of the uncertainty is an appropriate approach. Methodological uncertainty requires an evaluation of the methodology and how the knowledge is applied, which resembles technological knowing. Epistemic uncertainty in postnormal situations calls for critical citizenship and reflective knowing as the framing for societal problems.

**THE UNDERLYING TRIPARTITE DISTINCTION IMPLIES, THEREFORE, THAT
WITHIN MATHEMATICS EDUCATION, THE THREE SORTS OF UNCERTAINTY
CAN BE CONSIDERED THROUGH ATTENTION TO MATHEMATICAL,
TECHNOLOGICAL, AND REFLECTIVE KNOWING.**

Mathematical knowing can include learning about sources of inexactness in mathematics, as well as the mathematical methods used to deal with such inexactness. Technological knowing can include learning about how such methods are selected and deployed and how uncertainty is embedded in various kinds of mathematical application. Finally reflective knowing can involve learning about how uncertainty arises in postnormal situations, as well as the social and societal effects of different possible ways of handling uncertainty.

The issue of climate change provides a good example of how mathematics education can address and distinguish between the different sorts of uncertainty. To learn about inexactness and mathematical knowing, students may apply statistical concepts on empirical time series. This is the case for emission levels or temperatures measured at a specific place. The mathematical content knowledge can be basic, as is seen in the presentation through graphs or calculation of averages, or more advanced. Methodological uncertainty can be addressed through problem solving or discussions where students engage in methodological aspects. An example of this arises in discussing assumptions of linearity or choosing how to mathematically represent an area's annual temperature. The public debate on climate change, with its conflicting views and disagreements on facts illustrate epistemic uncertainty and the formatting power of mathematics. These discussions could include insights into why experts disagree on temperature changes, what stakes are at risk in climate change, the political consequences of temperature predictions, and the implications of public and political demand for more precise predictions. Mathematics education can thereby contribute to tackling mathematically expressed information, not with the purpose of requiring students to believe any particular idea, but through giving them the opportunity to learn about the inherent sorts of uncertainties in the issue of climate change.

Uncertainty in Mathematics Classrooms

The following are excerpts from three mathematics classroom activities to illustrate the preceding theory and to highlight several characteristics that need to be present in mathematics education to help prepare students for critical citizenship. We will not address mathematical content knowledge, but rather discuss the role and application of mathematics. The characteristics we discuss are conflicts of interest, values, complexity, and uncertainty.

Students discussing traffic safety

A mathematics teacher at a school in a rural area in Norway developed a student project on traffic safety for her twelve–thirteen years old students. [32] The local community had experienced several incidents where cars had driven off the road and into the sea, and the school bus passed this stretch of road every day. In the project, the students carried out a traffic survey and measured the heights of the barriers in five exposed bends in the road. The students participated in deciding how many measurements they should take in order to evaluate the height of the barriers and whether they were safe. Spreadsheets were used to process and present the data.

The teacher had decided the vehicle categories for the traffic count sheet, but the students came up with two suggestions for changes. One was in class when they presented their charts on the traffic counts:

Per: When I now look at what we have counted, I think we should have had a separate column for buses.

Teacher: Yeah, OK? Why would you do that?

Per: Because there are so many people in buses. There are more than for example in a private car.

When Per argues there are more people in buses than in cars, he is considering the much greater impact of a bus running into the sea than a car running into the sea. Regarding the chart as a way to communicate risk, a change in vehicle categories to include the buses as a separate category could make the risk look more severe.

The second suggestion the students made concerned sheep. Some sheep had been in the road during the traffic count, and these had been counted and placed under the 'other' category on their sheet. A student had argued that it was relevant to show explicitly that there had been sheep there, however, because they constituted a risk factor on the road. [33]

Within the constraints of a fairly conventional educational setting, the project gave the students some opportunity to experience the formatting power of mathematics in that they could see that choices on how to approach the problem of traffic safety through mathematics influence the perception of risk and hence,

potentially, the resulting decisions. The teacher allowed for a dialogic approach to learning, as the categories for the traffic count were negotiated between the students and the teacher. [34] The project was on a topic that mattered to the students and the teacher let the students have a say in developing the project. Projects like this can be useful preparation for critical citizenship, or for participation in extended peer communities, because the students were actual stakeholders, and the project was participatory.

Norwegian educationalists Kjellrun Hiis Hauge and Rune Herheim studied how the three sorts of uncertainty from post-normal science were present in the traffic project. [35] The uncertainty related to the students' charts on the traffic count was labelled as unreliability, possibly overlapping with ignorance, because the students indicated that the communicated risk level would change with different choices of categories. Students were therefore engaging with both methodological and epistemic uncertainty. The excerpt illustrates a similar overlap between technological and reflective knowing. Questioning the vehicle categories can be characterised as a reflection on the application of mathematics to increase its relevance, but the reasoning behind such choices, associated with the number of people in buses, is associated with reflective knowing and the formatting power of mathematics.

Although the school project was considered a success, there was still potential for further learning. The students could, for example, have been challenged to express more explicitly how the choices of categories make a difference. The excerpt above illustrates how the importance of choice was only implicit in the dialogue between Per and the Teacher; explicit argumentation might have facilitated further learning for critical citizenship. The students could also have discussed the issue of choices in more general terms: how do experts make such choices? What implications do the students see for their reflections? The students and the teacher might also have benefitted from being offered vocabulary on uncertainty to make their discussion more explicit.

Students discussing climate change

During a master's course on mathematics education, the students and the lecturer (Hauge) discussed a graph produced by the Intergovernmental Panel on Climate Change to represent projections of global temperature change. [36] The lecture was an introduction to critical mathematics education, and the aim was to link key concepts to the discussion about the graph and about climate change more generally. These concepts included the notions of formatting and reflective knowing.

The IPCC graph starts at the year 1850 and shows the estimated and predicted change in global temperature until 2300 with estimated 95% confidence intervals. The estimates and predictions are based on averages of results produced by a number of different computer-based climate models. The graph presents five predicted courses for average global temperature change, given different future scenarios of global greenhouse emission levels. The trajectories from each of the

emission scenarios are accompanied by a number that indicates how many models have contributed. There is a break in the trajectories in year 2100, since fewer models have contributed to the continuation beyond that point. [38]

In the following excerpt, Kjellrun draws the students' attention to this feature:

Kjellrun: But if we look at year 2100, what is happening there?

[pause sixteen seconds.]

Elisabeth: [inaudible] is a break?

Kjellrun: Yes, why is that?

Elisabeth: At least the red one.

Kjellrun: Yes, at least the red one, that's very distinct.

Elisabeth: There are fewer models, you know.

[. . .]

Tor Inge: I'm thinking that the most critical until 2100 do not continue further in the models.

Kjellrun: Yeah, well that's true.

Tor Inge: So that the curve isn't as steep when it continues.

The red trajectory to which Elisabeth refers represents the status quo: emissions continue at more or less the same rate as today. Elisabeth recognises that the break is caused by the use of fewer models. Tor Inge's utterances indicate that he imagines a more critical future prediction if all the models had contributed after 2100. Unlike the examples from the traffic safety project, there is no apparent negotiation between the students and the teacher in the above excerpt. Yet, because of Kjellrun's semi-open questions, the excerpt can be argued to show a dialogic element when she invites the students to reflect on its mathematical properties. Skovsmose's understanding of negotiation may rather be linked to the different ways of understanding the knowledge claims represented by the graph. The students' reflections can thus be characterised as reflective knowing. [39]

The students were not introduced to uncertainty concepts from post-normal science, but they seemed to recognise that the predictions are associated with uncertainty beyond what can be characterised as technical uncertainty. [40] Their reflections are dealing with an understanding that the involved models do not

necessarily provide the same predictions or the same uncertainty measurements. This implies that the associated uncertainty is more in line with methodological or epistemic uncertainty.

Again, a clear line cannot be drawn between the two because the students do not comment further on implications of the differences in model output. There are several ways of perceiving the uncertainty relating to the break in the graph. One might picture that the uncertainty is of a methodological sort; that the models are more or less reliable but that there is uncertainty related to connecting components in the climate system. The break can also be perceived as a consequence of ignorance; a lack of knowledge about what affects the climate and how this uncertainty contributes in shaping how the problem of climate change is understood. Similarly, whether the excerpt illustrates technological or reflective knowing is not clear since the students do not reflect further on the significance of the break.

This small classroom study suggests that discussing graphs, has potential for developing critical mathematics education for post-normal science, even though the underlying mathematics and science is to some extent incomprehensible to the participant. [41] The context of the graph is of course essential for understanding the significance of the associated uncertainties and the reasons for disagreements about climate change. During the classroom discussion, the students offered a range of critical reflections besides those shown above, while still expressing their trust in the IPCC and climate scientists. In fact, they expressed unease about pointing to limitations in the knowledge base of the graph. [42]

Nevertheless, the students reflected on a range of aspects of uncertainty, including natural variation, uncertainty in models, irreducible uncertainty, epistemic uncertainty and how to cope with uncertainty.

THE CLASSROOM DISCUSSION AND THE LECTURE ON CRITICAL MATHEMATICS TOGETHER OFFERED THEM IDEAS AND CONCEPTS WHICH COULD HELP THEM ARTICULATE ASPECTS OF MATHEMATICS IN SOCIETY THAT ARE CRUCIAL FOR CRITICAL CITIZENSHIP.

Students discussing oil exploitation

The last example is taken from a plenary discussion among fifty thirteen–fourteen year olds in their classroom. In Norway, there is an ongoing debate on whether the offshore area close to these students' hometown in Lofoten, a rural area, should be opened for petroleum exploitation. The area is considered promising for oil and gas production, but is also a significant area for tourism and a range of fisheries. A research team from Bergen University College prepared the student discussion and visited the school. The students were asked to consider futures with or without oil exploitation and provide arguments for and against. The activity was not overtly

mathematical, but the classroom activity illustrates some qualities relevant for critical mathematics education and post-normal science.

Hauge et al. described how the classroom discussion exposed the students to uncertainties and the complexity of the issue through their disagreeing opinions. [43] The students introduced a range of topics during a two-hour plenary discussion: fish, scenery, mountains, tourists, oil prize, shopping malls, oil spills, and job opportunities. Through arguments and statements, the students made links between these elements, and through doubts and through counter arguments they introduced uncertainties about these links. In this way, the discussion provided an arena where the students together constructed an image of uncertainty and complexity.

The students also disagreed on values and what was at stake. To illustrate this, we present two excerpts from the plenary discussion. Melissa is a student and the first speaker when they return after a break:

Melissa: We came up with a point. You talked about getting a shopping mall here. It's the same thing as if you should remove the Eiffel Tower in Paris and rather build a shopping mall. Then tourism there would drop at once, and the same can happen here. That if we get big oil installations and a shopping mall, and we only have industry here, then it will drop here, too.

[several minutes with students discussing]

Roy: I think personally, that change is the best for [their hometown] right now. We need to take a few chances, because now we have lived on fish and dried fish, and tourists, for many, many years - and we are committed to try, at least - to try to become a city - it is a good thing. Maybe people think it's cool. We can- There will be a shopping mall. And then when you want to go out for a walk, there are still mountains, and everything else you can go to. It's not like we're going to remove mountains. We're not going to blast them to create a shopping mall.

Melissa and Roy clearly disagree about preferred futures. The power expressed in Melissa's statement, conveying Lofoten's iconic value, suggests she might not be willing to take any risk of affecting Lofoten's culture and identity. Roy, on the other hand, announces that he wants a different life than Lofoten can offer and calls for a new identity for his hometown. He seems willing to accept associated risks. Conflict of interests and diverging opinions on acceptable risks are common in societal risk debates. The classroom discussion thus allowed the students to experience key elements of public debate: They exposed conflicts of interests, defended their opinions and values and experienced that values and opinions remain conflicting.

The conflicting opinions of Melissa and Roy illustrate a knowledge conflict regarding whether a risk is acceptable or not. The classroom discussion thus allowed for a dialogical epistemology in education. [44]

Hauge et al. has exemplified how the students developed arguments, which they refined and further developed because their classmates provided counter arguments. [45] Classroom discussions are recognized as a learning arena for critical citizenship, as students need to practice developing arguments by responding to others, and they learn mutual respect, in spite of conflicting view. [45]

The activity cannot be labelled 'mathematics education' although the students did use concepts like probability and risk in their argumentation. Still, the students experienced being exposed to key characteristics of postnormal situations conflicting values, urgency, uncertainty, and complexity while also having to respond to them during the discussion. To learn more about risk, the students could have been made aware of these typical characteristics of confrontational risk issues and with reference to their own discussion. They could also have explored information on the internet, discussed premises and assumptions of presented information and statements, and, more specifically, addressed the question of why experts disagree.

Discussion

Uncertainty is multi-dimensional and can be studied through a critical mathematics education approach. By summarising the main points from the three classroom situations, we can begin to shed light on what a mathematics classroom activity might look like that prepares students for critical citizenship, inspired by ideas from critical mathematics education and post-normal science. Relevant aspects for mathematics educators to consider include forms of critique, the role of mathematics, and the potential for conflicting values, uncertainty, and complexity related to the societal issues that stand as the basis for classroom activities. In summarising the classroom activity, we begin to see how post-normal science can enrich critical mathematics education and vice versa. Finally, we can then look at what implications this investigation might have for the future development of mathematics education and its connections to post-normal science.

In all three projects, the students were given opportunities for critique. In the oil discussion, the students turned critique towards each other through responding to other student's arguments and developing and reconsidering their own reasoning. In the traffic safety project, the students were critical of the teacher's decision on the categories on the count sheet as they worked on quantifying and communicating risks related to the low road barriers. In the second example, the students' discussion of projected temperature change provided an arena for critiquing qualities of assessments and predictions produced by experts as well as how the public and decisionmakers respond to expert knowledge. All three student projects were about choices concerning the future, they were exploratory in their approach, and all three project topics were relevant for the groups of students.

The role of mathematics varies across the three projects. While the students in the traffic project had to complete mathematics tasks in order to develop arguments highlighting the risk of accidents, the students discussing temperature change examined mathematical information and results. The students who discussed oil exploitation did not work with mathematics explicitly, but achieved insight into a real-world context where there is plenty of expert information in mathematical form. Indeed, this last example could be considered to be a simulation of how an extended peer community might work. In different ways, the classroom activities highlighted the importance of values and uncertainty.

Excerpts from the three classroom situations illustrate how uncertainty concepts from post-normal science can be understood and applied in mathematics education. In the students' discussion on oil exploitation, it was essential in both a critical mathematics perspective and a post-normal science perspective to recognise how conflicting stakes, complexity, decisions, and uncertainty were present in their argumentation and how these characteristics were intertwined. The traffic safety project and the temperature change discussion demonstrated students' capabilities to reflect on the impact of uncertainty in mathematical information on risk-related problems. Uncertainty and values were linked by the students in all classroom studies. The students' choices in how to present traffic statistics could influence value perspectives of risks present. Students reflected on their attitude to risk together with value statements on the future of Lofoten. In the final discussion, differences in model predictions were linked to critical futures in terms of global warming.

CONCEPTS AND IDEAS FROM POST-NORMAL SCIENCE CAN BE USEFUL FOR CRITICAL MATHEMATICS EDUCATION, INCLUDING STUDENTS, TEACHERS, AND RESEARCHERS AS THEY CAN BRING ATTENTION TO, AND AWARENESS OF, KEY CHARACTERISTICS OF THE ROLE OF QUANTIFICATION IN SOCIETY.

They can also serve as a guide for what mathematics education should include in preparing students for critical citizenship and, potentially, participation in extended peer communities: handling conflicting views, dealing with complexity and recognising and coping with uncertainty. Together, the classroom activities described in this paper involve some of these elements, but deliberate choices based on post-normal science might have further developed the activities in terms of preparing for critical citizenship. Students could, for instance, be made aware of different sorts of uncertainty that can and cannot be controlled through statistical measures, and postnormal characteristics could be articulated in relation to the topic, such as conflicting values and stakes, risk, uncertainty, urgency, and complexity.

Mathematics education can make an important contribution to post-normal science, particularly in relation to preparing students for critical citizenship and participation in extended peer communities. We have argued that classroom activities based on dialogues in the form of negotiation on uncertainty aspects is central for this purpose. Society will benefit from an educational system that emphasises critical perspectives, although such an approach is far from being realised. As shown earlier in this paper, there are voices from critical mathematics education who emphasise the necessity of education for critical citizenship and lived democracy. There are clear benefits from cooperation between critical mathematics education and post-normal science, yet challenges need to be overcome. Some are related to further exploration of how to apply ideas from post-normal science in critical mathematics education. In post-normal science, the types of uncertainty can be regarded as qualities in expert knowledge. Pointing out the quality of uncertainty serves several purposes. One is to encourage experts to both take the types of uncertainty into account when developing knowledge and to communicate types of uncertainty in advice. Another purpose is to rationalise that postnormal situations call for extended peer communities. Both purposes reflect a theoretical and philosophical stance and imply changes in how science and the role of science in society is understood. However, once the types of uncertainty are used to label knowledge, utterances, or student activities, the researcher takes the role of an uncertainty expert. Defining uncertainty may easily become positivistic which, in itself, contradicts the philosophy of post-normal science. Yet, concepts and ideas from post-normal science, can serve to increase educators' and students' awareness of uncertainty and its possible roles in societal issues. This complements ideas from critical mathematical education related to critical citizenship and has additional valuable perspectives to offer.

Research on mathematics education in a post-normal science perspective, and vice versa, is in its initial stages. More studies need to be conducted on how to empower students and to develop critical citizenship and to also see how this benefits research on post-normal science.

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SCIENCE EDUCATION FOR THE ANTHROPOCENE

Jane Gilbert

The challenge is not that we must find ways to ‘know’ the future; rather, we need to find ways to live and act with *not* knowing the future. [1]

The point of education is never that children or students learn, but that they learn *something*, that they learn this for particular *purposes*, and that they learn this from *someone*. The problem with the language of learning and with the wider ‘learnification’ of educational discourse is that it makes it far more difficult, if not impossible, to ask the crucial questions about content, purpose, and relationships. [2]

This joins the already large body of work that argues for change in science education. It is intended to contribute to the debate on why change in science education is so difficult by raising the possibility that there are significant ‘blind spots’ in our vision of science education. While being ‘in crisis’ seems to have been a feature of science education since its inception, we must consider that the transition into the Anthropocene could be the ‘crisis to end all crises’, the catalyst needed to provoke real change. [3]

If we accept that carbonised modernity is coming to an end, then we have to accept that science education as we have known it must be reconceptualised. Substantial rethinking – of its content, its purposes, and its relationships – is required. This kind of thinking is incredibly challenging because the conceptual categories that structure our thinking are themselves part of the problem. We cannot think outside these categories: we can only, to use a term from the Algerian French philosopher Jacques Derrida, put them ‘under erasure’, signal that they are problematic and may eventually need to be ‘erased’, while also continuing to work with them. However, despite the difficulties, I think it is essential that we begin this work.

To understand this imminent change in how we teach science, we must begin with an overview of various change initiatives in science education. This overview will also outline recent work calling for schools to be ‘revolutionised’ for the ‘new times’ of the twenty-first century. We must then consider the implications of this call, for education in general, and then for science education. Following this, I will set out three possible scenarios for science education’s future and propose some strategies that could allow us to see the ‘blind spots’ that seem to make science education immune to change.

The American philosopher of science, Thomas Kuhn's much-cited work of nearly half a century ago describes scientific progress as occurring, not via the gradual accumulation of knowledge, but as a series of revolutions – or 'paradigm shifts' – in thought. [4] There are long periods of what he calls 'normal science', 'puzzle-solving' activity structured by the current way of conceptualising the field and its problems. Anomalies emerge, but the puzzle-solvers work to explain these from within the current paradigm. Eventually, however, these anomalies build up to a crisis point. There are disputes, which can be bitter, and calls for change. If these are not resolved, the field undergoes a 'paradigm shift', a radical departure from the old way of seeing things, which is replaced by an incommensurable new view. The field moves off with new energy, in a new direction and/or with new conceptual tools, but it eventually settles down into a new period of 'normal science', within the new paradigm.

THE DEFINING FEATURE OF SCIENCE EDUCATION, AS IT HAS DEVELOPED OVER THE LAST CENTURY OR SO, HAS BEEN 'PUZZLE-SOLVING' ACTIVITY AROUND TWO BASIC QUESTIONS: HOW TO GET STUDENTS TO LEARN SCIENCE MORE EFFECTIVELY AND/OR HOW TO ENGAGE GREATER NUMBERS OF STUDENTS IN STUDYING SCIENCE.

Anomalies have arisen, and there have been many calls for change, over several decades. A major theme has been the disparity between what school science education programmes offer and the needs and interests of young people. In research project after research project, this disparity has been explored, and a great many solutions have been proposed. Despite all this, participation rates in science study (once it is no longer compulsory) continue to decline, as do levels of interest and engagement in science. Overall, student's understanding of science does not seem to have improved. [5]

Partly, but not entirely, because capability in science (and a science-supportive public) is thought to be key to economic progress, every few years, a 'crisis' in science education is identified. [6] Reports and new research are commissioned, new teaching approaches are recommended and new curricula come into effect. [7] Some (usually small fragments) of this thinking finds its way into policy rhetoric and classrooms, but, inevitably, there is no paradigm shift in thinking or practice, and things continue much as they always have.

As science educator George DeBoer has shown, this is a well-established pattern. [8] Over the century or so of its existence, science education debate has alternated, with a periodicity of about twenty years, between two competing ontological positions. In one position, the disciplinary requirements of science are emphasised. Education here is a technical matter – how best to instruct or initiate

students into the discipline. The second of the two positions emphasise educational considerations. The focus is on learners and how best to foster their intellectual and socio-cultural development. Science is seen as one context (of many) within which this can take place.

In the last couple of decades, this pattern has continued. Research in science education has had a strong focus on developing and evaluating initiatives designed to make science more relevant and interesting for learners. One approach has been to advocate changes to the curriculum content. Science educators have proposed a broadening of the traditional knowledge base of school science to include, for example, science, technology, and society (STS) studies, the history and philosophy of science (HPS), environmental science, 'issues-based' science, the study of socio-scientific issues (SSIs), ethics, 'nature of science' studies (NoS) and science capabilities, and, more recently, making future studies part of science education. Science 'literacy' and/or 'citizenship science' as key purposes of science education have been discussed at great length. Another approach has been to advocate for the development of better teaching and learning methods. Constructivist pedagogies, and a focus on social, cultural, and/or affective dimensions of an individual's learning have become, at least in theory, the 'new orthodoxy'. Alongside this, the 'science for all' movement has argued for changes to science education's content and teaching methods to make it more attractive to individuals from under-represented groups, in particular, students from indigenous and/or lower socio-economic backgrounds and girls.

While there have been dissenters and there are signs that the science side of DeBoer's pendulum might be in the ascendancy again, it seems fair to say that the education focus has, in theory, predominated for a generation or so. However, below the surface rhetoric, we find a different story. A clue to this is science education's tendency towards what American educationalist David Perkins calls 'aboutism': that is, the predilection to re-orient all new initiatives, whatever their putative intent, as new knowledge to be learned, usually in addition to the previously accepted knowledge base. [10] For example, the 'nature of science' (NoS) initiative: this was originally intended as a way of moving science education away from its traditional focus on the facts of science to approaches that were supposed to facilitate critical thinking about science and the epistemological frameworks on which it rests. However, in practice, NoS has become just another set of concepts students must learn *about*. In some jurisdictions, these are even expressed as sets of propositions that need to be understood by students and by teachers. [11] Similarly, the introduction of "socio-scientific issues" was supposed to be a way of helping students critically engage in debates about science's relationship with its socio-cultural context. [12] However, possibly through a commitment to the idea of objectivity, many teachers aim to treat SSIs in a balanced way, avoiding discussions of economic or political interests and/or socio-cultural values. The result of this is a tendency to teach *about* the social, cultural, or ethical issues associated with various scientific or technological practices: that is, giving students more "stuff

to know”, not providing them with appropriate contexts to develop the critical thinking skills they need to participate productively in debates about these issues. Another example is recent work advocating adding ideas from futures studies into science education programmes. This work sets out approaches to science education which involve students learning about the discipline of futures studies, ostensibly as a way of preparing them for the future. [13] While apparently contributing to the education side of DeBoer’s pendulum, these approaches are also likely to produce yet more ‘aboutism’, the collecting of new concepts, as opposed to fostering students’ capacity to think critically, to think for themselves, in increasingly complex ways, about the future.

My point, in drawing attention to these trends, is to find a way in to the deconstructive process that I think will be necessary to move science education out of the impasse DeBoer identifies, into new spaces that can release us from the past and allow us to try to address the challenges posed by the Anthropocene.

Why is it that, while science educators say they are committed to meeting the needs of learners in their socio-cultural context(s), they default to ‘aboutism’? Is there something in the way science educators are socialised that predisposes them to think like this? Or does science education attract people who already think like this? Or does this have something to do with how science education is structured, with how it has developed as a discrete field of enquiry? I don’t think we know the answers to these questions, and I think this is part of the problem. In this paper, I want to argue that we need to look closely at ourselves, to dig up some of our assumptions about science education – what it is and what it is for – as well as our assumptions about science, education, society, and the future. I think we are likely to find ‘blind spots’ that are getting in the way of the many changes that, in the past, we have advocated but never really actioned. Looking to the future, if these blind spots are not addressed, science education will maintain its current immunity to change and become increasingly anachronous. I return to the discussion of blind spots later, but now it is necessary to review some recent arguments for major change in education and look at the implications of this work for science education.

The last two decades have seen a tsunami of commentary on education’s future. References to ‘future-focused’ education, ‘twenty-first century learners’, ‘digital natives’, and so on are now routine, particularly in policy contexts. According to this literature, today’s schools are not adequately preparing young people for the increasingly complex, uncertain, and fast-changing world of the future and the need for significant change is now urgent.

A two-part story underpins this literature. The first part lists some of the “mega-trends” driving the ‘paradigm shift’ taking place in the world beyond education. This list usually includes the following: First is the digital revolution – the exponential growth in computing power and digital networks, and the implications of this for society, the economy, and the nature and distribution of employment opportunities. [14] Second is globalisation – the dissolving of boundaries between

nation-states and their economies. Third is the development of new, networked forms of knowledge that are now 'too big to know'. [15] Fourth is the projected shift in world order that is likely to result from the demographic and economic changes now well under way in, for example, the BRICS (Brazil, Russian, India, China, and South Africa) group of countries. [16] The fifth mega-trend encompasses developments linked to the Anthropocene – climate change and the many other wicked problems we face in the twenty-first century. These trends, it is argued, are likely to produce the end of work as we currently know it. Most manufacturing work, as well as whole classes of professional work, will be replaced by intelligent technologies (this will affect large sections of the current scientific workforce).

THE BREAKDOWN OF NATION-STATE BOUNDARIES WILL LIMIT THE ABILITY TO LEVY TAXES, WHICH WILL IN TURN LIMIT THE CAPACITY TO PROVIDE PUBLIC SERVICES, INVEST IN INFRASTRUCTURE AND SO ON. SOCIAL INEQUALITIES WILL INCREASE. AND THEN THERE ARE THE PHYSICAL EFFECTS OF CLIMATE CHANGE.

Taken together, these trends represent a strong challenge to the current order and to known ways of doing things. However, the response, in most 'first world' countries, thus far, has been to strive to maintain their competitive advantage, to mitigate the risk of economic and/or political oblivion. This is where education comes into the picture.

In the second part of the prevailing story, schools are portrayed as having failed to respond to these trends, as being inert, outdated, obsolete, and no longer 'fit for purpose'. Part of another, bygone age, they rely on, and are embedded in, 'old knowledge', 'old systems', and 'old technologies'. We need, the argument goes, to revolutionise education, to rebuild it from the ground up so that it can better meet the needs of these 'new times'.

This story is pervasive and well-known in education contexts: however, it has not produced a revolution in educational thinking. Schools continue to be organised by the same knowledge, the same systems, and, to a large extent, the same technologies (in the widest sense of this term).

In the policy rhetoric on education's future, two big ideas predominate. The first is better system performance – a future-focused system is one that produces higher rates of student achievement and more students with tertiary qualifications. The second is digitisation – e-learning and better data management. However, these ideas are just a finessing of old understandings of education: they are not a framework for preparing young people to live, think, and act in tomorrow's world.

Education's apparent inability to engage with futures thinking, like science education's inability to find its way out of the impasse it is in, has to do with its

genealogy, its connection to some big ideas that, in the postmodern Anthropocene age, may no longer apply.

Modern education was forged in the transition from agriculture-based economies and societies to predominantly urbanised, industrially oriented ways of life. The development of mass schooling was important for its role in producing the human resources – and consumers – needed in modern economies. The subjects of the modern school curriculum, including science, were developed to support the growth of modern economies and societies. However, modernity was based on (and made possible by) the burning of fossil fuels, and this period in history, characterised by some authors as ‘carboniferous capitalism’ is coming to an end. [17] This has implications well beyond the economic context.

Sociological and philosophical analyses of the Anthropocene’s implications for modernity’s key assumptions are well under way. A case is being made by some scholars for a new paradigm of post-carbon social theory, for a reworking of the modern conceptions of society, politics, and the economy. [18] In other disciplines, there is talk of the shift to postnormal times. [19] As readers of this volume will be aware, this term was first used in the 1990s to describe changes in science: however, it is now widely applied across a range of other, very different disciplines. Key to its meaning is the recognition that things are no longer certain, simple, or stable (if they ever were). Uncertainty, complexity, chaos, and contradictions are the ‘new’ normal. As Ziauddin Sardar puts it:

We live in an in-between period where old orthodoxies are dying, new ones have yet to be born, and very few things seem to make sense. Ours is a transitional age, a time without the confidence that we can return to any past we have known and with no confidence in any path to a desirable attainable sustainable future. [20]

Everything is now complex – that is, deeply entangled, inter-connected, unpredictable, and open. Any given problem has multiple dimensions: there can be no right or wrong answers, just different ways to understand the problem. Reality is incomprehensible via the traditional disciplines, which rely on reducing the system to a selection of discrete units, inevitably leaving out key aspects. As Sardar puts it, in postnormal times, business-as-usual modes of thinking and behaving are ‘now dangerously obsolete’: they are ‘an invitation to impending catastrophe’. [21]

If, as these scholars argue, we have moved into the postnormal, postcarbon, Anthropocene era and modernity’s key concepts no longer apply, then it seems we need to think again about the meaning of *education* and *society*, and, following from this, the meaning (and purpose) of traditional school subjects, including science. Schools, if we continue to have them, will need to prepare young people for a range of different possible futures, including possibilities other than the continued growth model assumed by modern education.

Some educational theorists are increasingly beginning to work with these ideas. [22] A few, most notably Richard Slaughter in the UK, Noel Gough in Australia, and William Doll in the US have been working in this area for twenty years or more. However, apart from their work, I think it is fair to say that science education has lagged behind the other curriculum areas in debating these questions.

There are important reasons for this. One is science's deep connection to carboniferous capitalism. Another is that science and technology are routinely depicted as the future: that is, the idea that the future will be built via advances in nanotechnology, biotechnology, information technology (IT), and so on and that science will 'save' us from the problems we face. But, as Richard Slaughter has pointed out, science takes place in social contexts.

SCIENCE AND TECHNOLOGY DO NOT, BY THEMSELVES, SHAPE THE FUTURE: IT IS SHAPED BY CHOICES HUMANS MAKE ABOUT THE VALUES USED TO CREATE AND GUIDE DEVELOPMENTS IN SCIENCE AND TECHNOLOGY. [23]

The future of science education will similarly be shaped by human choices and values. The point of this paper is to argue that we are now at an important turning point. There are choices available to us now, important choices that will shape the future of science education and, if education really can have a role in this, the future of the planet.

As a way of trying to see outside the current paradigm, to imagine the kinds of spaces we need to make choices now, I sketched out three broad scenarios for the future of science education, written as if we are looking backwards from a point in time a decade or so in the future. These scenarios or, more properly, 'orientations to the future' are of course simplifications. They are not predictions: their purpose is to serve as a starting point for the discussions we need to have about the range of values and assumptions that could – and hopefully will – shape science education's future development.

Orientation 1: "Business as Usual"

Science education has continued to see itself as having two main purposes: providing preprofessional training for the scientists of the future, working in ways that would be familiar to twentieth century scientists, and producing citizens who are 'literate' in science and disposed to support its endeavours. The goal of continuous improvement, seeking ever more efficient ways of achieving these purposes, has been maintained. School science has kept its traditionally strong disciplinary boundaries and continued its search for ways to make its abstract, disembodied knowledge more relevant and/or engaging to students. New content (like the STS and/or NoS studies referred to earlier) has been added, and new pedagogies have

been developed. Discussion of the importance of scientific skills, capabilities or competencies continued, largely apart from the content debates and the pedagogical connections between the knowing, doing, and thinking aspects of science remain under-theorised. Debate about why so many students are not particularly positive about school science and/ or a career in science has continued, and research has increasingly focused on ‘teacher effects’ – improving teachers’ content knowledge, their pedagogical knowledge, and their pedagogical content knowledge, via new and improved pre-service teacher education and in-service professional learning programmes. School-scientist collaborations have been a focus: these were designed to bridge gaps in teachers’ science knowledge, to provide access to up-to-date technologies and ‘authentic’ science experiences for students. Investment in e-learning, both as a tool for communication and collaboration, and as a way of providing simulated and/or authentic science experiences, has increased hugely. Because science has continued to be seen as central to future economic prosperity, there has been significant investment in science education; however, it remains in a ‘puzzle-solving’ mode.

Orientation 2: “Science as Innovation”

The early twenty-first century saw an explosion of interest in the concept of innovation. Science and innovation (which were traditionally distinguished) came to be seen as strongly linked, and science/innovation came to be seen as the basis of virtually all new economic growth.

SCIENCE WAS VALUED, NOT AS AN END IN ITSELF, BUT FOR ITS
'PERFORMATIVITY', WHAT CAN BE DONE WITH IT. WHILE THIS SHIFT
REFLECTED PERCEIVED ECONOMIC IMPERATIVES, IT WAS ALSO BASED
ON AN ACKNOWLEDGEMENT OF CHANGES IN SCIENCE IN THE LATER
TWENTIETH CENTURY.

First was the shift to what the British Kiwi psychologist John Ziman calls ‘post-academic’ science: large teams of scientists, working in complex networks, on large-scale, multi-disciplinary projects, which often have complex ethical and/or stakeholder issues. [24] Second was the development, in the early twenty-first century, of new, more open forms of science: that is, increased use of non-expert data collection, crowdsourcing, open sharing, discussion, and publishing of early results, and highly networked, ‘just-in-time’ collaborations. [25] This Science 2.0 is highly productive: it is, according to the commentators, the source of innovation in today’s world. [26] Alongside this were massive changes to traditional conceptions of knowledge and expertise. In the age of Big Data, knowledge became ‘too big to know’. No longer a thing in itself, it became seen as existing in, and a property of,

networks not individual minds or even disciplines. [27] These changes, combined with the policy emphasis on innovation, produced calls for change in school science. Initially, these involved greater emphasis on collaborative work, e-learning, and students participating in authentic science (such as bird counts or collecting weather or water quality data). However, these were soon recognised as ‘business as usual’ science education (albeit more authentic and with better technology), as opposed to teaching for innovation, and the focus shifted. Picking up on research on the conditions needed for innovation, science educators began to advocate approaches designed to develop the ‘diversive’ forms of curiosity found in very young children into the deeper, more disciplined, epistemic forms of curiosity that underpin mature intellectual development. [28] These new strategies also aimed to build students’ capacity to collaborate with people very different from themselves, to build deep knowledge in specific areas and to use this knowledge in a range of creative endeavours. While there was an apparent shift away from the traditional emphasis on the concepts and processes of science as ends in themselves, the aim was for students to develop deep knowledge in a few areas of science, to allow them to engage in “knowledge-building” in areas of personal interest. However, because most people’s ideas about science education’s purpose did not change very much, implementation of these strategies was patchy. While there was plenty of talk about collaboration, curiosity, communication, and design thinking, these terms, like enquiry, capabilities, NoS, ssIs, and the like, did not revolutionise science education: they simply became more stuff to know for students.

Orientation 3: Post-Normal Science Education

In the first quarter of the twentieth century, the increasing likelihood of abrupt climate change came to be widely accepted. The continued growth scenario became untenable and the possibility of other images of the future had to be considered. This was deeply disruptive to educational thinking. Environmental considerations were nothing new in education: the last half century or so had seen the development of many environmental and/or sustainability education programmes. But because these initiatives rested on many of the same assumptions as mainstream education, they were not especially helpful for supporting the kinds of change needed to transition beyond the Anthropocene. Fortunately, in the early twenty-first century, a few theorists had started to think about the demands of the Anthropocene shift. Some emphasised the qualities people need to cope with postnormal times: for example, Sardar and the South African philosopher Paul Cilliers argued that imagination, creativity, and ethical thinking are critical. [29] The creativity theorists, on the other hand, emphasised resilience, persistence, and the capacity to ‘manage polarities’ – the ability to hold multiple perspectives simultaneously and the ability to shift between openness and discipline. [30] Other theorists focused on new thinking tools. For systems/complexity theorists, while complex systems are fundamentally unmasterable, it is possible to investigate elements of their behaviour via what the Welsh futurist David Snowden calls ‘safe-to-fail probes’. [31] Educationists began to

use systems thinking – to see learning systems where before they had seen individual students and subjects. [32] However, science educators struggled to adapt to this new thinking. A few began to advocate teaching about science as a complex system and/or teaching for complexity. Others made the case for seeing science education as a complex system. [33] However, this work was a radical departure from science education's traditional vision of itself. At this point in time, it is not yet clear whether complexity thinking's influence will provoke a paradigm shift or whether the field will continue to move slowly towards entropy and eventual death.

EACH OF THE THREE SCENARIOS ABOVE HAS A DIFFERENT ORIENTATION TO THE FUTURE. MY PURPOSE IN CONSTRUCTING THEM WAS TO MAKE THE POINT THAT WE NEED TO ACKNOWLEDGE A RANGE OF DIFFERENT POSSIBILITIES FOR THE FUTURE, AND TO ACKNOWLEDGE THAT THERE ARE CHOICES TO BE MADE.

However, I noticed my own default position as I was writing these scenarios: each sets out a different context for meeting students' needs, suggesting different knowledge and/or capacities accordingly. This focus on the needs of students does not address the blind spots in the discipline of science education that I argued are obstructing its development. To bring this all together, I want to look at science education's future through a completely different lens, one that I think is a potential catalyst for change.

The French philosopher Bruno Latour, in his 2013 Gifford Lectures, sees the Anthropocene as heralding a major intellectual shift. Building on his long-term investigation of modernity, Latour argues that we need to see nature, not as something to be tamed, as something to be deified, or something we are apart from, but something we are deeply engaged with. [34] This focus on nature, not as an "object of enquiry", but as part of us, something we are inextricably entangled with, needs new ways of thinking, new tools that are capable of exploring what he refers to as the 'crossings', 'borders', or 'conversations' between science and nature. For Latour, the Anthropocene challenges scientists to think very differently about science – what it is, what it is for, and what and who it should engage with. [35]

The Anthropocene's advent challenges science *education* in a similar way. It challenges science educators to think very differently about what science education is, about what it is *for*, *who* it is for, and *what* and *who* it should be engaging with. Following Latour, it suggests that instead of framing science, education, and society as discrete entities, we need to foreground the 'crossings' or spaces *between* science, education, and society.

Latour's emphasis on interconnectedness, entanglements and complexity is part of the wider intellectual turn I've outlined. How then can this challenge be taken

up in science education, a field dominated by its predilection for entities? In what follows, I offer the beginnings of a framework for tackling this very considerable challenge. Getting underneath this predilection requires new thinking tools, approaches that allow us to see the system differently.

Some recent work on the concept of futures literacy has been helpful to me in beginning this process. According to Riel Miller, the purpose of futures studies is *not* mechanistic prediction of the future, extrapolating from current trends, or managing risk. Nor is it utopian thinking, steering us towards certain desirable futures. These, he says, are the *opposite* of what futures studies is about. Instead,

[w]hat distinguishes futures studies from other disciplines is their preoccupation with how we create the future every day and on this basis to analyse the prospects for change - be it one day or a century from now... Most of futures studies focuses on exposing how the future cannot be predicted because it is contingent on choices we make starting now. The aim is to evoke a much wider and deeper sense of possible futures, in this sense entirely unlike the predictive traditions that depend very heavily on either continuity or on exogenous events like an apocalypse. [36]

Miller advocates what he calls futures literacies, strategies that scaffold the anticipation of a range of possible futures, in ways that are not constrained by our past, usually unnoticed, assumptions. [37] As the Australian futurist Keri Facer puts it,

[t]his perspective changes the dominant metaphor for our orientation toward the future. Rather than envisaging ourselves walking forwards into a future in which choices are laid out before us and from which we must choose, carefully selecting paths to avoid risks and fears. Instead we might imagine ourselves walking backwards into an unknowable future, in which possibilities flow out behind us from our actions. [38]

But to think about and make choices for the future, we first must be aware of the basis for our past choices. This, in the case of science education, seems to be a series of unconscious assumptions. We need strategies for helping us release these assumptions, strategies that will allow us to see the system in new ways and in all its complexity.

System change involves addressing the mind-set out of which the system arises. [39] This of course is no easy task. As the American leadership experts Ronald Heifetz, Alexander Grashow, and Marty Linksy put it, 'enough important people like the situation exactly as it is, whatever they may say about it, or it would not be the way it is'. [40]

While it is common for individuals and organisations in a system to rhetorically promote new approaches and paradigm shifts, the capacity to fully embrace and enact new ideas is often limited by existing but unnoticed or unexamined assumptions and beliefs. These hidden assumptions obstruct, or, as Kegan and Lahey put it, make individuals and organisations ‘immune to change’. [41] Overcoming this immunity requires us to bring these assumptions to consciousness, or, as the American adult development theorist Robert Kegan puts it, ‘make them object’. Kegan writes:

differentiation always precedes integration. ... Before we can reconnect to, internalise, or integrate something with which we were formerly fused [or ‘subject to’], we must first distinguish ourselves from it [‘make it object’]. [42]

So, what are the unnoticed assumptions in science education that we need to ‘make object’ so that they can be put up for discussion, and engaged with in new ways for the ‘new times’? Here is my attempt to notice some of the more obvious ones.

First, science. We treat science as an entity, something that, while it evolves, already exists as a thing in itself, outside human thought (and values), and, therefore, coming *before* education (and society). While there is now a large body of work in the philosophy and sociology of science showing that science, like all the other disciplines, is a social construction and therefore evolves alongside, and embedded in, our social systems, there is another, different point to be made here. The debate over which – science, society, or education – comes first (and therefore structures whatever comes after it) just reinforces our predilection for entities.

SEEING OUR WAY OUT OF THIS RUT REQUIRES US TO ASK DIFFERENT QUESTIONS: HOW ARE SCIENCE, SOCIETY, AND EDUCATION INTER-CONNECTED? HOW DO THEY DEPEND ON EACH OTHER? HOW DO THEY INFLUENCE EACH OTHER? HOW DO THEY CONSTRUCT EACH OTHER? HOW DO THEY TALK TO EACH OTHER?

What does asking these kinds of questions tell us about the system they are part of? What new ways of looking at it are opened up? What new “images of the future” become possible?

Second, Education. We treat education as the process of accumulating conceptual and practical knowledge, which develops the mind and prepares people for the world of work and for citizenship. It takes place in specialised institutions and involves following a pre-set curriculum, assisted by teachers. But is this kind of education, already being called into question, likely to continue? Other learning opportunities are already available – via the new knowledge networks,

invisible colleges, not-school and so on, and preparation for the world of work is unlikely to remain a key function. Electronic devices will render traditional practices redundant – teaching will have to become something other than the mass instruction of students, through pre-determined steps, to mastery of topics that are of little interest to them. What should education's goals be as we transition to the Anthropocene? How, if at all, could education support people to work well with complexity, uncertainty, and contradiction? How, if at all, could it support people to work well with each other?

Third, society is also treated as an entity, as something that has always existed. Yet it too is a construct of modernity. Modern mass education was supposed to produce the kind of society we want, to create the 'glue' that makes it possible and holds it together. A great deal of what is taught and how it is taught has this purpose. But maybe society will be held together differently in the future. Or maybe holding it together will not be possible in an age of 'filter bubbles' and steadily increasing inequalities. [43]

Fourth, we treat 'the future' as if it were a single something, and we treat it as if it already exists. As Miller, Facer, and others point out, this closes down the possibilities for thinking and acting to create it. This is obviously just a beginning: my point here is that noticing these assumptions, bringing them to consciousness, is a necessary precursor to change, to seeing science education differently for the future. If we want there to be a future for science education, I think we need to start seeing its purpose as being to support different ways of defining, envisaging, constructing, and creating the future – in students, but, before this, in ourselves. Even considering this has profound implications for what we can see and what we can do – now, in the present. [44]

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DRAMA EDUCATION AND APPLIED THEATRE IN POSTNORMAL TIMES

Michael Anderson

The Western world is moving uneasily from one uncertainty to the next. In our nations, the ravages of the Global Financial Crisis (GFC) have brought into sharp focus the disparities between the rich and the poor. The overwhelming greed of bankers and corporations has led to 'austerity' which means, for citizens of Greece, Ireland, Spain, and many other countries, poverty. At the same time those responsible for these corporate crimes have remained largely untouched, untarnished, and in many cases rewarded. While there is nothing novel about corporate greed, contemporary capitalism and hyperactive market economies have created globalised and networked economic misery. This crisis of confidence, a crisis of trust, has developed in the midst of other crises. The crisis of climate change, the crisis of food security and the crisis of mass refugee movements are a result of wars. The rapid exchange of information that technology now allows has created a maelstrom of crises that are complex, contradictory, and confusing. As the American sociologists Brent K. Marshall and J. Steven Picou suggest, '(t)he critical question is not how do we reduce uncertainty, but rather how do we make better decisions in a world of irreducible uncertainties?' [1] Obama said in 2009 on his inauguration:

That we are in the midst of crisis is now well understood. Our nation is at war, against a far-reaching network of violence and hatred. Our economy is badly weakened, a consequence of greed and irresponsibility on the part of some, but also our collective failure to make hard choices and prepare the nation for a new age. Homes have been lost; jobs shed; businesses shuttered. Our healthcare is too costly; our schools fail too many; and each day brings further evidence that the ways we use energy strengthen our adversaries and threaten our planet. [2]

These coinciding conditions have moved international relationships to a situation that Ziauddin Sardar calls postnormality. [3] The term first emerged when philosophers of science, Silvio Funowicz and Jerome Ravetz, sought to understand 'unpredictability, incomplete control and a plurality of legitimate perspectives'. [4] They argued that beyond the certainties of scientific method a new understanding was required that facts are uncertain, values in dispute, stakes high, and decisions urgent. Beyond the normality paradigm, espoused by the American philosopher of science Thomas Kuhn, Funowicz and Ravetz developed a way of thinking about science and more recently the humanities that pushed the bounds of certainty and engage with the ambiguity of the modern condition. While Funowicz and Ravetz do not argue the postnormal paradigm completely replaces the scientific method they do argue that 'we would be misled if we retained the image of a process where true scientific facts simply determine the correct policy conclusions'. [5] Policy in science and other spheres is still somewhat driven by the 'normality principle' driven by 'facts'.

The normality paradigm is, however, an inadequate and, to a large extent, discredited starting point for education and schools and yet schools are almost universally predicated on assumptions that arise from normality: cause and effect, economic growth, and industrial prosperity. [6] The testing and reporting regimes imposed on schools by Governments in Western economies, such as Australia and the United Kingdom, have created a market-driven schooling system that is much more about training than it is about imagined futures. As educationalists Pat Thomson, Bob Lingard, and Terry Wrigley suggest:

Governments around the world are committed to changing education. These changes are framed by national economic imperatives and driven by the need to be globally competitive in today's globalised economy. This is not change driven by an imaginary of a better and more socially just future for all, but of a more competitive economy, powered by improved human capital and better skills. [7]

In the face of evidence that the old models of schooling are at best inadequate and at worst failing the large shifts demanded by the conditions of postnormality. Postnormality presents challenges to participants in education to reconsider the old 'normalities' and re-imagine what schooling could be in a 'post-fact' world, where students require the skills and understandings to confront the contradictions, chaos, and complexities of the future. [8]

A Postnormal Tomorrow?

If the realities of postnormality begin to overtake our schooling and our society, what might that mean and what we might do, as drama educators and applied theatre workers, in response. According to Ziauddin Sardar the postnormal age is:

... characterised by uncertainty, rapid change, realignment of power, upheaval, and chaotic behaviour. We live in an in-between period where old orthodoxies are dying, new ones have yet to be born, and very few things seem to make sense. Ours is a transitional age, a time without the confidence that we can return to any past we have known and with no confidence in any path to a desirable, attainable, or sustainable future. [9]

Sardar argues that the combination of complexity, chaos, and contradiction has fuelled a shift from normalcy to postnormality, sweeping away the institutions and understandings society has clung to for thousands of years and replacing them with uncertainty. Sardar argues that this condition is different to other shifts in history as the combination of rapid networked systems facilitates rapid and chaotic shifts. This is demonstrable in two distinct and interacting ways in science and global conflict. In economic terms, the pressures bearing down on the global economy, from networked greed and environmental pressure, created new and unprecedented conditions beyond the 'normalcy' of market economics. As British Futurist Gill Ringland argues, economic models have been in decline long before the GFC struck: 'concerns about energy, environmental and security issues, food price increases, growing economic and financial imbalances and asset price inflation should have suggested that all was not well with this model'. [10]

While financial crises are not new, the rebalancing of labour and resource economics from the West to the East means that the 'debt and deficit' business as usual model has become vulnerable. Ringland continues:

recovery from the crisis is likely to be slower than that of the new competitor nations. Competition will be intense, and on new terms. Global systems issues - such as environmental change, but also international law and finance, access to raw materials and the management of intellectual property - all require the rich nations to sacrifice some of their power. This combination of power rebalancing and an institutional vacuum implies that the next decade will be a turbulent one. [11]

While science and technology has driven economic growth in many economies, there has been a less welcome rise in the side effects of these technologies. As Marshall and Picou argue:

these same advances tend to manufacture environmental problems that are increasingly complex, large-scale, and destructive. This is the paradox of the twenty-first century. We are increasingly reliant on science and technology to solve 'normal' environmental problems, but some of these solutions in turn create 'post-normal' environmental problems. [12]

There is a paradoxical bind here. Society has become reliant on the network and market economies but the combined fruits of both of these are often poisonous. The certainties of 'facts' and 'normality' have been supplanted by societal conditions that Sardar nominates in a postnormal world; complexity, contradiction, and chaos. The first condition of postnormality, and that Sardar nominates, is complexity.

Complexity

One of the most compelling demonstrations of postnormal complexity is the ongoing 'wars' on terrorism whether they are state sanctioned or initiated by organisations such as Hamas or the Taliban or state sponsored. These conflicts are often in response to an abhorrent act such as a terror attack or a chemical weapons attack on civilian populations. There are, however, complex forces at work as the networked global community assesses the cost of action and/or non-action on the global community. Morality in these cases is shaped and driven at least in part by energy security and the economic pressures higher oil prices could bring to bear on local economies. The networking and linking of these geopolitical and economic factors integrated with the rapid delivery of live or almost live coverage brings new complexities to bear on decisionmakers and creates complicated tensions for political leaders. In one of the main theatres of the war on terror, Afghanistan, the United Nations Mission to Afghanistan records the death toll as 14,728 in addition to the 2996 who were killed in the 9/11 attacks. These wars on terror with their theatres in New York, London, Bali, Afghanistan, and Iraq have taken an enormous toll in human life and human hope.

THESE ARE COMPLEX CONFLICTS, THAT ARE TO A CERTAIN EXTENT, ABOUT BIG ISSUES, SUCH AS INTERNATIONAL ESTEEM, WESTERN CONFIDENCE, OIL, AND THE PLACE OF THE US IN INTERNATIONAL POWER PLAYS.

The problem with coming up with a coherent response to the 'war on terror' is the complexity this global war produces. The attacks of 9/11 remain abhorrent, but do they justify the torture and civilian deaths that have been the legacy of the West's war on terror? This 'war' seems in some ways more complex than many others from our past, as former US Secretary of State, Condoleeza Rice said: 'we're in a new world. We're in a world in which the possibility of terrorism, married up with technology, could make us very, very sorry that we didn't act'. [13]

And perhaps this complexity is a contributing factor to Sardar's next C, Chaos.

Chaos

The global warming phenomenon that will see chaotic changes in weather patterns, a rise in food and water conflict and widespread famine, is now upon us. [14] We see

the portents of this effect in the long droughts and the savage weather that seem to prophecy the chaos to come as politicians disengage with the issue. Chaos has also become more prevalent in our once civil societies. In 2005, in Australia we saw the largest ever race riot being coordinated on mobile phones. [15] Racist anarchy reigned, the sleepy seaside Sydney suburb of Cronulla exploded in the most violent and chaotic racist violence seen in years. Likewise in the UK, in 2011, in Hackney, Brixton, Chingford, Bristol, Manchester, Birmingham, and Liverpool chaotic riots also stained the landscape. [16] These riots had the added feature of social media that propelled the suddenness and the ferocity of the chaos. As the British journalist Stephanie Baker points out riots in the UK are not novel but 'new social media played a key role in organising the recent riots with smart phones giving those with access to these technologies the power to network socially and to incite collective disorder'. [17] Protest in the postnormal world is organised, coordinated, and delivered through mediated crowds for the voracious and instant twenty-four-hour news cycle.

Contradictions

Sardar's third C is contradictions. As he says, we now live in:

A complex, networked world, with countless competing interests and ideologies, designs, and desires, behaving chaotically, can do little more than throw up contradictions ... It is the natural product of numerous antagonistic social and cultural networks jostling for dominance. [18]

Teacher education, internationally, is one such site of this contradiction. We know of the importance of sustained supported teacher preparation that attends to theory and practice [19]. Yet we see governments in the UK, Australia, and the US delivering programmes where six-week training makes you 'ready to teach' and school ready. Even though the weight of evidence indicates these alternative pathways provide a better model, governments continue to roll these schemes out. [20]

Another example of the contradiction of our times, is in education. We know from the overwhelming weight of research that large and frequent testing does not enhance, let alone sustainably enhance, students' learning. Yet, testing regimes persist in schools, that effectively make the goal of learning, testing. As Thomson, Lingard, and Wrigley argue:

In stark contrast to this imaginary of a socially just world, and often driven by PISA envy, educational policymakers mobilise various forms of audit and intervention designed to produce measurable increases in 'performance' at system, school and student levels. [21]

Fundamentally contradictory pieces of evidence become policy and practice. These contradictions have become so entrenched that often the practices go on largely unchallenged. Contradictory policy is allowed to stand because in postnormal times society seems to have lost its ability to discern or trust 'normal' sources of evidence.

Drama Education and Applied Theatre in a Postnormal World

The wonder of our field is that we have the shape-shifting power of our art form to answer these ambiguous, complicated realities found in postnormality. We have an aesthetic, a pedagogy, a process that, through its features, ingests, processes, and produces meaning from chaos, complexity, and contradiction. Drama and theatre allow participants to respond to ambiguity, conflict, indifference, and complexity. Critically this art form allows us to make meaning through structure, form, and imagination, through devising, through enactment, through embodiment, through creation.

Sardar argues in the closing of his article that the only way to transition from postnormality to new normality is through imagination and creativity. He says:

Imagination is the main tool, indeed I would suggest the only tool, which takes us from simple reasoned analysis to higher synthesis. While imagination is intangible, it creates and shapes our reality; while a mental tool, it affects our behaviour and expectations. [22]

Sardar's identification of imagination as a way of delivering more informed analysis and 'higher synthesis' positions drama education and applied theatre as potent responses to postnormality. Drama's potential as a tool for social imagination and as a tool for 'analysis and higher synthesis' to imagine the shape of what might emerge in a postnormal space, is potent but there are significant blockages to that potential. The strongest lies in the persistence of curriculum hierarchies that push drama to the peripheries of schooling.

We have said and heard so many times before the claim that drama education and applied theatre should be at the centre of schooling and the centre of community understanding. [23] Drama education and applied theatre now have a body of large, diverse international research extending from 'Champions of Change' to 'Drama Improves Lisbon Key Competences in Education' and more recently the role of 'Arts in Motivation, Engagement and Achievement' study that provide an expansive and substantial evidence base for drama and the arts as influential factors in student learning, within and outside the arts. [24] This body of research evidence provides a strong case for why the arts in general and drama specifically should hold a strong position in the curriculum and schooling. Yet the curriculum hierarchy persists, and in some places that have traditionally been strongholds for drama curricula like the UK, the subject has been systematically removed from the curriculum. [25] This contradiction suggests that even though the evidence is now in that change even in a postnormal world is slow.

In a world that has gone postnormal, what space can a pedagogy that is low down on the curriculum hierarchy contribute to the massively complex postnormal landscape? Perhaps rather than being a threat to drama education and applied theatre, postnormality presents several opportunities that normal times do not for the revitalisation through some inherent qualities of drama and theatre that assist in the navigation through a postnormal world. [26] Perhaps drama and applied theatre could make a contribution to the rebuilding of hope and the social imagination in these confused, contradictory, and chaotic times. There is, however, a caveat on this potential that needs to be signalled before a discussion about the potential power of drama for transformation – the tendency for some in the field to over-reach in their advocacy for the ‘transformational power’ of drama education and applied theatre. In his recent writing about the politics of transformation in applied theatre discourses, the Professor of Theatre and Performance at the University of New South Wales, Michael Balfour highlighted some of the tensions that surround the advocacy and funding relationships in applied theatre arguing for a different kind of connection between advocacy, research, and practice in the field suggesting a recalibration of our claims for change:

a theatre of ‘little changes’ provides a way to re-orientate what is possible about the work. It moves away from the need for change rhetoric, impact assessments and the strain for verifiable measurements in defining applied theatre, and places an emphasis on the need for ‘theory generating’ research, and propositions about how theatre actually works. [27]

The advocacy driven rhetoric of change that funders, bureaucrats, and politicians have come to expect is rarely realistic. As the English educationalist Jonothan Neelands and Balfour argue, change does occur but the expectations created for the gatekeepers should be kept in check with what the evidence suggests or as Balfour argues, ‘(c)hange rarely occurs in the way any social architect plans for ... maybe it is a matter of simply reconsidering the scale of the claims for change that are made about the practice’. [28]

Positioning Drama Education for Postnormal Times

In the face of complexity, chaos, and contradiction, what might drama education and applied theatre have to contribute to imagining ourselves into a new post-postnormal future? If we can imagine that drama education and applied theatre does have a contribution to make in a postnormal world, how might the field reposition and reimagine itself to make a difference? Rather than laying out blueprints or plans I have nominated several qualities of drama education and applied theatre that I believe provide a potent answer to the postnormal condition. I believe that they must be developed and foregrounded in our research to help us and our field make a contribution to understanding postnormality.

Democratic Creativity

The rise of what the American urban studies theorist Richard Florida calls the 'creative class' has provided a further segregation of the elite 'creative' and the 'rest'. [29] Even though this new demographic is being touted as beneficial, it does have the (perhaps) unintended consequence of separating the 'creative classes' from whatever constitutes the other classes. The persistence of amateur drama at and arts of all kinds reminds us that participation and ability in the arts are classless and a democratic right of citizens in the community. As Michael Balfour points out applied art can be found in diverse contexts including far away from the supposed high incomes and middle-class predilections of the creative classes. [30]

Our responsibility as researchers in this field is to provide an understanding of the tools of creation, the ways of knowing that our field has to offer and find new ways to take them to places and people that currently feel excluded from the arts. [31] Applied theatre has found new ways to take participatory drama and theatre into 'refugee camps, schools, hospitals, homes for the elderly, remote villages, prisons, indigenous communities and care homes for children'. This kind of approach has taken drama and theatre into the communities that are often victims of postnormal conditions. Applied theatre has a track record in democratising access to drama and theatre by providing access to the tools of creation and performance. As we consider how we might regenerate our field in a postnormal future, redoubling our efforts to democratise creativity, taking it to all classes, not just the creative classes, must surely be a priority.

In a postnormal world the challenge is to consider how we might make creativity a right for all, rather than an option for the creative classes. We need to continue dispelling the myth that creativity is some individual, divinely inspired, and mediated gift. It is the right of our children, our adults, our elders, and our communities in the same way that language and communication are rights. In fact, it may be one of the most important rights to ensure that we can imagine and enact our futures in postnormal times. We must redouble our research efforts to make creativity infiltrate new spaces and places. As British theatre and performance scholar Helen Nicholson suggests:

In a modest way, the theatre can help imagine what the shape of [the future] might look like. If theatre is an interweaving of memory and liveness and learning is constructed in negotiation and dialogue, theatre education offers a powerful place to encounter the unexpected, to extend horizons of expectations and consider where we are positioned in the world. It is material and ephemeral, and recognizes that meaning is made not only in the symbols, metaphors, and narratives of drama, but between spaces and places, in the gaps and the silences of reflection as well as in the movement of and activity of practice. [32]

The power to know and understand our world through theatre that Nicholson identifies here is not the privilege of a few; it is the right of all communities and we, through our research and practice, should redouble our efforts to make the creativity that we know and cherish a right for all our communities with methodologies that suit the needs of our community, not just the needs of the academies most of us work for. Which is the second quality I would like to nominate: methodological innovation.

Methodological Innovation

The originators of postnormal science Silvio Funckowicz and Jerome Ravetz argue that they introduced the term not to supplant scientific method but rather to make a place for inquiry that dealt with research questions that did not fit the strictures of positivism. [33] Perhaps because of the interdisciplinarity of our field, we have a rich and vibrant cross-fertilisation of methodological traditions. I think because we are researching drama education and applied theatre, that are by its very nature human, ephemeral, political, emotional, and physical, our research is always seeking innovative methods to record and represent our data. Drama education and applied theatre have not been colonised by ‘approved’ methods of researching, rather we have amongst us methodological innovators from education, psychology, theatre, and philosophy. [34]

OUR HERITAGE IS RICH IN FLEXIBLE METHODOLOGIES THAT MOVE WITH THEIR COMMUNITIES AND YET REMAIN DEVOTED TO RIGOUR AND THE CREATION OF MEANING. THIS STANDS IN STARK CONTRAST TO OTHER FIELDS THAT HAVE ALLOWED HOMOGENOUS RESEARCH METHODS THAT ARE OFTEN OUTMODED AND IRRELEVANT TO BECOME THE NORM.

There are, however, rich possibilities in creating research collaborations in a postnormal world. New research alliances with our colleagues in fields such as computer simulations, criminology, psychology, sociology, cultural studies, and the like will force us to reshape and refine our methodological traditions for the changes we see in our communities. As we create these collaborations, we become open to new methodological traditions that can infuse and ignite our own practice. I think this innovation and experimentation that has often looked ‘too risky’ and ‘unfundable’ to the research gatekeepers could in fact be a major advantage in postnormal times. It may be that our field’s search to capture what we do will be a potent force in a world that relies on solving problems that demand creativity and imagination and the third quality of the field that marks it out as different from others, the social imagination.

The Social Imagination

As our societies enter the next phase of postnormality, there is probably no more pressing need than the need to understand each other, to empathise, and to imagine what our future together could be. As Jonothan Neelands said:

The social experience of acting as an ensemble, making theatre that reflects and suggests how the world might become in the hope that it is not finished is of course of paramount importance to our young. We pass them the burden of the world that we have made in the hope that they will in turn have a world to pass on to their children. In this task socially made theatre will be their mirror, dynamo and lens – their tool for change. [35]

Neelands is defining the social imagination here. He is defining the ways we can through the mirror, the dynamo, and the lens make sense of postnormality and with a democratic creativity ask what-if questions about our community. The social imagination allows us to enact and rehearse better futures for our children, for our adults and for our prisoners and it gives them in the Brazilian educator Paulo Freire's terms a sense of critical hope that could provide the glue to cohere our communities through postnormality. It provides a way to understand what we could be and not just what we have been. It allows us to imagine a better community.

THE FUTURE OF OUR FIELD MATTERS BECAUSE RESEARCHERS WHO CAN UNDERSTAND AND ENLIGHTEN OTHERS ABOUT SOCIAL IMAGINATION WILL PROVIDE OUR COMMUNITY WITH A PRECIOUS GIFT, A GIFT OF TOLERANCE, A GIFT OF PEACE, A GIFT OF HOPE.

Postnormal times call for radically different approaches. Postnormal times call for researchers who understand ambiguity, who value imagination and who champion creativity. Postnormality could be the golden years of our field, a time where social imagination, methodological innovation, and democratic creativity can meet the needs of a confused and uncertain world. Our legacy will be judged on whether we have made a clear and rigorous argument about putting methodological innovation, democratic creativity, and the social imagination at the centre of the debates not for the 'good' of our field or own careers, but for those who are a collateral damage in a postnormal world. Change for those set adrift in a post-normal world even 'little' change could be real change. We must chart our course for the postnormal times ahead because as Brutus reflects following the assassination of the titular character in William Shakespeare's *Julius Caesar*:

There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyages of their life
Is bound in shallows and in miseries:
On such a full sea are we now afloat;
And must take the current when it serves,
Or lose our ventures.

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ZOMBIE DISCIPLINES

Liam Mayo and Shamim Miah

Ours is an age defined by significant change. In these postnormal times we are suspended between the no-longer and the not-quite-yet. [1] Those things we have held to be true are increasingly irrelevant, ways of knowing and being in the world are rapidly transforming, and the tools that we once used to navigate change have become all but obsolete. [2] With the loss of faith in science, technology, and politics to lead the West into the future, with the traditional touchstones questioned, it seems there is uncertainty not just about the future, but about how to even begin thinking about the future. [3] In these postnormal times, humans de-emphasise change and cling to traditional notions of stability and certainty: a product of our perception of what is and what is not normal. As a consequence, our postnormal condition nurtures ignorance and fosters uncertainty, characteristics which, we argue here, are systemically promoted through zombie disciplines. [4]

In an interview with the *Journal of Consumer Culture*, the noted German sociologist Ulrich Beck reflected on the challenge of theorising about a society whose system of coordinates is changing significantly. [5] Throughout his career, Beck had repeatedly rejected 'zombie categories' which he attributed to the sociological classics and claimed embodied aspects of experience that were no longer relevant in the twenty first century. Zombie categories, such as 'social class' or the 'nation-state', Beck contended, are merely kept alive today artificially by scholars. [6] Going further, in the wake of the terrorist attacks of 9/11, Beck argued that state-based concepts of war, peace, friend, foe, enemy, crime, and peace should also be rendered obsolete. With these concepts, he built the general foundations for the assertion that sociology, as a discipline, should liberate itself from the intellectual blockages that it had inherited from the classical tradition. 'How can one,' Beck queries, 'make reasonable decisions about the future under such conditions of uncertainty?' [7]

Indeed, these sentiments mirror those of futurist Ziauddin Sardar, who argued that postnormal times provides a lens through which futures studies may interpret and understand the present period and develop a language to describe the ruptures that are occurring across disciplines and canons. Traditional futures approaches deal with the plurality of alternative futures by distinguishing between plausible, probable, possible, and preferable. Now, Sardar contends that a postnormal landscape challenges empiricist futures and makes conventional strategic planning and foresight work problematic. [8] This is not the death nail for futures studies; rather, it is a redoubling of importance of futures approaches

and a signal toward the importance of the imagination in navigating the change of our age and indeed, the importance of imagination in dealing with zombie disciplines. [9]

Confronted with zombie disciplines we propose to do three things. First, explore the erosion in traditional forms of knowledge and how this is impacting the way change is approached and understood. Expanding on Beck's notion of 'zombie categories', we argue that it is indeed 'zombie disciplines', concomitant with the erosion of knowledge, that leave us ill-equipped to effectively navigate current epochal changes. To demonstrate this, we use the example of sociology, unpacking the characteristics that render it as a zombie discipline. Second, we take Sardar's contention and expand further on the notion of imagination as a means 'to produce new definitions of everything from art to architecture, politics to policy, science to spirituality and what it means to be human in postnormal times'. [10]

ANTICIPATORY IMAGINATION IS OFFERED HERE AS A USEFUL PROCESS FOR QUESTIONING AND FORMULATING THAT IS LINKED TO 'PEDAGOGIES OF POSSIBILITY' AND FOR OPENING SPACES FOR ALTERNATE FORMS OF KNOWLEDGE CREATION. [11]

We make the case that, in light of zombie disciplines, fostering anticipatory imagination within curriculums and institutions invites change and transformation at the personal and cognitive levels while fostering new values and new strategies that can creatively manage uncertainty and complexity. [12] Third, we address notions of agency and suggest how, through a reimagining, an ontological shift from Enlightenment notions of Being to new notion of Becoming is available to us, which is worth considering given our postnormal context.

Zombies and the Living Dead

The zombie, as a metaphor, provides a deeper critique of knowledge in postnormal times: occupying the space of both the living and the dead. They embody the paradox of our transitional age. By nature, the zombie is 'human and non-human, living and not living, cultural and non-cultural, natural and supernatural, suspended between fundamental binaries that most definitions presuppose'. [13] The zombie has its origins in Haitian Vodou via African spirituality; it represents the embodiment of the fear associated with the woes of slavery, economics, politics, or spirituality. [14] Appropriated by modernity, the outbreak of *zombieism* is a twentieth century phenomenon rooted in the Western imagination, that has exploded and become part of the cultural zeitgeist, and transformed into the flesh-eating ghoul of modern cinema. To date, over one thousand zombie movies have been made since 1920 and over half of them produced in the last ten years. The zombie phenomena commercialized in 1968 by Romero's *Night of the Living Dead*, considered to be the

movie to popularise the zombie genre and to establish it as a cultural phenomenon, replaced the earlier alien villain introduced by H. G. Wells in his 1898 classical novel *War of the Worlds*, which was a source of inspiration for many film directors. Now the threat to Western humanity was not the fear of the alien, the Other, rather, the threat existed within us, amongst us, an imminent viral threat.

While there has been much academic discussion of the zombie of the cinema, there has been little examination of the zombie itself, prompting several scholars to 'analyze the zombie as a symbol in itself', representative of the 'anxieties growing from the anomie resulting from a monolithic authority structure weakened by secularism, pluralism, and cultural relativity', quintessentially the slave without master, subject to their vilest desires, and without hope of divine salvation. [15]

The primary feature of the zombie is that they inhabit a diseased world: by embodying a diseased body, they exist without cure. In this sense, the zombie lacks the essential feature of any living organism; rather, they straddle the divide between the living and dead. Unintelligibly, they are communal in that they vaguely share proximity despite the absence of any accord between them. [16] They shuffle from place to place, seemingly unattached; they do not talk, rather communicate their incommunicability; they are heedless, fierce, and threatening but give no thought to defending themselves against harm; and are not evil, rather merely scrabbling to satisfy a base instinct of their own craving. [17] Indeed, zombies are us. Their premise is based on their self-reflected image of humanity. But zombies are an ugly us. They lack dignity, and in pursuit of their consumption, they will destroy themselves. [18] Thus, more than a symbolic representation, the zombie is an abstraction by which we may explore the erosion of knowledge in postnormal times.

The zombie metaphor has indeed provided utility for the topic of critical assessment within sociology and, in particular, cultural studies. The zombie as a metaphor has been used to describe how disciplines, such as sociology, anthropology, and economics, are based upon ideas which are dead, but paradoxically continue to walk amongst us. As Quiggin noted:

Some ideas live on because they are useful. Others die and are forgotten. But even when they have proved themselves wrong and dangerous, ideas are very hard to kill. Even after the evidence seems to have killed them, they keep coming back. These ideas are neither alive nor dead.. they are undead, or zombie ideas. [19]

An examination of zombie disciplines is crucial in postnormal times, especially given that the entire *raison d'être* of higher education based upon critique, contestation, and developing new knowledge has given rise to 'post-truth' (postmodernism), 'deep-fake' (not possible without computer algorithms), and 'fake-news' (made popular largely due to uncritical masses). Universities, together with some of the disciplines that are taught, are like the living dead: an uncritical movement of scholarship, bounded and restricted by its methodological constraints, which

continues to exist and to teach the next generation of students, thus allowing the system to self-perpetuate. [20]

A discipline, rooted in traditional forms of knowledge production and dissemination, in these postnormal times, characterised by chaos, complexity, and contradiction, rather than leading to wisdom, instead produces an epistemological veil, a 'smog of ignorance': [21] an obnoxious projection of the existence of knowledge that masks a lack of knowledge within the neoliberal educational system which benefits only those within the power structure rather than the students. [22] This diseased reasoning is a helpful way of describing people's inability to provide authentic explanations to complex issues because the capacity of organizations to make judgments has become infected with zombie ideas. [23]

Disciplines and Knowledge

The current disciplinary ordering and structuring of knowledge is largely a product of the Enlightenment, in general, and modernity, in particular. During the premodern period, most Western higher education institutions of learning included four distinct faculties of study: theology, canon law, medicine, and the arts otherwise known as the liberal arts (which mainly taught the trivium: grammar, rhetoric, and logic).

THE RISE OF MODERNITY WITNESSED THE EVOLUTION AND EXPANSION OF A RANGE OF KNOWLEDGE SYSTEMS BY NEW AND EMERGING SCHOLARLY COMMUNITIES. DURING THE NINETEENTH CENTURY, DISCIPLINES BECAME A HELPFUL MEDIUM THROUGH WHICH MOST UNIVERSITIES IN THE WEST WERE ABLE TO CATALOGUE AND ARCHIVE NEW EMERGING FORMS OF KNOWLEDGE, RANGING FROM THE NATURAL SCIENCES, TO SOCIAL SCIENCES, AND TO HUMANITIES.

Throughout the early twentieth century, new disciplines were added to the growing list; with psychology, the late twentieth century witnessed the growth of media studies, gender studies, and queer studies.

It is clear that the rise of disciplines was closely associated with knowledge production and dissemination, but as the Icelandic philosopher Páll Skúlason, in *A Critique of Universities*, has pointed out, the purpose, function, and objective of higher education establishments and their relationship with discipline and knowledge served different purposes. [24] The French tradition, as seen with the l'Universite de France, which was founded by Napoleon in 1806, viewed discipline and knowledge as serving the interest of the state. Similarly, the British tradition considered the function of universities to train the administrators, soldiers, and

leaders to run the empire. Conversely, the German tradition as developed by the Prussian philosopher and linguist Wilhelm von Humboldt via the Humboldt University of Berlin considered the importance of advancing science, scholarship, and research as the purpose of higher education.

A number of critiques of academic disciplines have demonstrated how disciplines have strong connections with knowledge and not with ethics or wisdom. In an early critique of discipline, Foucault, in *Archaeology of Knowledge*, argued how academic disciplines are simply a set of 'ideas' that have been historically grounded in power structures and have actively re-produced existing power politics. [25] Furthermore, modern knowledge production translates to power, control, and exploitation. According to American sociologists Jeffery Guhin and Jonathan Wyrzten, knowledge production is a political act, which they term as 'violence of knowledge'. [26] They question the liberal assertion that 'true' knowledge is apolitical by locating the deeply political circumstances through which knowledge is produced. They go on to elucidate the point, drawing upon postcolonial theorists to describe how the Other, subjected to 'violence of essentialization', based upon the principles of Orientalism, is largely an academic pursuit for dominating, restructuring, having the authority over the Orient, [27] and epistemic violence', which according to the Indian literary critic Gayatri Chakravorty Spivak refers to the process by which Western forms of epistemology preclude or destroy local forms of knowledge. [28] For Sardar, 'wisdom integrates and unifies the knowledge and values of a person, it cannot be abused, and a wise person cannot be immoral'. For the subaltern, knowledge, when linked to disciplines, is not the pursuit of the greater good, neither is it linked with wisdom – knowledge is the obliteration of the cultural codings that enable agency. [29]

It has now been established that contemporary knowledge production is linked to neoliberalism. The cultural theorist Samir Amin illustrates how paradigms within the social and economic sciences tend to shift with times and schools of thoughts, often in opposition to one another. This critical analysis reveals that the dominant paradigm becomes the 'single thought' of the moment when it 'responds best to the demands posed by the particular phase of capitalist development' – what best suits those with power and influence in society. [30] Similarly, the social philosopher Karl Polanyi argued that instead of historically normal patterns of subordinating the economy to society, the system of self-regulating markets required subordinating society to the logic of the market. [31] As a result, the 'developed world' runs society 'as an adjunct (accessory) to the market; instead of the economy being embedded in social relations, social relations are embedded in the economic system'. [32] More recently, most universities have developed a tradition which embodies the market and the business model of neo-liberalism; as Sardar noted, 'the underlying argument of most of the early literature on the crisis of education is that thanks to confluence of the rise of neoliberalism, increasing globalization and advancing communication technology, universities have become big businesses'. [33] These arguments, centred on discourses of productivity

and activity, paradoxically create feelings of compliance and passivity, including inability to think, loss of individual control, and contagion. [34] Additionally, the emphasis on creating a labour force results in the student as the consumer rather than the learner. These consumers become what Matt M. Husain calls “zombie graduates,” who are entitled to be happy yet lack critical understanding and suffer acute philosophical poverty. [35]

Sociology as a Zombie Discipline

Disciplines disseminate ideas and concepts that are no longer representative of reality but continue to shape minds and outlooks, education and policies, and outlooks and futures. [36] Zombie disciplines range from anthropology to economics, political science to development studies, cultural studies to media studies, all varieties of ‘area studies’, certain types of history and philosophy, particular perspectives on biology, and many other ‘subjects’ in between. For illustrative purposes, we will focus on sociology.

Sociology is a product of modernity while concurrently maintaining the objective to make sense of modernity. Modernity had fundamentally transformed Western societies through industrialisation, urbanisation, and the decline of religion. The introduction of sociology made it possible to reflect upon the nature of these socio-cultural transformations. In short, ‘sociological conceptualizations of capitalism, modernity, and economic development as western European phenomena emerged due only to factors endogenous to the region, such as the French Revolution, the Enlightenment, and the Industrial Revolution’. [37] However, it is important to challenge some of the many claims underpinned by the literature related to ideas of modernity and liberalism, especially related to the socio-political transformation of France and advances of liberty, equality, and fraternity. In fact, as the Trinidadian historian Cyril Lionel Robert James has pointed out, it was the slave resistance in Haiti that was instrumental in shaping these ideas of universal rights in the minds of French thinkers. [38] Thus, sociology is an outcome of socio-historical factors of European modernity. Its rise coincided with positivist epistemology, which developed from the decaying roots of Western religious certainty. Auguste Comte, the author of *Plan of the Scientific Works Necessary for the Re-Organisation of Society*, proposed sociological positivism as a way of solving social problems through rational planning. Comte maintained that positivist or scientific methods of approaching society would lead to a linear, orderly, and progressive view of history, starting with theological stage, through a metaphysical phase, and gradually leading to a positive or scientific stage.

While the origins of sociology can be traced back to Plato’s *Republic* (375 BC), Ibn Khaldun’s *Muqaddimah* (1377), or even Baron Montesquieu’s work *The Spirit of the Law* (1748), it was in the fourth volume of Comte’s 1838 work, *Cours de Philosophie Positive*, that the actual term sociology was first used. As a result, he is the father of modern sociology, and his ideas enjoy the same legitimacy as the natural sciences. The second key figure within sociology was Herbert Spenser who

combined scientific metaphors with sociological theories. Spencer's *The Study of Sociobiology* advocated evolutionary theory of Social Darwinism to 'explain' the intellectual superiority of Europeans over non-Europeans. His idea was used to justify Western superiority via anthropology and colonialism abroad while justifying the status quo of the ruling classes in England by resisting social reforms made by the oppressed working classes. While sociobiology has had a complex and controversial history, some of the ideas of race science continue to shape popular and scientific debates.

Given its historical context, it is important to note that the rise of sociology was materially connected with its Eurocentric formations. As Alatas has noted, the 'vigorous outburst of colonialism in the nineteenth century was accompanied by intellectual trends which sought to justify the phenomenon [of colonialism].' [39] In light of the current questioning of sociology's heteronormative standpoint by feminism, critical race theory, and others, Julian Go has pointed out that sociology, and by extension any discipline, needs to take stock of issues related to knowledge, power, and standpoint. So, while the discipline is the product of history, it is the product of only one history of the victor. [40]

ZOMBIE DISCIPLINES DO NOT ONLY HAVE THEIR FOUNDATIONS FIRMLY ANCHORED IN IMPERIALIST AND RACIST HISTORIES, BUT ALSO HAVE 'GREAT MEN' ASSOCIATED WITH THEM WHO ARE REQUIRED TO BE CITED WITHIN THE LITERATURE.

Sociology revolves around three thinkers: Karl Marx, Émile Durkheim, and Max Weber. Karl Marx's ideas have been well documented especially those related to capitalism, economy, class struggle, and ideology. Perhaps what is less frequently debated is his idea related to non-European societies. In his analysis of the empires that existed before industrialisation, Marx viewed pre-capitalist 'Asiatic Empires,' such as the Ottoman, Chinese, Indian, and Persian empires, as going through political change without any social transformation. In his analysis of India, he argued how despite centuries of political change, the village-centred social order was unaltered. The British Empire destroyed India's village-centred order by connecting India's local economy with the global economy. For Marx, colonialism was crucial to create the conditions of a world capitalist order. [41] Max Weber's writings and interests were diverse and covered a range of topics, ideas, and concerns. His key writings on modernity were to establish the claim that while scientific knowledge existed, especially throughout worlds, such as China, India, and the Islamic world, systematic rational science was unique to the West and could be traced back to the Hellenic mind, that is, Ancient Greece. [42] Émile Durkheim's views on imperialism were slightly different from those of Marx and Weber, especially given that he did not publicly advocate nor hold a critical position on French Imperialism. [43]

Nevertheless, these three classical sociologists failed to 'incorporate the dynamics of Empire into their historical sociology of contemporary society'. [44]

To spread ideas and concepts, zombie disciplines use canonical texts and, in the case of sociology, canonical sociological classics. As British sociologist Gregor McLennan pointed out, these texts 'were largely couched as grand ethnographies of social progress, however complicated, featuring a common scenario in which nonWestern societies are positioned as backward and modern capitalist ones as advanced'. [45] There are many epistemic shortcomings that gave rise to sociology as a zombie discipline, perhaps one of the most important of these is based upon the claims of metrocentricism; that is to say, epistemological ideas underpinned within sociology, rooted within a specific understanding of Europe and the rest of the world, are made universal through the writings of Weber, Marx, and Durkheim. [46]

It is important to note that the key to understanding any zombie discipline lies neither in the uncritical acceptance, nor its rejection, but rather in acknowledging its ontological standpoint, its limitations, and its ability (or more pointedly, inability) to navigate postnormal times. In postnormal times, the mask slips from sociology and its related disciplines to expose its zombie nature, and in doing so, it demonstrates how it leads to the logical conclusion of postmodernism, the death of knowledge, and the triumph of interpretation.

Is sociology dead? It can be argued that as a discipline, it is indeed dead, but it continues to give the illusion that it exists. Sociology is dead, especially given the rejection of any grand theory or set of theories to explain the nature of society. This raises several broad ontological questions, most pertinently stated by cultural theorist and philosopher Jean Baudrillard. In a number of transformative articles, especially *Simulcra and Simulation* [47] and *The Gulf War Did Not Take Place*, [48] he argued that society did not exist; if it does, it is entirely composed of signs. His argument is based upon the notion that televisual communication and by extension social media and its signs are so ubiquitous in its 'reality' that people struggle in deciding what is real. By the same logical conclusion, if the boundary between real and the hyper-real is blurred, then how can sociologists develop a theory explaining the nature of society? Indeed, this speaks to the quandary posed by Beck as he reflected on the challenge of theorizing significant societal change: 'if the fundamental distinction and criteria that we have always identified with modern society no longer apply, where can one begin?' [49]

Perhaps what is most striking is that contemporary society – given its complexity, chaos, and contradiction together with its speed and spontaneity – is moving faster than sociology, so it is difficult for it, or indeed any discipline, to keep up with. The desire to play down change in spite of change is symptomatic of a humanity attempting to navigate postnormal times without the adequate know how to do so. [50] Zombie disciplines create zombie people, who continue to make decisions that are informed by toxic knowledge, [51] and these further exacerbate the impacts of postnormal change. [52]

Culture and Imagination

The root of this predicament is human culture. The psychologists John Vervaeke, Christopher Mastropietro, and Filip Miscevic locate the epistemological crisis in Western culture, a result of the collapse in the worldviews of modernity; and as a result, we are now bereft of the wherewithal to respond to emergent challenges. [53] He takes an aesthetic reading of Western culture, reflecting on the collective sense of alienation, disconnection, and disenchantment that appears apparent in a society devoid of a spiritual mythology to compel action. As Vervaeke, Mastropietro, and Miscevic put it, 'it is one thing for a culture to run its course, and give rise to the next stage in its development, or even to be conquered by another culture – a death and rebirth, if you will. It is another for it to trip over itself and expedite its own demise – a waking death the walking dead epitomize'. [54]

Indeed, ours is a cultural crisis owed to humanity's inability to move beyond a manufactured normalcy that perpetuates a familiar sense of the present. [55] The sociologist John Robert Clammer asserts, 'if Bauman is correct in his argument that the outcome of modernity was the Holocaust [56] then it is indeed our very civilization that has brought us to the brink of catastrophe, but perhaps this time to an ecological Holocaust. If this is the case then ... it is our very culture and the values that constitute it that is the root of our problems'. [57]

CULTURE, AS CLAMMER REMINDS US, IS PREMISED ON CONSTELLATIONS OF VALUES, ASSUMPTIONS, AND DRIVERS THAT ARE CONSTANTLY IN FLUX.

Within culture lies imagination, which, according to Sardar, is a key ingredient for coping with postnormal times: 'while imagination is intangible, it creates and shapes our reality; while a mental tool, it affects our behaviour and expectations'. [58] With imagination, the construction of myths and stories becomes the vehicle for communicating and negotiating meaning about our world. [59] As such, 'given that our imagination is embedded and limited to our culture, we will have to unleash a broad spectrum of imaginations from the rich diversity of human cultures and multiple ways of imagining alternatives to conventional, orthodox ways of being and doing'. [60]

Futurists have a role to play here. Futures thinking, as an approach to problem solving, understands the world as a complex system, and draws on a wide range of tools to access understanding, capacity building, and strategic potential it has concerning possible, plausible, and preferred futures. [61] The primary focus of futurists is images of the future and as it is culture that provides us with such images, imagination is the domain of the futurist. [62]

However, the imagination is contextual; we cannot imagine beyond our experiential, spatial, or temporal contexts. Indeed, contexts often seem hegemonic

and diminish agency, [63] and our futures are colonized. [64] Responding to this, futures work locates agency within the past–present–future nexus of culture. In this way, the role of the futurist is to break free from dominant (extended) present-centred imagery of the future and facilitate creation of and/or the presentation of alternative images of the future. This requires us to, as Bussey suggested, ‘claim – or reclaim – our right to cultural agency... to offer alternative narratives, images and visions ... to hack into the cultural coding that determines how we think, relate, remember, act, love, fear and hope’. [65] Here, the futurist is responsible for generating new possibilities within the cultural genome, exploring new pathways by reconfiguring old elements, inserting new code, and bringing out creative work generating alternative futures. [66] To achieve this, what is required is an appreciation of anticipation as a human faculty and anticipatory imagination, the pedagogical device, as tools for thinking beyond current utilitarian approaches to the future, emancipating those invested in – even complicit in – a dominant reading of the present. [67] Thus, the role of the futurist is to unlock anticipatory imagination. This requires a framework for praxis.

Anticipatory Learning, Imagination, and Agency

As a pedagogical device, anticipatory action learning is a well-established framework in the futures research tool bag. Effective anticipatory action learning processes link individuals to social transformation, integrate different kinds and levels of appreciation of futures, create open-ended and continually evolving conditions, and contribute to intelligent action rather than formal knowledge. [68]

EDUCATIONALISTS RICHARD M. FELDER AND REBECCA BRENT SUGGEST THAT WORKING IN THE SPACE BETWEEN KNOWLEDGE AND PROBLEM IS WHERE LEARNING IS TRULY FOSTERED. [69] WITHIN THIS FRAMEWORK, 'SOCIALLY ROBUST KNOWLEDGE ... CAPABLE OF DEALING WITH UNKNOWN AND UNFORESEEABLE CONTEXTS' IS FOSTERED AND TESTED. [70]

This points toward the request of postnormal sciences to engage extended peer communities in the work of science; however, we argue, anticipatory action learning goes much further.

Postnormal science, where postnormal times finds its foundations, was conceived as a means to question values and make them explicit in scientific research. [71] Silvio Funtowicz and Jerome Ravetz were advocating for the inclusion of non-expert audiences and stakeholders, those groups whose concerns and values are usually considered external to the scientific process, as a means to democratise research inputs and outputs. [72] Known as extended peer communities, these groups can and might lead toward the integration and absorption of localised

knowledge, which can shape areas of study and bring about more collaborative and responsive modes of research.

Anticipatory action learning is different and more relevant in postnormal times, in that it incites active participation, is future focused in its application of anticipatory decision making, and embeds a reflective practice – or double loop learning – in which participants identify a problem, posit a solution, apply this solution, assess the outcome, and reflect on the questions: what happened, did it work, and where next. [73] In this way, teacher and student, researcher and subject, all become creators and purveyors of new, practical knowledge and are involved in positive action toward the future. Indeed, the anticipatory action learning model has successfully been integrated into curriculums for the development of students' anticipatory reasoning and questioning as well as into community engagement projects deployed by city planners to bolster participatory decision-making processes. [74] Conceptually, this future-orientated attention essentially draws an awareness of and yearning for alternatives already embedded in the present database of images and practices.

However, positive action, nested in constructive optimism, [75] requires a healthy imagination that is 'critically aware of the diminished futures that appear hegemonic in the dominant culture'. [76] Futurists Marcus Bussey, Mei Mei Song, and Hsieh Shang-Hsien have offered a model for anticipatory imagination that brings in the personal and transformational as domains that point to the capacity to lead from conditioned reality to a point beyond it – something new, perhaps even surprising. Indeed, the inclusion of the personal and transformational domains acknowledges that there is a connection between our sense of identity and our relationship with the future, and the process of transformation can have personal, social, and cultural outcomes. [77] Thus, personal imagination is dependent on an individual's social and cultural capital and makes sense of deep existential questions of identity, potentially, and taboos. Social imagination speaks to the assumptions, values, rationalities, and institutional conditions that set contexts. Cultural imagination exposes the historical and epistemological roots of context. Anticipatory imagination traverses all three plains of imagination to, in the case of Bussey, Song, and Hsieh, empower engineering students to regard the interdependence of systems, embrace risk taking and open-ended questioning, and adopt a proactive stance toward their future in reconstructive and creative ways.

We propose that this pedagogical model for building anticipatory imagination should be deployed and embraced across disciplines. Unlocking anticipatory imagination, it is suggested, builds confidence around one's capacity to actively reframe contexts, deploy skills and materials in the quest to solve problems. That is to say, that the futurist becomes the hacker, who exercises individual and collective agency within the cultural domain, to put one's creative energy in the service of social, cultural, and ecological processes that keep gridlocking, in a state of postnormal paralysis. [78]

Fundamentally, this is all about agency: the capacity of individuals and communities to make decisions concerning all main aspects of their lives in ways that are neither completely constrained nor completely without reference to social, economic, and family circumstances. [79] In particular, agency refers to the agentic dimension of human subjectivity, the human-specific capacity to actively influence and change their living conditions. [80] This capacity for action, the American writer Kevin Brockmeier tells us, is mediated through the particular social character of human life. [81] In Brockmeier's view, this implies that the conduct of action is under the sway of intentional states, such as beliefs, desires, emotions, and moral commitments, states which in turn are interwoven with culture, society, and history. [82] Indeed, we are reminded of Karl Marx who reflected, in his *Theses on Feuerbach*, that the 'human essence is no abstraction inherent in each single individual ... but the ensemble of the social relations'. [83]

A particular futures method provides the opportunity to unpack and analyse the particular contextualities that are seen to govern and/or affect images of the future: causal layered analysis (CLA). [84] This poststructuralist method opens up a greater understanding of one's complicity in any context and how, through the logic of causality, through either active or passive behaviour, one can rework the world around them. Causal layered analysis encompasses four vertical layers within which horizontal discourses may be entered:

Layer	Agency
Litany	I have the ability to influence the direction of my life
Systems	Set and rigid; institutional and paternalistic
Worldviews	Grand narratives
Myth/metaphor	If you imagine it, you can make it so

The basic insight here is that agency, however constrained by force of circumstance, always lies where the stakeholder stands and, in the context, what they determine.

Postnormal times is a transitional period. What comes after postnormal times, Sardar tells us, 'can be consciously shaped to be better, saner, more globally and ecologically relevant, more pluralistic, more humane and more peaceful alternative'. [85] While the emphasis here is on agency, Sardar is implicit in his invitation for a diversity of voices in shaping what comes next. Indeed, Sardar's project has long been to simultaneously resist and disengage from the defining power of the West and create an intellectual and cultural space for the non-West by encouraging nonWestern cultures and societies to describe themselves with their own categories and concepts and anticipate their own futures. [86] Further, agency is not an exclusive property of humans or even the biosphere. [87] Surely in our

postnormal times, as autonomous machines become smarter and more ubiquitous, bound to make life-or-death decisions, their agency ought to be addressed too. [88]

The European philosopher Rosi Braidotti advocates for a postanthropocentric configuration for knowledge that grants the earth the same agency as the human subjects that inhabit it. This will require a reimagining of what is meant by agency. [89] For Braidotti, this reimagining cannot be drawn from the immediate context or the current state of terrain, rather:

they have to be generated affirmatively and creatively by efforts geared to creating possible futures, by mobilizing resources and visions that have been left untapped and by actualizing them in daily practices of interconnection with others. This project requires more visionary power or prophetic energy, qualities which are neither especially in fashion in academic circles, nor highly valued scientifically in these times of coercive pursuit of globalized 'excellence'. [90]

Untapped visions may be explored through anticipatory imagination. What makes narrative such a flexible vehicle of imagination is its capacity to tap into multiple frameworks of meaning that draw on both real and fictive scenarios of agency. As Brockmeier points out, the imagination and its use of narrative seamlessly mingles the factual with the fictitious, the real with the possible; 'in fact, it fuses the real and possible with the impossible'. [91] Agency, then, in postnormal times exists everywhere, is open and fluid, is not linked to a dominant world view, but rather invites us to reimagine everything we thought we already knew.

Layer	Agency in normal times	Agency in postnormal times
Litany	I have the ability to influence the direction of my life	Everything has agency
Systems	Set and rigid; institutional and paternalistic	Open, fluid, and dynamic
Worldviews	Grand narratives	Eroding, new, yet to emerge
Myth/metaphor	If you imagine it, you can make it so	Reimagine everything that you thought you knew

Futurist Sohail Inayatullah proposes that while all four layers of CLA are important in the process of unpacking the contextualities, a higher order is placed on the value of the mythic/metaphoric layer as it is the layer that informs all other layers. [92] Indeed, mythology has the ability to transcend paradigms. [93] Thus, a change in the mythology that drives us, a reimagining of how we are in the world, whilst enabled

by the imagination and facilitated through the epistemological realm, has implicated effects on the ontological realm. Let us address this in a return to our zombie metaphor.

Anticipation and Becoming

Our relationship to the zombie has been one based on fear: fear of the Other, fear of the imminent existential threat, and fear of that which exists amongst us waiting to ravish us and strip us of our very souls. It is no mistake that the West has appropriated the zombie into the zeitgeist from the Haitian Vodou tradition; Said's Orientalism remains entrenched in the cultural artifacts of today. Others, like the French duo of Gilles Deleuze, a philosopher, and Félix Guattari, a psychoanalyst, viewed the zombie from a Freudian-Marxist view, [94] in which capitalism is the root of the so-called death drive; as people become dehumanized by commodification, they can increasingly look forward only to death. [95] It is a relationship rooted in fear. This fear, it is argued, stems from the fact that zombies, at first glance, look like us; they are our undead doppelgangers, familiar yet unfamiliar, intimate, and strange, all at the same time. Here, we enter the realm of the uncanny.

Freud's conceptualization of the uncanny indicates the divergence of the realm of the real and the realm of the fantastic. [96] Freud's project, whilst denoting the very real emotion – the uncanny experience – is nevertheless a response to the objective world, a response that remained ungraspable for Freud by anything available to him in the clinical terms. Freud's acknowledgment of other forms of knowing and being outside empirical constructs hints at a disownment of the Enlightenment constructs of reason, rationalism, and secularism that otherwise framed the clinical case studies of Freud's work. [97]

Freud's notion of the uncanny has become a point of reflection for many thinkers investigating our relationship with the world. The object-oriented philosopher Timothy Morton argued strongly for the importance of uncanniness and for allowing space for strangeness in intimacy, in which other beings can be their strange selves, 'strange strangers'. [98] For Morton, these beings are everywhere and everything: people, animals, trees, chairs, desks, sports cars, skyscrapers, microbes, and laptops. His goal is to, philosophically, make the inanimate, animate. This is an open and co-evolving space, where objects share relationships with one another in a manner that is reciprocal. [99] This approach moves beyond Enlightenment, subject-object relations, instead seeking to conceptualise an ecology of objects, flattened and without hierarchy. Ontologically, this is a proposition toward Becoming, rather than Being. This process of Becoming is more closely aligned to what the political and social philosopher Diana Coole calls new materialist ontology 'a process of materialisation in which matter literally matters itself ... this is not, then, the dead, inert, passive matter of the mechanist, which relied on an external agent, human or divine, to set it in motion. Rather, it is a materialisation that contains its own energies and forces of transformation. It is self-organising, *sui generis*'. [100] This approach seeks to expand our sense of agency so as to involve the interplay of human-non-human in co-creative works of materialisation. If new materialism

is moving to a process of Becoming, then our notion of subjectivity too becomes a process; fluid, porous, open, and coexistent. [101]

Indian economist Arun Kumar Giri calls this weak ontology 'which urges us to realise that ontological cultivation is not only a cultivation of mastery of the self, but also cultivation of its humility, fragilities, weakness, and servanthood facilitating blossoming of non-sovereignty and shared sovereignties... Weak ontology helps us realise that both identities and differences have inbuilt limitations and they ought to realise their own weakness as a starting point for communication and sharing through cultivation of weak identities and weak differences'. [102] This is resonant with object-orientated ontology, an anti-anthropocentric philosophy that removes humans from the centre of the cosmos and asserts the agency of non-living forms. With object-orientated ontology, Morton offered the notion of the 'mesh' – the interdependence and interconnectedness of all living and non-living things in a way which gives equal value to the holes in the network and the threading between actors within that network. [103] In doing so, Morton keeps open a space for the uncanniness of our intimacy with the world and with other beings. [104] Thus, according to Morton, through the embrace of object-orientated ontology, we open ways of being together in the world – subject and object – that go beyond Modernist constructs of the self and self-interest. [105]

Wither Zombies?

Should we reimagine our relationship with the zombie? The zombie as a symbol, as an abstracted concept, fills us with fear as it reminds us of our fundamental deficits as a human. The zombie disciplines as the force that perpetuates these deficits are proving obsolete to meet the emergent challenges presented in these postnormal times. Our proposition has been that, rather than ward off the zombie apocalypse as we are taught to do in Hollywood movies and popular culture, we should embrace the Otherness of the zombie – uncover and embrace the intimacy that underlies our uncanny relationship with the flesh-eating undead and seek to navigate the future together. By examining images of the future and uncovering cultural assumptions, with a view toward transformation, futures approaches provide the tool kit we need to shape a 'better, saner, more globally and ecologically relevant, more pluralistic, more humane and more peaceful alternative'. [106] In particular, anticipatory imagination, nested within the anticipatory action learning framework, provides a process that brings in the personal and transformational as domains of knowledge creation. As we have postured here, anticipatory imagination, when injected into the curricular that buoys zombie disciplines, unlocks agency, fosters confidence around one's capacity to actively reframe contexts, and deploys skills and materials in the quest to solve problems. We aspire to create transformation from the inside out. Zombie disciplines, like the zombie itself, are not the enemy, but rather are relics from modernity that require excavation, revamping, and reframing to help us transition toward that which is to come after postnormal times. [107] After all, the zombie is fundamentally and metaphorically transformational.

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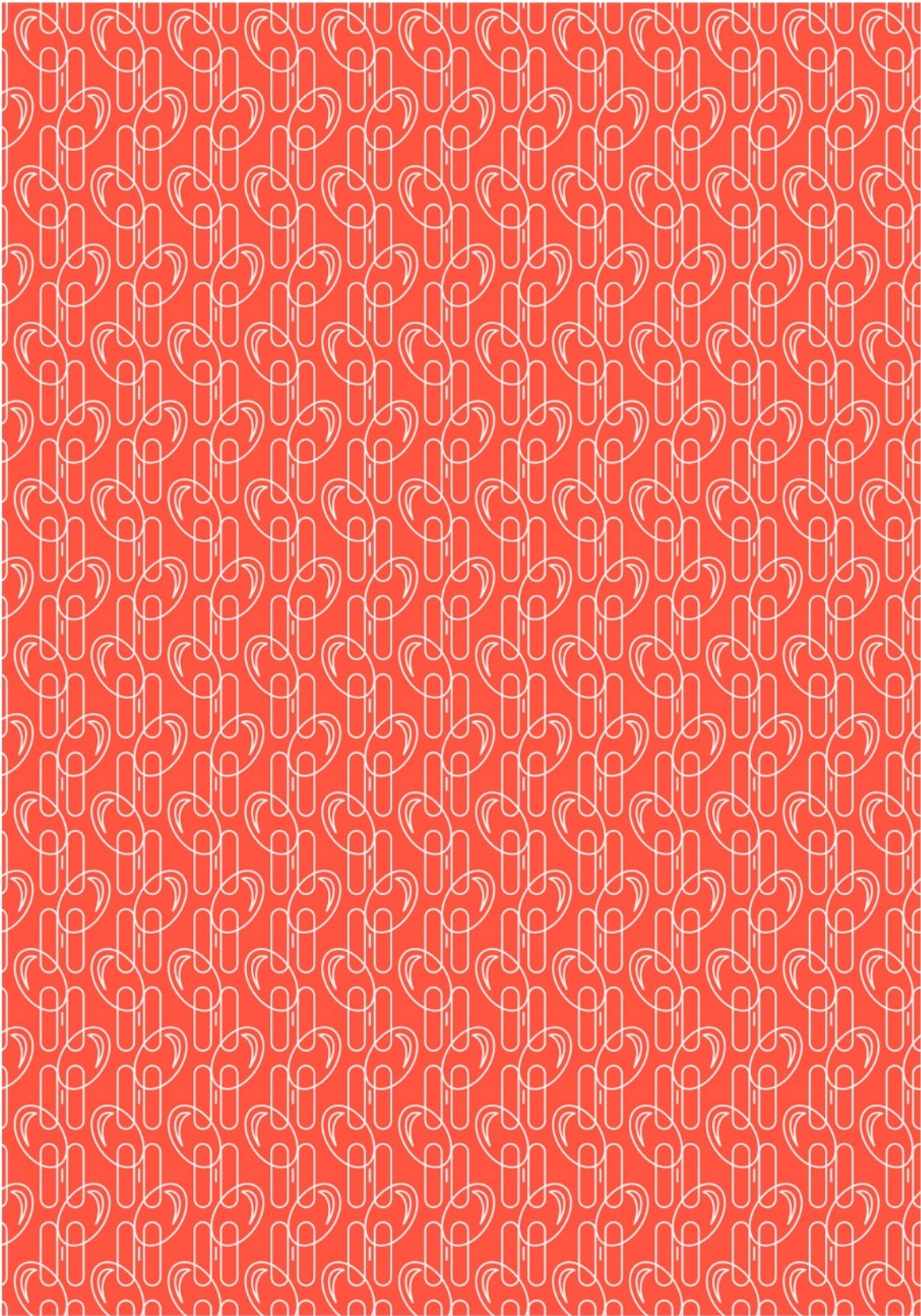
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**CULTURE &
CREATIVITY**

POSTNORMAL TIMES & MINCED WORDS

C Scott Jordan

It was a swastika.

It is such a strange word. Even by English standards. Swastika. This odd combination of consonants and vowels makes for something almost as startling as the symbol itself. The symbol which lies burnt into the lawn before me on a particularly steamy summer morning. It is a peculiarly cruel form of cultural genocide to so bastardise a religious peace symbol. Peculiar still that I find this pyrotechnic graffiti in Omaha, Nebraska: a micro example of the city's famous tradition. That being, the destruction of tradition. Out with the old, in with the new. Gentrification in Omaha takes on a meaning no other city could fathom. Excise the historical and lay out a new rug to forget. No memory to romanticise, no past to draw fear from. Only the newer and the better. A noncanonical interpretation of the American Dream.

If Omaha didn't invent gentrification it has, at least, perfected the model, making it widely available and applicable. Packaged for home use, cultural genocide has been neutralised to the point of it almost being a fun and recommended family outing for the weekend. My roommate and I laugh with a nervous accent as we drive by the numerous gentrification projects at work all throughout the streets of Omaha.

This nature dates back to the first staking out of the Nebraska territory during the United States' western expansion of the nineteenth century. Nebraska comes from the native Oto tribe's word for 'flat water' referring to the Platte River which bisects the state's contemporary territorial borders. Omaha itself was one of the tribes that roamed the great plains. The first white people to call Nebraska home were nicknamed 'tree planters'. This unusual moniker comes from the annual tradition turned state holiday known as Arbor Day. Arbor Day traces its origin back to the sojourn of one of the original American mythological figures, Johnny Appleseed. Bare footed with a tin pot upon his head, Johnny marched across the American frontier with his bag of apple seeds in a nigh biblical, yet suspiciously homoerotic, fashion ridding the new world of useless grassland to lay the groundwork for the industrialised, production-ready landscape that Manifest Destiny called for. Indeed, the American Spirit! The first inhabitants of contemporary America rolled with the

punches. Whatever nature gave, the early tribes made it work and in such a way that did not destroy the hand that fed them. They would attempt to teach the first Europeans how to farm so that they may survive those first treacherous winters. Leave it to the Western tradition to take a model and find a way to exploit it and bleed it for all it has to offer. The gift of the first thanksgiving would, unbeknownst to the givers – the first American tribes – be the instrument of their undoing. Military campaign, mass over-farming, and slaughter of the Buffalo would provide the first wave of genocide and gentrification against the native peoples. The second wave would not only strike against the way of life for Native Americans but be a slap in the face of mother nature. A mass terraforming event that would set the ball rolling on the demonic mind of early developers of the largest Midwestern American cities.

Year after year, more and more trees turned the endless sea of prairie grass into odd forest as the nineteenth century waxed and waned. The tradition of gentrification would not stop there. The twentieth century brought cars and industry, turning Omaha from a pit stop on the Oregon Trail, to a metropolis, a true American city. The fathers of contemporary Omaha had the Pacific Ocean in their sights but found that fortune and glory would be found easier in the journey than the destination. They settled in Omaha to finance those set on California's promise of gold and most importantly in transporting it back east. Bankers and businessmen sought to make Omaha the ultimate capital of a pan continental empire of business, managing trainlines, telegram (and eventually telephone) lines, and safe transport of mail and money, to and fro. To the northern part of the town, the first kings and queens of Omaha (to this day they actually hold a ball every year where the city elites elect a King and Queen of Aksarben, which is just Nebraska spelled backwards).

**A NEW WAY OF LIFE HAD TAKEN ROOT IN THE LOOSE SOIL OF THE
FORMER PLAINS. SYMBOLS OF THE OLD NATIVE AMERICAN WAY WERE
TRANSFORMED AND 'MADE BETTER' WITH THE HEAVY USE OF ART DECO
– YET ANOTHER APPROPRIATION OF SORTS.**

The mass immigration from Europe at the turn of the century created a refugee crisis for the eastern United States. Just as the founders of the East Coast fled the persecution of the Old World, the new immigrants moved west to flee the new persecutors (a weird cyclical trend seen all around this great big planet of ours). Tribes of Bohemians, Italians, and Slovaks built ghettos within the modern-day city limits of Omaha. Like any true American city ought to, the city developed along a classic grid system. North to South. East to West. Block by block. The streets became as good walls as modes of transport, making sure every different group stayed in their own place. Eventually the rich elites of the North set their eyes for the west to recreate a Stepfordian paradise in the yet untouched land Johnny Appleseed left them. The South, the landing point for newcomers (due to the railroad's

placement) became the labour capital and home to the working minorities. First Europeans, more recently the Latin Americans. The abandoned castles of the North would become as good a place as any for the recently freed slaves to settle upon the conclusion of the American Civil War. Malcolm X was born in the leftovers of Omaha's most royal families. The construction of major interstates would help solidify the artificial borders of segregation that keep all the different citizens of Omaha away from each other.

Omaha today is a microbrewery for racial and class tensions. Numerous structures in society seek to maintain the physical borders that the architects of Omaha put up to frame Omaha from the Missouri River westwards. Fairy tales told to scare children are reinforced by the five o'clock news. The South is for the lazy foreigners and is ruled by gangs imported from Latin America, mostly Mexico (statistically true, yet nevertheless grotesquely over generalised by the netizens of Omaha). The North is the capital of crime and hate, also noted as the most likely place in all of the United States for a black male to be murdered. Downtown (the East) is just where you go to work, but try to avoid the homeless and their plight. Even the mighty police force has trouble properly herding them away from the general public. They inspire an instant of empathy, but in truth, the average American hopes they would carry on with decreasing the surplus population. West Omaha is safe. That is where home is, reeking of cleanliness and success. The American Dream imagined. No crime happens here (except of course for the crime which happens within the family unit, or within the closed boardroom, or any of that sexual misconduct occurring in front of the blind eyes of university campus leaders or church officials).

Omaha is America. That wonderful melting pot of culture, where only the filmy crud rises to the top and temperatures and tensions remain constantly extreme, regardless the season. Come visit our world-famous Henry Doorly Zoo. It houses a wide variety of species taken from the wilds all around the world! Like this world-renowned zoo, Omaha itself is always tearing down old builds to build new and better, yet keeping little bits of romanticised memories in the façade. Shuffling new groups of immigrants around being careful not to let them mix too much. The immigrants of Yugoslavia and Africa from the nineties and the noughties are just beginning to carve their little bits of the city out, just in time as the latest influx of global refugees is beginning to develop bringing in new groups from the Middle East. Everyday more and more projects gentrify the old and decrepit. Upon the ashes of the old, Omaha builds up and outward, prices soar, and the class gap is kept well fed. Yet each group is kept sectioned off from each other, each in their own cage. A proud zoo of humanity. Something truly postnormal comes in Omaha's pride over its heritage, steeped in multiculturalism, yet emphasised with segregation and division.

What keeps it all together? Well, that would be the lie upon which the plot of the American narrative is carefully constructed. The lie is that America defeated racism, or at least that we have managed racism so effectively that to even count it as still

existing is statistically superfluous. The Civil War, the Civil Rights Movement, Black History Month, Juneteenth, the multitude of pancultural holidays and school lesson plans. They all succeeded. Congratulations America, we did it. Blacks and Whites, Asians, Mexicans, Middle Easterners, even the Russians and the Ukrainians. We can all live in tolerant harmony. Even religious, gender, and sexual identity come together to sing Kumbaya or enjoy a cup of Joe, consuming and gentrifying *ad infinitum*. Score one for humanity!

This was the education I was served growing up an American millennial. It was the 1990s and we were at peacetime, things, by American standards, were quite weird. We were told to look around, there was no forced segregation, and to look at all the minorities that we share this wonderful country with. Measures had even been taken to pay for the sins of the father such as Affirmative Action and issued public apologies. It was the highest crime for our generation to make fun of anyone for being different, to refer to disliked things as being 'gay' was outlawed, ditto plus one for the infamous 'r' word (which even in its 'acceptable' scientific contexts is something to be avoided). A sort of Ludovico sickness would develop in our stomach just for thinking of certain racial slurs. Change had finally come.

And then there was 9/11. No, that must have been a fluke. Americans are past hate. We love our differences. That which makes us unique. We stand together in our differences as one nation. We would rally behind the stars and stripes. The struggle occurred, and we progressed to the mountaintop. Hadn't we? Why did the older generations use certain words or avoid certain places or banish certain types of music and film. Was this story more complicated? Did we miss a part? Had I slept through some sliver of exposition? What if we had been lied to? It is a hard and nauseating thought, to realise that you might have been indoctrinated.

And then there was the election of 2008. Barack Obama. And just like that, the hate returned. Racism resurfaced, alive and flourishing. Those differences shifted into focus. To be American meant something different overnight. While we didn't fully understand it, it was something that none of us really liked. And then there was the election of Donald Trump. The seemingly impossible, now an in-your-face reality.

And then I found myself in Omaha's Memorial Park on a phenomenally humid day. Sweat dripping and my morning jog reduced to a dumbfounded loiter with an exhaustion-induced contrapposto stance. My lungs rapidly disrupting the air pressure around me. The salinity of my sweat burning my eyes. And a swastika lay burnt into the hallowed ground of Omaha's highest war memorial. Aside from housing the granddaddy of all high hills, famed for snow day sledding, Memorial Park is the sight of memorials honouring those who died from Douglas County in America's various foreign conflicts. World War I, World War II, Korea, Vietnam, all meshed together. Memorial Park is a collage of patriotism, organic as with the tallying of each new death toll for each new American military operation, one could bet that another statue or plaque will be added to the grounds. Among the names of the fallen Nebraskans is an exorbitant number of American flags and the fast

and loose use of classic patriot phrases. Each one more mind numbing than the last, derived from sound bites delivered to force homogeneity amongst a people ready to tear each other apart in accordance with English philosopher Thomas Hobbes's nightmare.

**GIVE ME LIBERTY OR GIVE ME DEATH. UNITED WE STAND, DIVIDED WE
FALL. LIVE FREE OR DIE. YOU'RE EITHER WITH US OR YOU'RE AGAINST
US. FORGIVE BUT NEVER FORGET. FREEDOM ISN'T FREE. ALL OF THEM
DATED. ALL OF THEM RIDICULOUS. PATHETIC ATTEMPTS TO UNITE A
PEOPLE SIMPLY TO BE AGAINST THE OTHER.**

Simple platitudes and threatening contradictory mind traps. If Freedom is not free, then perhaps what it is that we are talking about is anything but. We utter these words without thought or reflection just as we recite the anthems and light the fireworks and gather around the heart-warming glow of patriotic nationalism.

And then, as I wipe the sweat from my forehead, I realise I have discovered what it is that Omaha is missing in all its infinite diversity. Nazis.

Just as it takes the latest fashion trends to travel from the Coasts to Middle America, perhaps Postnormal Times has also lagged in reaching the Heartland. But it is unmistakably here. This swastika was no random event. This is not something that can be passed off as a childish prank or the ravings of an isolated lunatic. A ripple of thunder is rocketing across America as Nazis are returning, if it is the case that they actually went away. Even in Omaha, reports spoke of Nazi propaganda leaflets appearing in various neighbourhood Little Free Library boxes. While defamation of property is a bold statement, do we know what is actually being talked about?

Language is a strange thing and postnormal times has made it even stranger. What I propose here is not some duel of wits and semantics. Instead, I wish to point out the fragility of the very semantics by which we structure our logic and the fundamental fallibility of our wits. The damage already done leaves us with words, starved of definition, which we take for granted. Wilfully sipping this nectar of ignorance, we pass through time and space with reckless regard speaking to such phenomenon as unpatriotic nationalism, contingent independence, and subjugating freedom. A blissful ignorance side kicked to an unrelenting uncertainty self-perpetuates the postnormal state. Those in the know, or, perhaps at best, aware of their own unknowing, are perplexed to a crippling degree. The problem is an issue of not having the correct tools. The physicists find their theories reaching beyond their experimental range. Thus, their practice is more philosophy than fact challenging science. The postmodernist attempts to eradicate grand narratives, creating a grand narrative against grand narratives. The posthumanist dives headfirst into the robot revolution untroubled by the multiverse of potential

ironic consequences that can and are resulting in such neglectful investigation. Each master tries to capture the future in their own image and direct it towards their own utopic ideal.

At this point we are faced with two problems. First the future is not singular, it is a plurality of futures. Second the future cannot be controlled, managed, or placed upon a shelf. The complexity and contradictions, uncertainty and chaos of our times, coupled with breathless accelerating change, does not allow for the old-fashioned luxuries of control, efficiency, and management. The present is not just weird; it is constantly getting weirder. Our systems and routines are becoming obsolete. The jogging paths we've come to know by muscle memory are not taking us to the destinations we desire. So, is this where the road ends?

Where to go next? This is an interesting dilemma. The approach favoured by the most academically minded is to grapple this problem, wrestle the angel, dissect, experiment, and look for the definite solution. But the beasts of uncertainty and ignorance cannot be defeated. We need to learn to navigate our way through postnormal times. Beyond this point, we require tremendous creativity, distillation of foundational value, acceptance of rapid change, living with uncertainty, awareness of our ignorance, and thinking the unthought. Even mastery of those tools does not guarantee smooth seas for navigation. There is no assurance of safety, sanity, or indeed survival in postnormal times.

**POSTNORMAL TIMES DOES NOT COME WITHOUT SIGNS. INDEED,
THOSE OF US WRESTLING WITH POSTNORMAL TIMES ARE CONSTANTLY
REFINING AND BUILDING UP OUR AWARENESS OF THESE SIGNS.**

The menagerie of postnormal times serves our purpose best here. Black elephants are the first member of the menagerie. Black elephants are those events which are otherwise easily identifiable possibilities that had been ruled out due to confirmation bias or simple ignorance. The second member of the menagerie are black swans. Black swans are the inconceivable, at least within given worldviews and systems, the seemingly impossible. These game changers alter our imagination's ability to perceive what is possible, they trigger a flurry of positive and negative potentialities. The third member of the menagerie are black jellyfish. These creatures are the true bulls in the china shop of postnormal times. Rapidly becoming the symbol of these climatically challenging times, black jellyfishes are those events that, though often starting as small, 'normal' occurrences, are driven, through positive feedback, to grow in geometric proportions challenging the structural integrity of global systems. They are 'high impact' and have a great potential to make things postnormal – rapidly. [1]

It is important to note here that the menagerie is largely dependent on perspective. One individual's black swan could easily be a black elephant to an

individual halfway around the world in a different socio-political context. But the purpose of the menagerie is to highlight uncertainties, our ignorance, and the limitations of our own worldview and situation. It is a much better way of navigating futures beyond the end of the road.

Jogging on the road, the body is in a super-heightened state. Smells, sights, sounds, feelings are all on their highest alert as the body struggles to maintain homeostatic control of itself. During a proper run, things out of place can startle, sending the body into a state of shock. On the numerous jogs I have taken in my life I have been startled by the happening upon of roadkill, animal scat, and even unnoticed fellow joggers. This was the first time I had been startled by the discovery of a symbol. I snap out of it, moving away from the swastika, reigniting my run for home, still a few miles down the road. My mind is racked by various words. Words we overuse and others we don't use enough. And then there are the words we use and don't actually know the definition of what we are talking about.

Freedom

Freedom. It is a most curious contradiction. Worse yet, it is a seductive contradiction. Like capital, it is never just satisfied with a unit or two of itself, it must always be more. Insatiable, freedom fights for itself even at the consumption of the freedom of others. Just as Adam Smith convinced the Western world that acting in one's self-interest magically worked in the interest of the common, my freedom is your freedom and we must be willing to die for it, at any given moment!

This could not be illustrated more perfectly than through the Constitution of the United States of America. While I could write volumes on the contradictions this particular document alludes to, I will try to remain focused on this one. Naturally, the first two amendments are the only ones the common American will remember by heart without having to consult Google. While the second amendment gets more airtime on the news (for the unfamiliar, that's the gun one) the first amendment is the one which tends to be invoked on a more regular basis. Within that one run-on sentence, which comprises the amendment, lies over two hundred years of legal philosophy, fundamental building blocks responsible for American angst and arrogance. And it is a dangerous contradiction. It speaks to freedom of expression, speech, and assembly. It promises that if this great experiment fails, we have the right to tear it all down and build something better in its place. It allows one the freedom to be. But, it also allows one the freedom to take others freedom. Common sense and jurisprudence have done a little good in history. For instance, it is illegal to yell 'Fire!' in a crowded theatre, as this would invoke mass hysteria. Though it gives both the oppressed and the oppressors the right to march in the streets with police protection. This freedom gives you the freedom to bind your fellow humans in bigotry, racism, and xenophobia, of course with the adage that you ought to be able to consume what you dish out. The first amendment of the US Constitution gives one the right to hate. It also turns freedom into a commodity. Our commodity and one which can be stripped from the other if they don't play by our rules. A day

doesn't go by in the United States without us proclaiming the sacred word freedom, with each use, we further bastardise its meaning deepening the contradiction. This black elephant is ripening towards postnormal fruition and soon those cries for freedom will find themselves being answered by something very different.

Fascism

As the Americans have overused the word freedom into its own undoing, both Europe and the United States have underused another word allowing for a faded memory to return proudly and display its ugly face unabashedly. Fascism. Even to see the word written, carries with it an entire context. Yet, today we are told not to use this word. Not for fear of offending others or because it has become outdated. We have become so afraid of Fascism's return to global dominance, that we shun the slightest use of it beyond historical context. In fact, a black swan is identifiable in the concept of fascism ever rising to power again in Europe, or anywhere in the world for that matter. Those of us who find some or all of our life having been uploaded to the internet may be familiar with Godwin's Law. This is the law which states that eventually all online arguments devolve into comparing one's competitor to Hitler or the Nazis. The use of this comparison had become a cop out for finding the most insulting thing to say to one's opponent. Understandably, for the preservation of professionalism and dignity, many have refrained from making such comparisons entirely. But what for the events in the contemporary era that actually are fascist and look a lot like or even one-up the deeds of the Nazis?

Former US Secretary of State, Madeleine Albright throws the word at us in giant red letters on a black background in her 2018 book. In *Fascism: A Warning*, Albright seeks to re-inoculate public discourse with the word. [2] She rightly points out that fascism has often been chalked up to meaning 'What Hitler or Mussolini did'. Distilling it from historical conceptions, Albright defines fascism as the belief in one opinion standing for the whole of a nation or state and the defence of that opinion being the justification of violence. She lays out a historical primer in fascism's approach to the twentieth and twenty-first centuries and highlights the creep of fascism back into global politics. Most importantly she pushes for further study of the phenomenon so that it can be curbed and prevented from being the decay of the contemporary political order.

Freedom and fascism have taken an interesting path into contemporary political rhetoric. Trump, Brexit, Fake News, Social Media, Big Data. Little of it has retained any intellectual value. As in Albright's work, there has been a small revival in reflecting on fascism and freedom. Thinkers like Timothy Snyder are not afraid of pointing towards a soft hijacking of contemporary democratic processes by tyrants and fascists. Like a good Aristotelian should, in his latest book, *The Road to Unfreedom*, he pits extreme political views of the now against each other so as to find a mean, the principle itself. [3] Ultimately, this exercise proves futile in postnormal times. The extremes of the now are contradictions that fracture our opinions. There is a value to Snyder's discussion though. The struggle between

extremes is important for beginning to comprehend the contemporary world. He also points out important historical trends we must remain cognisant of. He asks the reader to take control of the past so as to build a more preferred future. In terms of postnormal times, the past he speaks of is more properly stated as the Extended Present. This is the future before us if the status quo is maintained. Trends continue uninterrupted and all is business as usual. [4] As things become more and more postnormal, the probability of this future coming to be is less likely. Understanding this limitation is key to fulfilling the request to the reader that Snyder states. Power is never given. No one is just offered the keys to history.

POSTNORMAL TIMES IS NOT A SPECTATOR'S SPORT. IT REQUIRES PARTICIPATION. THIS CONVERSATION MUST BE KEPT ALIVE. REFLECTION AND CONSTANT CORRECTION CONTROL IS NEEDED TO REFINE THE LANGUAGE WE USE.

Fear, irrational assumption, and hate have been allowed to control discourse at an unprecedented rate. Words need to be constantly on trial. What do we mean when we cry freedom? What are we doing when we mindlessly spout off patriotic diatribes or nationalist oaths and songs? What is truly being risked when we turn freedom, in its myriad of forms, into a motivation for action? Fascism is scary. But will we ignore it as it quietly grows in the dark? The confounding nature of the potential danger laced within language can quickly be manipulated into convincing people of their own opinions. This is populism at its most malicious. The calls for a return to the 'good ole days' or to make (insert your nationality/state identity here) great again are the smooth romanticising of the familiar and ultimately destructive. And we have already seen how seamlessly this carries on along with each of our technological leaps. Now social media and our online lives segregate and silo us off instead of bringing the world together as techno-utopians once dreamed – but now desperately pray for.

Language has a unique power. It can time travel. At this particular point in time, we humans cannot. Because of this fact, we must rely on memory. Language travels through time and space, often unscathed by the journey. Memory is constantly recast and edited before the might of perspective, clever storytelling (often by the winner of a particular historical moment) and the ever-flexible impact of emotion. The more eloquent of society can attempt to use words as they please and, if they sing a pretty enough song, can weave lies and fractured reality into language. We can be convinced to disregard history and let the sins of the father be just that. But remember, history matters. Futures matter and are always there before us. We cannot allow our words to be misused and morphed. Slowly they become the black elephants and swans that haunt our reality and historical trajectory. Heaven, forbid they become the black jellyfish that can disrupt all, positive and negative, for better

and for worse. Yet, words are words. Just as we can lose our own identity in the wake of populism, it can be recovered. Definitions must be held accountable. This is the first step towards owning the future, that together can begin the construction of a trajectory towards our preferred futures. Sticks and stones be damned; words can indeed hurt – and maybe they ought to.

I am not sure if a dictionary can be made in postnormal times. Perhaps the philosopher in me needs that stability, and perhaps that stability may come in a form unthought to our present selves. What is important is a self-awareness check on the language we use and the complexity, contradictions, and chaos that takes it to radically new trajectories. The confinement brought on by structures in language and society can equally be an opportunity and impediment. If a dictionary is to be attempted, it mustn't be a dead, hardened, set-in-stone law text; it has to remain flexible and a living dictionary subject to change, and changing times. It will be uncomfortable as we must breathe life into the reference materials that once grounded us. But postnormal times is an 'in-between period' and for the time being, until the new paradigms are born, we must challenge those that are problematic and dying and get creative and imaginative in how we do it if it's to have an effect. [5]

I adore running in the rain. There is a comfort in the hazard. The combination of a thinned-out atmosphere and a slight temperature drop makes for an all-too-familiar world being made anew. You notice things you have once taken for granted. Postnormal times is like running in the rain, but that only means our bodies must be all the more alert for the dangers that accompany roads and rain. Be aware that the path you once knew so well might take you to an entirely different destination. We are blinded by the rain drops of our own uncertainties and ignorance, but we can take comfort in identifying the elements of the menagerie, judging the awareness of our limited perspectives, and begin to take the first steps that become the full-on sprint. We stand to be startled out of our run by things far stranger and more fear invoking than swastikas burnt into a public green space.

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MUSEUMS IN POSTNORMAL TIMES

Olga Van Oost

Reports of conflict and revolt in the European Union dominate the news and journals with a seemingly endless diversity of subjects. In pre Covid-19 times, we saw the 'yellow jacket' movement demonstrating in France and Belgium against high petrol prices and social inequality; the increasing public anger of #YouthForClimate at politicians for their global failure to tackle the problems of climate change and international migration; the growing terror threat; the crippling poverty that still exists in many parts of the world; the Brexit; and last, but certainly not least, the #MeToo actions that frequently made the headlines in 2018. During the pandemic, existing inequalities sharpened even more than before, with the murder of Afro-American George Floyd on 25 May 2020 by a policeman as a most cynical and painful point of culmination. In our ultra-connected societies this boosted the Black Lives Matter movement on a global scale. Currently, the pandemic seems to be 'under control' in many parts of the world but to state that 'normal life' has returned would be an overstatement. In Western Europe, we notice that a lot of people are experiencing a tremendous setback in this (almost) post-Covid-19 era: burn-outs, depression, and other mental issues are rampant. Shocking and disruptive are the numbers of news items on youngster's mental and physical problems (loneliness, eating disorders to name a couple examples). It goes without saying that the impact of the war in Ukraine is huge and one of the major problems on European soil. Not to mention the energy and economic crisis we are all facing. And this is only the tip of the iceberg of world and local problems.

In short, the number of problems on a global scale is superfluous and cannot be overseen. Our era is characterised by an unseen complexity, chaos, and hyper-connectivity. According to Ziauddin Sardar, we find ourselves in a transitional era: postnormal times.

When looking back to the past few years and trying to make it balance out, it is hard to keep up an optimistic spirit. Global problems have only grown, especially against the backdrop of the pandemic and the increasing explicit and ubiquitous violence. The work of Sardar has not lost any of its credibility, on the contrary. It is frightening in its actuality.

For a person working in the field of museums and cultural heritage who strongly believes the *Zeitgeist* determines the meaning and position of museums in society,

this is challenging. I came across this work a few years ago and I was intrigued instantly. In particular, I wondered whether this framework could be useful when analysing 'the museum' as an institution and concept. [1] What might a museum mean in postnormal times? Is it possible to 'make a difference' or 'make a change' as so many of these and other heritage organisations aspire? Or is this a sheer illusion?

I will reflect upon these questions and try to analyse them. The new museum definition that the international museum community of the International Council of Museums (ICOM) voted for on 24 August 2022 is an interesting starting point. Will it prove to be 'futureproof' in postnormal times? Will it help to give answers to the major challenges in society or will it confirm the status quo?

A New Museum Definition

In museum circles, 24 August 2022 will be remembered as the day members of the global community of the International Council of Museums voted for a new museum definition, during the Twenty-Sixth General Conference of ICOM, which was held in Prague. The new definition for museum they defined was:

a museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing. [2]

This museum definition is the result of a participatory process that took several years and that involved the international museum community. A (temporary) so-called 'Standing Committee' was assigned to lead the process. Initially, the Museum Definition Prospects and Potential Committee (MDPP) was the Standing Committee in charge, led by Danish museologist Jette Sandahl. The MDPP presented a proposal in September 2019, at the General Conference that was hosted in Kyoto. Unfortunately, the committee encountered major protests from the international community. The community stated there was no democratic basis to vote for the proposal that was put forward because the process prior to the proposal was not transparent enough. Besides, the text that was proposed was very long, and looked more like a vision text than a definition.

In short, during the Kyoto-conference, we voted not to vote for the proposal. This was quite a turbulent situation that shook the confidence in ICOM and had an impact on its legitimacy.

Subsequently and in the middle of the Covid-19 crisis, a new standing committee was appointed, 'Museum Define'. The committee embraced the lessons learnt from the previous trajectory and quickly set up and communicated a very transparent process, including multiple moments of asking feedback from the

ICOM-committees. Eventually, this resulted in the proposal that was voted for in Prague, and that was accepted by more than 90 percent of the votes cast.

The Importance of an International Museum Definition

The importance of an international museum definition may not be underestimated. It is one of the foundations for many national museum and heritage policies. Against the backdrop of the museum definition, policymakers can decide whether to subsidise an organization or project. The International Council of Museums (ICOM) is a powerful and authoritative umbrella organisation on which museum and heritage professionals rely. ICOM offers opportunities to collaborate on a global scale and it is the musicological reference. Not seldom (political) authorities need to be convinced of the relevance and uniqueness of museums they are responsible for. The global, musicological, and legislative framework of ICOM is an important support, even if it is often just symbolic.

Museums Opening to Society?

Obviously, this definition is a compromise. The core ideas of the 'old' museum definition recalled the 'traditional' museum's function as a site for collecting, researching, preserving, and educating. This traditional view is still prominently present as well as the focus for both tangible and intangible heritage.

To better illustrate this, it is necessary to review the former museum definition, that was decided in 2007 in Vienna:

a museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment. [3]

However, it was expanded considerably with such critical phrases as 'open to the public', 'accessible and inclusive', 'diversity and sustainability', 'operate and communicate ethically', 'participation of communities', 'education', 'reflection', and 'knowledge sharing'. These new characteristics are notable and acknowledge the role museums (aim to) play in society. For years now, museums all over the world are going through processes of transformation from inward-looking, closed institutions to more outward-looking and open organisations. Museums tap into a broader trend where citizens are being encouraged (and are encouraging each other) to display social engagement through direct action in response to key societal problems. Museums are also being challenged to take a stance. Throughout the world, they are displaying an increasing willingness to take their social responsibility seriously by contributing as an independent voice to the most important contemporary debates. This goes hand in hand with a growing sensitiveness towards ethics and principles of 'good conduct'.

We notice this paradigm shift happening in museology as well. Archaeologist and museum management and curation expert Robert Janes and professor of museum studies Richard Sandell have been working on such themes as activism, mindfulness, sustainability, and ethics for a long time and the recently published book *Museum Activism* gives an overview of these ongoing debates. [3] Museums and their associations increasingly discuss these topics on public fora. It is exemplary that the London based Museums Association's annual conference in 2019 focussed on 'Sustainability and Ethical Museums' and 'dealing with conflict' was of paramount importance. But these debates not only exist locally, but have received more international attention as well.

At the level of ICOM, The International Committee of Ethical Dilemmas (IC ETHICS) is a very young committee, only taking its first steps in 2017. [4] However, its importance is growing fast. The committee has been addressing thematic issues on the handling of ethical dilemmas while also striving for equality, diversity, and inclusion. Illicit trafficking of cultural property, decolonising collections, the ways of dealing with human remains, and general good governance only top a growing list of concerns whose attention and navigation is required to create more ethical museums fit for our postnormal times. INTERCOM, ICOM's international committee working on museum management also recently published a study on the lack of 'good governance' in many museums in East and Central Europe. Above, at the 2022 ICOM General Conference in Prague, 'ethics' was a major issue as well. [5] The ICOM Code of Ethics which is, next to the new definition of a museum, another cornerstone of ICOM's achievements, is currently being revised with the aim of making the necessary adjustments to equip museums for the contemporary challenges they will face.

TO SUMMARISE, IT ACTUALLY IS AN ACCOMPLISHMENT THAT A MAJOR SHIFT TOWARDS MORE OPENNESS, PARTICIPATION, INCLUSION, AND ETHICS HAS FOUND SOIL IN THE NEW MUSEUM DEFINITION. HOWEVER, THE QUESTION IS WHETHER THESE CHANGES ARE SUFFICIENT, ESPECIALLY IN THE CONTEXT OF A POSTNORMAL ERA?

From Classic, Modern, Postmodern to Postnormal?

In order to answer this question, we first need to pinpoint a bit more of what Sardar actually means by 'postnormal'. According to Ziauddin Sardar, we live:

in a transitional age, a time without the confidence that we can return to any past we have known and with no confidence in any path to a desirable, attainable or sustainable future. It is a time when

all choices seem perilous, likely to lead to ruin, if not entirely over the edge of the abyss. In our time it is possible to dream all dreams of visionary futures but almost impossible to believe we have the capability or commitment to make any of them a reality. We live in a state of flux beset by indecision: what is for the best, which is for the worst? We are disempowered by the risks, cowed into timidity by fear of the choices we might be inclined or persuaded to contemplate. [6]

While in the 'normal' past, we could rely on our foundations, from economics and political sciences to natural and biological sciences to deal with the major global problems, this no longer holds true. Sardar states that:

things are going wrong; they are going spectacularly wrong, on a global scale, and in multiple and concurrent ways. We thus find ourselves in a situation that is far from normal; we have entered the domain of the postnormal. [7]

Sardar draws on the work of Jerry Ravetz, the British philosopher of science, and the Argentinean mathematician Silvio Funtowicz, who first introduced the concept of 'postnormal' in the nineties, when they came to the conclusion, they could no longer rely merely on empirical data to develop scientific reasoning and policies because of the uncertainty in scientific work. [8] Science had become postnormal. Three decades later, Sardar concludes that society has become postnormal. Its main features are complexity, chaos, and contradictions against the backdrop of globalisation and ubiquitous connectivity and communication. The confidence in institutions – nation states, public institutions as museums, politics – established in the heyday of Modernity, is collapsing. Says Sardar, 'in postnormal times it is the institutions, the system itself which constitutes the problem'. [9]

In order to determine the 'postnormal era', Sardar made an interesting overview of subsequent time frames: classic (1920–1950), modern (1950–1975), postmodern (1975–2005), and postnormal (2005–). He acknowledges that this division is arbitrary, but it is an exciting exercise in which he argues these eras convincingly. It is beyond my intended scope here to elaborate on the different characteristics of the eras; however, it is useful to sum up a few characteristics. In particular, I wish to focus on the difference between the postmodern or late modern era and the postnormal era. [10]

In the analysis of our present juncture the focus in social sciences seldom goes beyond the 'postmodern' – or variations as late modern, reflexive, liquid. It is a merit of Sardar to actually do this and to develop a real alternative, and move beyond the postmodern.

Meaning

Classic: 'I think, therefore I am'

Modern: 'I progress, therefore I am'

Postmodern: 'I shop, therefore I am'

Postnormal: 'I share, therefore I am'

Truth

Classic: Monolithic

Modern: Monolithic

Postmodern: Relative and pluralistic

Postnormal: Contradictory

Key Concepts

Classic: Conquest, Supremacy, Progress

Modern: Progress, Efficiency, Modernisation

Postmodern: Dissolution of Grand Narratives (meaning), Multiple Truths, Plural Voices

Postnormal: Complexity, Chaos, Contradictions, Uncertainty, Ignorance

Science

Classic: Pursuit of Truth, funded largely by the State

Modern: Scientific Method as Neutral, Objective Truth; funded by the State and Corporations (Military-Industrial Complex); Peer Reviewed Publication

Postmodern: Socially Constructed; funded largely by Military-Industrial-Corporations Complex; Peer Reviewed Publications

Postnormal: 'Facts are Uncertain, Values in Dispute, Stakes High and Decisions Urgent'; Driven by Mega Corporations (Google, Microsoft) and Billionaire Philanthropists; 'Extended Peer Communities' but still largely funded by Military-Industrial-Corporations Complex

Communication

Classic: Telephone, Telegraph, Morse Code, Radio

Modern: Microwave Ovens, Television

Postmodern: Mobiles, e-mail, Internet, World Wide Web

Postnormal: Instant, Perpetually Connected, 24-hour Global News Channels, Facebook, Twitter, 'Internet of Things'

Political Organization

Classic: Empires

Modern: Nation States

Postmodern: Regional Groupings and Alliances

Postnormal: Power shift to Non-State Actors

Governance

Classic: Representative Democracy

Modern: Interest-Based Democracy (neo-liberal, hyper Modern)

Postmodern: Deliberative Democracy (diversity, plurality, 'politics of difference')

Postnormal: Complex, Chaotic, Unmanageable

Equality

Classic: Legislate discrimination, Poor Law

Modern: Welfare State, Equality before the Law (assumed), Trickle Down Effect will improve the lot of the poor

Postmodern: Multiculturalism, Integration, Assimilation

Postnormal: Acceleration of Inequality, Rich Grow Richer at Lightning Speed

Environment

Classic: Relatively Healthy

Modern: Polluting

Postmodern: Toxic

Postnormal: Catastrophic, Climate Change

Museums and Societies

The future will tell whether all our times will become postnormal. Meanwhile, it is definitively an inspiration. Furthermore, the model seems viable, and it is an exciting reflection to ask ourselves whether museums would fit in this postnormal era and if they will be able to adapt.

In order to understand museums, we should also try to understand dynamics and reforms in societies over the past centuries, especially during the period known as Western Modernity. Museums and their societies are communicating vessels. However difficult and in fact unattainable this may be, many philosophers, sociologists, and historians have dedicated their work to it. Regarding museum histories, scholars generally share the framework of eighteenth century Western European Modernity to coin the notion of the 'public museum'. [11] Museum histories are intrinsically 'classic', as Sardar notes, and 'modern' because they were invented in an era that was dominated by a paramount belief in Western European civilisation and establishment, self-presumed supremacy of Western colonial culture and values. [12] Public museums were created by a ruling class and served to give expression and confirmation to the form of society championed by that class. Museums also acquired a position of authority as scientific and 'neutral' institutions, embedded in a narrative of 'progress' and 'truth-finding'. Sardar's model, mentioned previously, exposit on these aspects nicely.

It is important to note, that since this time, many have made valiant adjustments to this modern narrative and distanced themselves from these modern ideas. Notably, in the nineties of the twentieth century, scholars such as the German sociologist Ulrich Beck, the English sociologist Anthony Giddens, and the English sociologist

Scott Lash left their marks on this academic debate when they defined the ‘reflexive modernity’ as a next phase in modernity. The Polish British Zygmunt Bauman used ‘liquid modernity’ as a leading principle in this thought. [13] Lash and Bauman amongst others share the idea that ‘modernity’ has not come to an end as postmodern thinkers suggest but has entered another phase as the ‘certainties’ of early modern Enlightenment have crumbled at the precipice of the twenty-first century. [14] Museologists were influenced by the work of these sociologists when they coined ‘the liquid museum’ or ‘the reflexive museum’ – museum models that reflect the urge for museums to reinvent themselves in line with the dynamics of present-day societies.

The Imaginary Postnormal Museum

Following up on Sardar’s theory, it is time to go past the notions of postmodern/late modern/reflexive/liquid modernity and to enter the postnormal. What could this imaginary postnormal museum look like?

A POSTNORMAL MUSEUM WOULD STILL CONCERN ‘HERITAGE’ BUT IT IS NO LONGER CLEAR WHETHER THE FOCUS WOULD BE AS STRONGLY AND EXCLUSIVELY ON ‘ARTEFACTS’. INTANGIBLE ASPECTS OF HERITAGE SUCH AS MEMORIES, RITUALS, PRACTICES THAT ARE BEING PASSED ON BETWEEN MEMBERS OF COMMUNITIES BECOME MORE IMPORTANT.

A major issue for this matter is the basic question whose heritage will be selected by whom, to be kept in a museum? Selection processes are hard in a postnormal era that is characterised by complexity, chaos, controversies, and contradictions. Besides, this era is defined by decolonisation and a radical questioning of Western Enlightenment all together.

Subsequently, the institution ‘museum’ and the way it works, is being questioned as well. It can no longer be the ‘national’, ‘regional’, or ‘local’ pride of an elite. After all, in this new system political power has shifted from national states and regional groupings to non-state actors. Furthermore, governance has become really complex, chaotic and even unmanageable. While in a postmodern era we could still fall back on key concepts of a deliberative democracy, built around diversity, plurality, ‘politics of difference’, this is no longer the case. The postnormal museum will have to rethink its governance structure completely, with special attention to human relations and ethical responsibility. We notice in museology that practitioners as well as academics have already been saying for years that organisations need to change their power structures. [15] Janes criticizes the way most museums are organized and run. [16] He confirms that the structures are still frequently based on the old museum model that is top-down, bureaucratic, hierarchical, and even (slightly) otherworldly.

If museums do not want to become irrelevant, they urgently need to reflect on these issues and their internal organisation. With this in mind, Janes has introduced the concept of the 'mindful museum'. Drawing on the Buddhist tradition, this is an interesting model to review both the wider tasks of the museum and its interpersonal relations with people both inside and outside the museum walls. [17] To Janet Marstine, an expert in the field of museum ethics, the key to the survival of museums as meaningful institutions lies in a rethinking of their organisational structures, that should take 'people and the world' as its starting point. She argues for a new form of museum ethics, based on the idea of an ethical, socially responsible museum:

the ethical, socially responsible museum of the twenty-first century recognizes the identities of its staff and its publics as hybrid and fluid, rather than simply boxes to be ticked. [18]

In the past, ethics have all too often been reduced to the drawing up of ethical codes and regulations, which serve no other purpose than the so-called 'professionalisation' of museum work. These codes are still valuable and should be maintained but in an ethical, socially responsible museum 'democratic pluralism, shared authority and social justice' are equally important. [19]

Sardar also stresses the importance of 'ethics' in the postnormal era. This attitude is key when trying to deal with the acceleration of inequality and the major environmental issues we are facing. It is the only way to stay tuned with younger generations for who it is 'normal' to be perpetually connected, have access to 24-hour global news channels, and be continuously present on social media platforms. Younger generations to whom it is also quite 'normal' to share views, knowledge, and ideas.

Is the ICOM Museum Definition Postnormal (Enough)?

Honestly, it is not easy to reflect on the idea of a 'postnormal museum'. Especially since the above-mentioned scholars and many among 'us' museologists, including myself, are the embodiment of a Western Modern framework. Although we self-assume to be very open-minded, reflexive, and flexible thinkers, the fact remains that we are part of the Modern-Postmodern system. Certain prejudices are deeply ingrained in our societies, thoughts, and feelings. There are many challenges. One of the major ones resides at the level of the institution itself. We need to rethink the institution itself, the (political) governance and the 'powers that be'. Museums are actually having debates on their questionable governance, their debatable 'ethics', the way they are funded and by whom, and the (lack of) 'autonomy' and 'sovereignty' all over the world. They also share difficulties in finding new ways to share collections and knowledge. Historical burdens remain concerning the 'ethics' (and especially the lack thereof) by which many museums acquired their present collections and an unwillingness to make up for or even begin the process

of addressing historical wrongs holds the contemporary museum in a lag state. Although debates are going on, the outcomes are generally rather affirming for the status quo. Unfortunately, there seems to be an inability to embrace change and to *actually* change.

In this sense, the postnormal museum is still largely imaginary. The same goes for the postnormal character of the new ICOM Museum Definition. As I explained, the museum definition is innovative because it embraces very important societal values. However, it can hardly be called a harbinger of a new age. Museums probably have to change first, bit by bit, in order to influence the definition to its fullest extent.

We should stay hopeful, and my reflection undoubtedly lacks depth and examples. When working in the museum field, I do see many heritage organisations striving for change. We actually see museums are tapping into themes like climate change, the importance of ethics and of decolonising the collection, or generally decolonising deeply rooted ways of colonial thinking, fighting inequality, and so on. Museums do acknowledge they have a role to play. The International Council of Museums could also play a forerunner's role and actually use its non-governmental power to enable change through empowerment and provocation.

The postnormal paradigm offers us a viable framework to work with. It would be really interesting and worthwhile to set up a research project and to look for examples of museums or heritage organisations that might be going in the postnormal direction. This would not only be a valuable thinking exercise; it might even contribute to a next generation of museums and museum people that are badly needed in a postnormal society.

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CONFRONTING POSTNORMAL TIMES

Yelena Muzykina

For the last few decades, contemporary scholars have tried to conceptualise the changes taking place around the globe. Through this process new perceptions of the world have emerged pointing out the variety of modifications we are currently going through. Most of the transformations – to name a few: extreme weather events, a global recession, or privacy evaporation with the arrival of big data – send us specific signals that we ought to be receiving as wake up calls. Greenpeace activists steadily holler, slightly louder than the wide host of doom-forecasting soothsayers, that the overuse of resources leads to environmental catastrophes (warming up of the world's oceans, droughts in California, erosion of the sea coast in Florida, floods in Britain, and the list goes on) and the spoiling of the planet's ecosystem. Every year think tanks agonise over all sorts of pending crises from economic to political to energy supply or refugees settling, thus making society slip deeper into them. As Andy Hines put it, 'we're fouling our nest, and not aware of how serious the issue is.' [1]

The proportions of the tragedies we face day by day lead some to call attention to the 'ills' of modern-day times, defining them as 'The End of Normal', thus proclaiming the 'normal' as somewhat passé. [2] Assumptions such as progress, modernisation, (economic) growth, and development have become confusingly obsolete. We see that the 'old' world is falling apart. A new reality, or 'real virtuality', that substitutes our customary existence comes into being. [3] Yet there is no one to be blamed beyond ourselves, collectively, as we humans continue, unincumbered, to alter life on the planet, so much so that American biologist Michael Soule had to coin a new term – the 'Catastrophozoic Era' – to describe our times. [4]

On the one hand, scholars and experts on complexity Peter Allan and Liz Varga distinguish specific negative characteristics of our present epoch, talking of 'instability, breakdown, and collapse of old structures' giving some hope that they may serve as a springboard to 'new features, technologies, variables and characteristics' on the horizon that might 'lead to a new period of qualitative stability'. [5] On the other, futurist John A. Sweeny is less enthusiastic and describes our era as one of extreme 'global weirding'. [6] All in all, we see that things are not just going wrong, but they are going astray on a global level. What is even more

shocking is that this chaos is taking different directions, occupying various fields at the same time. Nothing around us functions 'normally' any longer.

To tackle this complex situation Ziauddin Sardar, a British Muslim intellectual and polymath, proposes the concept of Postnormal Times (PNT), which suggests a fresh view articulating a theoretical framework that could explain our epoch. Beyond this, the framework also envisages the emergence of 'postnormal' phenomenon and hints at a way to activate further practical changes. [6] The key components that Sardar identifies as the drivers and shakers of PNT are the '3C's': complexity, chaos, and contradiction. Their understanding could help to find a new way forward. Let us give a brief outline for each 'c'.

Defining Postnormal Times through 3C's

The first distinctive characteristic of PNT is *complexity*. There is nothing simple about things that require fixing, whether it is food supply chains, frequent floods, or a given state's foreign policy. Sardar points out that complexity should be perceived as 'a natural by-product of the fact that most of our problems have a global scale'. [7] Moreover, the critical lesson of complexity could be put like this: the notion of control and certainty are becoming obsolete.

IF, IN 'NORMAL' TIMES, WE USED TO BUILD MODELS, COME UP WITH MODES, AND FORMULATE METHODS THAT HELPED US TO FIND ANSWERS TO INTERCONNECTED ISSUES, NOW WE MUST DISCARD THEM AND LOOK FOR SOMETHING ELSE.

The second characteristic of PNT, according to Sardar, is *chaos*. When acceleration is the norm, predictability is rare, and small changes can lead to significant consequences. The philosopher discerns that the reason for this inherent unpredictability resides in the behaviour of the complex systems of human beings, particularly in the changing nature, scope, and function of true networks. Due to the rise of technology, we have never been as connected as we are now. That connection keeps us in close contact not only with each other but with the world around us, causing interdependence. 'Indeed, it seems that nowadays we do not communicate to live; but live to communicate', says Sardar. [8] Such close linkages, however, work like a Trojan horse. A small, seemingly insignificant, occurrence can trigger a collapse of enormous impact. When everything is linked up, the potential for both positive and negative effect multiplies in geometrical progression. The latter option presents us with greater bother because, for instance, one computer virus can, in principle, bring the whole world to a grinding halt.

For the human and cultural spheres, Sardar identifies individualism as a reason for the chaotic behaviour that is causing networks to fail. Our irresponsible, selfish actions are essential ingredients of a recipe for catastrophe, amplified by the fact

that we are always in the know, a condition that prompts us towards self-organised panics, thanks to mobile phones, e-mails, tweets, messaging apps, and the 24-hour news channels. It sounds horrifying, but looking back at 9/11, which gave rise to the global War on Terror, or the self-immolation of Mohamed Bouazizi in Tunis in 2010, which gave rise to the Arab Spring – the actions of a few individuals could indeed lead the world to waste.

Last but not least, Sardar identifies *contradictions* as the third characteristic of PNT. He cites Jerome Ravetz, a British philosopher of science, who together with Silvio Funtovicz, an Argentinian mathematician, introduced the concept of 'postnormal'. Ravetz and Funtovicz point out that:

contradictions also point to the fact that everything, every policy, has a cost. No matter how we may perceive progress, how beneficial we may think it is, it always has detrimental side effects. There is no achievement of good without some production of evil. [9]

From all possible contradictions, Ziauddin Sardar sets his eyes on two. The first one is about the pace of changes that have always existed. 'It is not just that change is rapid but the actual rate of change is itself changing – exponential acceleration has now become the norm.' The examples are easily spotted in the economy, for example. According to the latest research results of Oxfam International, 1% of the world population owned 82% of all wealth created in 2017. 'The billionaire boom is not a sign of a thriving economy but a symptom of a failing economic system,' said Winnie Byanyima, executive director of Oxfam International. [11] The second contradiction grabs knowledge as its prey. Sardar concludes that in the process of our knowledge expansion, we realize more keenly than ever that our generation is more ignorant than any other in the history of humanity. In addition, our current ignorance takes a new turn: whatever solution we produce to a problem using our contemporary knowledge, there are always bits that are not solved and cannot be solved because of our unconscious ignorance of them. Sardar and many others writing on postnormal times exposit extensively on the various layers of ignorance in postnormal times and their epistemological consequences, both conscious and unconscious. [12]

What do all these scaring characteristics mean for the existential perspective? First of all, in such a situation the highest merit goes to the required quality of intellectual humility. We are presently unable to define things or process them with any precision; no new models are yet available; no new classification schemes have been suggested. In conditions of complexity, chaos, and contradiction, any attempt at simplifying the structuring of new knowledge, using any of the present models or classification systems, is futile. The very notion of a model implies simplification, reduction of some components, a linear way of interaction – all of which go directly in the face of the reality of PNT. They are out of the question in this environment and new ways of thinking that embody the 3C's are desperately needed.

Secondly, the PNT situation deprives us of what Sardar calls the 'luxury of time'. When things change rapidly, how could the process of observation, reflection, and response adjust to the necessity of responding promptly? The human mind is not able to carry out complex mental calculations at the speed of light, as it is often required nowadays. That is the prerogative of artificial intelligence that get more and more attention, funds, and powerful support in contrast to philosophy and the humanities in general. An artificial 'brain' can perform, simultaneously, hundreds of thousands of operations and provide results in nanoseconds. So, the question arises: 'what is intellect nowadays and what are its functions?' Even though the quest to answer such questions requires direct participation of human beings – as a machine can only mimic 'cognitive' functions that are associated with human learning and problem-solving – a new definition for what exactly is human, is required. [12]

What exactly makes us human? What activities would classify us as a species different from machines? How can we define the purpose of life and what sense will it carry in a chaotic environment? What relationship to time, space, and matter should humans have in PNT? Should we keep talking about those three at all when now they look more ephemeral than ever? And what are we to make of such notions as 'order', that has always been helpful to promote a certainly structured and organised world? Order doesn't seem to work anymore. Even the simple idea of order seems unfeasible or at least in need of updating in PNT.

HOW ARE WE TO GO DEEPER? WHERE IS THE PLACE FOR DETERMINING GOOD AND EVIL WHEN THINGS ARE CHOSEN BY HOW FAST THEY WORK? WHAT VALUES SHOULD HUMANS HOLD ON TO IN AN INSTANTLY CHANGING WORLD?

Even though we produce more questions than answers at the moment, this is a sign of our awareness of the problem.

Coping With Postnormality: Variety, Creativity, and Dialogue

Let us try to think about some ingredients that could help us deal with postnormal times: the world that falls apart, loses its solidness, struggles with ambiguities, and menaces to shatter because of the most trivial thing. If we cannot manage and control this new reality, why not instead try to navigate through it?

For such an undertaking, a few suggested milestones could assist in balancing those characteristics that Sardar lists in his description of PNT and might stand to make our existence more plausible. They can also be considered landmarks of our ontology, indications of who we are as human beings.

First, how about counterpoising awareness of variety to sheer complexity? Would you agree that chaos longs for creativity and contradiction requires promoting a

dialogue as a means of a solution in time of turbulence? All three ingredients are indispensable for our survival in postnormal times.

Variety is not something new, but an old characteristic of our society. As a state of diversification, it is profoundly neglected and almost forbidden, though it might be pretended to be acknowledged and even praised. Take the well-known but failed concept of multiculturalism, specially developed by politicians of Western Europe to manage the complexity of the situation that arose from the flow of Muslim immigrants into the countries of the European Union. On the surface, it seemed that the conventions were preserved, and variety was celebrated. But a closer look reveals that the new culture that has emerged on the expanses of Western Europe was initially doomed to terminate.

Multiculturalism holds a national and Western identity as a, supposed, *a priori* foundational concept that assumes that Western culture can coexist freely with others. It is the West that defines what is required for full citizenship, pressing the 'Others' to comply with the rules of the game. Of course, it is done not as bluntly as in the case of the French assimilation model, which places a straightforward demand to newcomers to 'become like us without any excuse'. But the ultimate result is the same for multiculturalism as was the case with assimilation – abject failure. According to Olivier Roy, the problem here is not with 'multi', but with 'culturalism'. [13] The prefix denotes the complexity of the problem, not a possible solution. The latter happens with a culture that, by definition, is a lifestyle of people in its fullness, the social heritage that an individual gets within his or her group. [14] It is a very complex system that includes economy, religion, society, and varies by time and geography. As a result, they are quite tangible and get their embodiment in objects. Those objects help us to identify ourselves as individuals and human beings with our unique environment that often differs dramatically from the images of Western civilisation. Such existential variety could be vital and productive, proving that the world is of different sizes, shapes, colours, forms, contents, meanings, and cannot be ruled by a single notion of truth. The world, then, is much more complicated and demands recognition of what Ziauddin Sardar calls 'genuine multiculturalism.' [15] By this, he means that our world ultimately needs to turn into a world of various civilisations – Western, Islamic, Indian, Chinese, and the world of others out there:

each civilization will rediscover and renovate itself according to its own criteria and concepts and have its own dynamic, thriving way of knowledge, governance, democratic autonomy and civilizational identity. And all will enrich each other with mutual respect, cooperation and synthesis. [16]

Some sparkles of that enriched future could be caught in the contemporary philosophical concepts developed by Costica Bradatan, a Romanian American philosopher. Who could imagine a couple of decades ago that American culture

obsessed with success, self-made and self-built people would respond so willingly to the idea of preserving the human capacity to fail as an essential to what humans inherently are? It could happen only now, in postnormal times when our previously dominant ways of being, doing, and knowing stop working. This model of success does not function properly in our current circumstances. So what?

'If there was ever a time to think seriously about failure, it is now.' [17] Bradatan suggests bringing some variety into the complexity of our existence and to look at it from a different angle. That perspective enriches our understanding of ourselves. Our capacity to fail is essential to what we are. Instead of trotting a familiar path, the philosopher echoes Sardar and calls us to recognize that progress and improvement are alluring. We need to form a new discourse about failure that helps us to get rid of self-deceit and internal pride for being in this world. Bradatan points out that failure has a distinct *therapeutic* function and mercilessly cures us from the imaginable importance we put on thinking that the world exists only for our sake. Instead of proclaiming that we are designed to be kings of nature and destined to dominate, Bradatan declares that we humans are created to fail. Because of failure, we recognise the gap left between what *we are* and what *we can be*, and we try to fill that space with fantastic things. That real gap – not our understanding of our talents as that which gives birth to technical innovations and genial inventions – makes our historical accomplishments possible, makes us better.

This praise of failure sounds very fresh but very familiar at the same time. It brings us back to the Biblical anthropology that recognizes the weakness and fallibility of human nature. It describes the pervasive longing 'to be like gods' that mystically immersed in the heads of the first people and the consequences that desire brought into their daily life – failure, disasters, pain, non-existence. But the collapse came with hope, hope that evil would be turned into good; the gap – the existential abyss between what we are and what we could be – would be transcended and even eliminated according to the higher will. Because of that promised hope, we humans can really accept that our failures are not ultimately fatal. As Bradatan puts it, 'maybe it's not a failure; maybe it can be a jumping off point for some kind of success'. [18] A good point that proves that complexity of the world needs multiple perspectives with different explanations that complement each other even in their surface contradiction.

Indeed, the recognition of variety in the complex world helps to survive for it brings unity avoiding uniformity that is usually imposed through violence and annihilation. Variety constructs a mosaic canvas of reality from multiple pieces of different shapes, colours, and materials that hold a marvellous organic cohesion.

Variety has a tight connection with its peer, creativity, which balances the chaotic nature of postnormal times. In fact, we must stop perceiving chaos as something destructive, something that leads to disorder. We must renew our knowledge of it as a starting point of an immense creative project that is eventually 'very good'! The creation of this world in the biblical account (Genesis 1) leads us from chaotic, formless, and dark conditions of this earth to the proclamation of

its perfection. Some portion of this creating-out-of-chaos power is assigned to us, humans from the dawn of our existence. See how the Old Testament pictures Adam naming animals according to their kind, thus bringing out of chaos an orderly system of species (Genesis 2:19). Think about the command to take care of the new environment, including plants, birds and animals that our ancestors received from the first day of their existence (Genesis 1:28). [19] Creativity has been a tool useful in combating chaos, amongst other tasks, since prehistory.

This Creator's sparkle enlightened human history for centuries and was accessible to every human being, without exaggeration. Pause for a moment and think who the first listeners of the masterpieces of Johann Sebastian Bach were? Those were ordinary German burgers which were coming to listen to their kapellmeister after a hard-working week. That heavenly-inspired music was bringing peace and order into the chaos of their daily thoughts; those were the moment of blessings that creativity lavishly grants. Or think of St. Paul's Cathedral and St. Peter's Basilica? Were they accessed only by some tourists who duly paid their entrance fees? The architectural talent of Antonio da Sangallo, Giacomo Vignola, Giacomo Della Porta and Sir Christopher Wren made exquisite creativity accessible to everyone on daily bases. And what can you say about the harmony, order, and magic of such palaces as the Alhambra or Topkapi created by the genius of Muslim architects? The creative magic made them illuminate the landscape so exquisitely that you would never think that the chaos of hills, woods, or bare slopes could bring to life that beauty.

**FOR CENTURIES CREATIVITY WAS PUBLICLY AVAILABLE AND EXERCISED.
IT EXISTED (IN DIFFERENT FORMS AND DEGREES) IN ALL PUBLIC
SPHERES OF HUMAN LIFE AND WITH ALL PEOPLE, FROM A POTTER TO
A PEASANT, TO A TAILOR, TO A MERCHANT.**

They contributed to the development of creativity because they worked it out with their hands, minds, and hearts. The outstanding representatives of creativity, the world-renowned artists, marked human history with the milestones of their masterpieces. Facing the enormous progress in the development of science in the nineteenth and twentieth centuries, Modernity with its lawful, orderly, and objective perception of the world brought a new perspective to creativity. It turned out to be something incidental and subjective, a phenomenon associated with a breakdown in Order and therefore with Disorder. [20] A popular perception put creative people in the like of someone unhinged or even insane to some extent. [21] But it is a very distorted picture.

The preoccupation of the Modern with the creativity that deals mainly with the technical-scientific achievements that sprang up out of mere curiosity to find out how the world operated gave rise to the emergence of this distorted image. The type of creativity promoted builds a technological framework, based on the metaphor

of the Universe as a machine. Such creativity was used mainly to satisfy only one compartment of human existence, to provide a secure life for human beings protecting them from diseases, natural disasters, or weather cataclysms might arise to supplant them. The tragedy of chaos under PNT is caused by an entirely artificial conflict between creativity and logic that became dominant in the previous epoch. A society that wants to maintain a high level of creativity in its midst needs to nurture it. This happens through a fortified system of humanitarian education that teaches students music, philosophy, and the arts. Those courses have to be considered not as supplementary or elective but compulsory for they breed the zeal and passion for creative actions that leave visible impact all over our existence.

The Belarusian musician Mikhail Kazinik, in his book *The Secrets of Geniuses*, gives a stunning example of the impact of creative power on 'people of logic', the phrase he uses to refer to certain individuals, like businesspeople. [22] He, as a lecturer, musician, and an educator is often invited to take part in training the staff of renowned companies. For the first two days, those people listen to specialists who tell them about current conditions of the economy, stock markets, political trends, and the like. The information disperse here is highly logical and fact-based. On the third day, when everyone is overwhelmed with figures and largely in a depressed mood, Kazinik comes with his violin and starts talking about Mozart, recites poetry, and plays music. This mighty throw-in of arts releases the enormous creative power in the audience. The hard logic is washed down with the life water of creativity that dispels the distorted imaginations of businesspeople, taking them to a new level, helping them to find extraordinary solutions out of the chaos of facts. The world becomes whole and restores its functional potential. That is why if we want to overcome the chaos of postnormal times based on not-working-anymore logic, we have to return to creativity that was implanted into human beings by the Creator.

IT IS OBLIGATORY TO STOP DIVIDING PEOPLE INTO THE INITIATE AND THE COMMON AND BRING BACK INTO THE CURRICULUM OF OUR EDUCATIONAL INSTITUTIONS COMPULSORY COURSES IN PHILOSOPHY, MUSIC, AND FINE ART. WITHOUT THAT, SOCIETY IS DOOMED TO SINK INTO UNPRODUCTIVE, UNCREATIVE CHAOS.

At this point, perhaps the presence of religious ideas raises severe objections from the more secular side of society. An often, but not necessarily problematic occurrence. Indeed, I may not be correct and would not ask anyone to forcefully accept the belief that what PNT is trying to do is 'restore God's creative image in human beings', or the like that may come from other religions, belief systems, or conceptions of God or gods. This may appear to be a pitfall of unascendable contradiction. The vast variety of opinions becomes the norm and somehow this is

incompatible with nature. Yet, actually, a constructive conversation could help us to unleash the tension often found in PNT.

Here we come to the third milestone on our way out of postnormal times: *dialogue*. first, we must consider a few things that could help us to have a genuine dialogue and what might prevent it from taking place. First, some portion of amateur zeal has to be revived in the process of views exchange. Dialogue has become such a favourite tool that it is often turned into a business.

Let us take an interfaith dialogue as an example. The fear of Islam is reaching its maximum in the West and some other parts of the world. One of the solutions to combat Islamophobia is an open dialogue that brings together representatives of different faith traditions to shed light on their beliefs and build bridges that would help to overcome barriers to peaceful coexistence. Unfortunately, this method has turned into a platform for performance of professional preachers, either of their denomination or official state policy. For most participants, except a few fair-minded scholars, such meetings are just formality, a part of the annual working plan of their organizations for producing reports, not results. But taken seriously, interfaith dialogue will become a productive instrument of battling complexity only if it is followed up by actions that put people face to face with each other, make them interact and learn from each other actively. The practical, active learning should become a logical follow-up of any dialogue process.

The second characteristic of genuine dialogue in postnormal times is a strong ethical dimension where accountability, an old-fashion virtue, plays a vital role. In our debates we have to remember that ethics are neither remote nor impersonal; they are equally applied to a single human being and the universe. Ethics provide the guiding principle in our choices of direction to move, actions to take, goals to fulfil, and solutions to search. If we acknowledge our imperfection, then we will hold on to accountability as a saving anchor. Right now, giving an ethical response to the dilemmas of PNT is not an easy task because by far we have made ethics redundant in our existential realm. To revive them, it might sound for some people as an attempt to go back to a religious beliefs system that was discarded by secularism. The most profound maxim of accountability for our individual and collective actions could be found in the New Testament. 'In everything, do to others what you would have them do to you' (Matthew 7:12). We badly need to implant this tenable command, this ethical foundation into our thoughts, words, actions, motions, and being if we want to create a new normality.

The third thing informed and ethical dialogue assists us with is in allowing us to transcend those limitations of tradition that often block productivity. We need to accept a postmodern axiom in its postnormal rendition: there is no monopoly on truth, no right or wrong, but there is a *process* of searching for it. Everyone is able and welcome to contribute to that procedure and the objectives we set in our pursuit. It is no more a search for the answer that 'fits all sizes' but a quest for alternatives that might be born in a dialogue when sides take uncertainty, risk, and ignorance thoughtfully and responsibly. In a nutshell, if we want to negotiate

our way out of the complexity in postnormal times, we need to relearn to dialogue with each other, face to face, sincerely. Our primary objection should become multiplying the common good through united actions. But we have to be careful and not mix activity with activism; for there is no natural law that activism could or ought to serve only the common good. It could be very destructive and dangerous for creating new normality (take for example neo-Nazi or different forms of xenophobic and/or fascist activism).

The world is longing for constructive, not destructive, actions. Variety, creativity, and proper dialogue helps us to move forward through complexity and empowers us to shape postnormal chaos into a new form of liveable reality for human beings. Ultimately, positive futures lie ahead.

Who is Next?

All the ideas discussed thus far threaten to become void if there is nobody to see them out. So, who will be the generation that should pave the way out of postnormal times?

The observations of the modern youth, frankly speaking, give little hope from a traditional perspective. It looks like variety, creativity, and dialogue are not their intrinsic characteristics. These are people for whom a dialogue mostly means a symbiotic existence with their mobile phones that embody a whole world to them. Their relations with time, space and even matter are entirely changed; and that cannot but affect their human nature. The researchers say that those smart technologies alter the brain, decreasing empathy and reducing the ability to keep up the dialogue and any sort of conversation. [23] The younger generation is deprived of real social interaction and the boundaries between the living and non-living are blurring out for them.

The understanding of a variety by this generation is also strangely altered. It mainly exists in technical terms within a framework of gadgets and software. The diversity is determined in terms of options and apps things can use in their performance. Sadly, but even the variety of feelings one can express is defined, in a limited sense, by the number of emoji available on one's phone. It means that creativity is lived out within the borders of a virtual, not human, nature. These young people grow up in the digital age obtaining entirely different communicative, emotional, and practical habits than prior generations used to have at their age. Privacy is almost gone: the lives of young people are completely lived online, every face and every word can be instantly retrieved through Facebook, Twitter, or other social networks. Like the economic crisis, the digital effects on this generation are global, unparalleled, and complex. The moral categories of this generation are often defined not in terms of good or bad, but quick or slow. That is the criterion of choice nowadays.

The conclusion might sound quite pessimistic. These new people are brought up in the language of emoticons and graphical representations, have their own desires, expectations, and perspectives to envision and shape the world. It is a world of instant and perpetual changes, where every aspect of life is broadcasted online, and

the environment is built of complexity, contradictions, and chaos. So, they might feel quite comfortable in such reality. But there is still some portion of optimism we can find for the future. Under the outer garments of complete strangers, the innermost of this new generation is not that utterly unfamiliar. Those youth are still longing to find answers to such questions as 'who am I?' or 'what am I here for in this life?' or 'what is this life about and there is my place in it?' The good news is that while flesh and blood predominate in their physical bodies, the algorithm of their being would replicate the centuries-old history of human existence, with its spiritual tosses. The need for philosophical comprehension would stay acute drawing young people like a magnet to the transcendent reality that is much more fascinating than a virtual one. They would experience that unexplainable longing to make their way out of chaos, complexity, and contradiction to a new normal reality.

Such a perspective places a massive task in front of those who could lead the youth through the spiritual path full of allegorical thorns and thistles. This goes for the thinkers and educators of today. Contemporary philosophers and intellectuals should be as sensitive to all these immediate changes, more so than they ever have before. The time of their ascetic existence is over; they need to get out of their ivory towers. Their task is to see the reality from the ground, in order to lift it up, to think about eternity in terms of nanoseconds, to learn the contemporary techno-language to be able to explain the timeless truth. It is a challenging task but nobody promised an easier one.

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CAPTURING THE QUEEN AND OTHER CREATIVE MOVES IN POSTNORMAL TIMES

Liam Mayo

Chess has become very popular in my home recently. My five-year-old son Cassidy has become fixated with the nuances of the game. I am not a particularly gifted chess player myself, but one drizzly Sunday afternoon Cassidy and I found ourselves stooped over an old wooden chessboard, he with wide-eyed curiosity and me scratching my head, attempting to recall the rules of a game I had learned many decades earlier. Nowadays, Cassidy pursues me relentlessly for a match. Any spare moment and he is upon me with request, keeping his own tally of who leads who in our never-ending tournament of chess. Patrick, my three-year-old, is equally as engaged, although his interest peaks and wanes depending on who has captured whose queen (capturing the queen – apparently – signals certain victory). Patrick will hover around us, bouncing a rubber ball against the couch or the bookshelf, chiming into the game when he notices something interesting happening, or hurrying us along when he gets bored, or trying to coax his brother and I away from the chessboard and into a game that he would prefer we all played – ‘I am so bored of this! Hurry up!’

Given that the only real value I can offer Cassidy on his quest to master the game of chess is the tireless commitment of a doting father, I went in search for different ways I could inspire his learning journey. Online, I came across a quote from Thomas Huxley, ‘the chessboard is the world, the pieces are the phenomena of the Universe, the rules of the game are what we call the laws of Nature and the player on the other side is hidden from us’. [1] As someone interested in the ways in which reality is perceived, and how our perceptions of reality are now changing, this quote gave me pause for reflection. Pondering Huxley’s viewpoint – the world, the universe, the laws of nature, and our agency to respond to the moves of our opponent – a salient metaphor emerges for not only how we perceive reality, but how our perceptions influence the way we think about the future.

Modern Culture

Chess is a game of strategy after all, and whilst anyone can learn the rules of the game with relative ease, developing deeper insight into the game requires a practised commitment, emotional reflection as well as an ongoing intellectual inquiry. That is to say that rather than simply recognising the characteristics of each element of the game – the chessboard, the pieces, the rules of the game, and the opponent – but by understanding the active interplay between these, one may be able to achieve a strategic advantage. A strategic advantage – like capturing the queen – fosters a sense of certainty; our knowledge and experience tells us that a particular set of actions will elicit a desired outcome. The inference I take from Huxley's metaphor, is that we should not simply recognise the different attributes of our reality – world, universe, nature, and agency – but seek to understand the relationship between these as a means to nurture strategic foresight for how we approach the future, and thus, gain certainty about where we are going, and the change that is to come.

This premise fundamentally characterizes the modern approach to understanding the world around us: that certainty may be achieved through critical, rational, reasoned, and scientific inquiry.

THE FOUNDATION OF MODERN SOCIETY, A MATURATION OF ENLIGHTENMENT THINKING, IS THAT REALITY IS WHAT THE SUBJECT (ESSENTIALLY, WE HUMANS) PERCEIVES OF OUR OBJECTIVE WORLD (THE THINGS ALL AROUND US).

What we are left with is Western ontological constructs of subject/object as the dominant form of reality making. This perception, according to modernity, can be measured and rationalised through scientific inquiry. Huxley after all was a staunch proponent of human reason and the notion that certainty may be gained on scientific grounds. And while a diversity of thinking has infiltrated this space (postmodernism, post-colonialism, post-structuralism, to name a few), one central premise largely remains the same: through inquiry into the interplay between subject and object, a sense of certainty about our reality (or realities as the case may be) can be attained.

I use terms, 'we', 'us', and 'our', as a collective noun that captures, not only my own species (humans), but all objects that share the world. My aim with this use of language is to acknowledge multiplicity, but intentionally avoid relativism, through an embrace of what the philosopher Rosi Braidotti calls the new collective subject, 'a "we-are-(all)-in-this-together-but-we-are-not-one-and-the-same" kind of subject'. [2] This is an important distinction to make in the embrace of postnormal time theory; the effects of postnormal times impact all of us.

Yet, what is often taken for granted is that this premise is deeply cultural. To acknowledge this is to understand the ways in which culture governs our

interpretations of the world around us. Culture, as the contemporary philosopher Yuval Harari states, is imagined order. [3] Culture acts as a lens; it produces meaning and it brings purpose into focus. In interpreting the relationship between the different attributes of our reality, we must also acknowledge that all those attributes, those things that we consider to be normal, are cultural constructs – imagined order, but very much alive in the way that they influence all aspects of our life. What this means is that the instruments by which modern society is governed – the rejection of tradition in favour of progress, the prioritisation of the individual over the communal, and marriage of the political, the vocational and the aesthetic – are all constructs influenced by the monolithic culture of modernity.

Modern Creativity

To interpret and make problematic the assumptions and cultural constructs that we use to make sense of our world has been a source of creative inspiration throughout the modern epoch. Artists such as Edvard Munch, Georgia O'Keeffe, Frida Kahlo, Pablo Picasso, Henri Matisse, Marcel Duchamp, Wassily Kandisky, Salvador Dali, and Andy Warhol are characterised by the rejection of the traditional art concepts, forms, and techniques and their absolute resolve toward innovation and progress in their work, thought, and life. Their pursuit was to explore the juxtaposition between the seemingly contingent nature of life and modern societies yearning for certainty, thus challenging the audiences understanding of their relationship to the objective world.

Ernest Hemingway, the great novelist of modernity, experimented with an understated and economical style of literature that not only drew stark contrast to the more adorned writing styles that had come before, but draws the reader to use their own imagination in their consumption of his works. Hemingway achieved this by abandoning unnecessary adjectives, instead resting heavily on the use of nouns to structure his narrative. In doing so, Hemingway literarily points to the objective world and invites the reader to use their imagination to create a life around the characters within his stories.

Nicholas Ray's 1955 film *Rebel Without a Cause* is a cinematic representation of this. The angst that the young protagonists direct toward their parents (tradition) is palpable, although their reasoning is left somewhat opaque. In response to their frustrations, they commit acts of rebellion, that although seemingly trivial, appear to require a grave emotive response from the audience. And with the crescendo, the tension between the young protagonists and their parents appears to be resolved – the parents concede that the young people deserve to be treated with a greater degree of acknowledgement and the young people demonstrated a maturity beyond their frivolities (symbolised by the death of the character aptly named Plato). Modern creativity is a commitment to progress, through ongoing inquiry in our perceptions of reality. This inquiry is grounded in the individual, looking out at the world, and interpreting it. In this way, the arts in modernity are both vocational and political; they produce cultural artefacts to provoke critical inquiry and, as such, further progress.

Modern Futures

This approach has bled into the way we think creatively about the future. It is a sweet coincidence that Thomas Huxley was the grandfather of the future orientated writer and philosopher Aldous Huxley. Like the objective world, the future is outside us, beyond us, interpreted and understood through inquiry into our perceptions of it. The seminal futurist Jim Dator takes a quintessentially modern view of the future – seeing it as humankind’s ‘last frontier’, at risk of colonisation lest action is taken. [4] In light of this, theories about researching the future have been proposed and methods to achieve greater insight into the future have been developed, all of which play within the creative confines of Huxley’s world, universe, nature, and agency quadrilogy. Creativity, for the futurist, is to welcome a diversity of voices and perspectives into this inquiry, to make problematic dominant assumptions, while mapping and articulating trends, events, and emerging issues. [5] Through this, images of the future are interrogated, and new images emerge. Science fiction is of course one of the most poignant creative manifestations of modernity.

By this reckoning, the future – like our reality – is both malleable and multiple: there are many futures, and as such we can shape them to be desired spaces. For those aware of futures studies, there is familiarity here: by emphasising the plurality of futures, and the diversity of voices, perceptions and contexts, potentialities of the future are opened, and human agency provoked. But I would argue, there is risk too. If the future is both the principle for action and the active space for the realisation of potentialities, obligation is suspended. There is an unexplained cognitive dissonance between changing reality as experienced and change as imagined; the future always seems like something that is going to happen rather than something that is emergent. In this context, the future, as it is conceptualised within modernity, presents an epistemological obstacle to eliciting action in the present. It is a thing that is rationalised into existence; the secular bastion of hope that remains afar; an indicator by which we will progress, rather than the proverbial burning platform for action in the present.

However, in an epoch characterised by significant change, this approach is inessential. The phenomenon of the universe lays far further beyond our understanding than, up until recently, we had thought. We may no longer fool ourselves that we can control nature. Indeed, we are learning, the hard way, that nature controls us. And the concept of agency has revealed itself to be the notorious emperor without robes. The chessboard that is our world is shifting in ways that means grave uncertainties are abound. While we have discharged our creativity within the constructs of modernity, what are we to do when those constructs begin to rupture? When our conditioned reality ruptures, where to from here?

Postnormal Times

Prolific futurist Ziauddin Sardar argues that postnormal times is a transitional period, where well established ways of knowing and being are rupturing, and new ones are yet to emerge. [6] Ruptures are recurring points within the symbolic

structure that testify to that structure's fundamental incompleteness. [7] But ruptures also provide opportunities to reimagine the nature and scope of how we know the world around us. [8] When ruptures occur in culture, the way we perceive reality is impacted. And, as our perception of reality are impacted, so too the way we approach the future is impacted. Postnormal times theory conceptualises how ruptures across the disciplines of modernity, particularly how our approaches to the future, are becoming insufficient for understanding and interpreting today's increasingly complex and chaotic world. [9]

MODERNITY'S FALLACY, POSTNORMAL TIMES THEORY ARGUES, IS THAT THE FUTURE IS SOMETHING THAT IS GOING TO HAPPEN, RATHER THAN SOMETHING THAT IS HAPPENING RIGHT NOW.

That means that not only are we planning for the future in a way that we consider normal, we are planning for a future that has already arrived. [10] Moreover, the more we approach the future as though it is Dator's last frontier (suspend obligation for action), the more exacerbated our experience of postnormal conditioning (an acute sense of ignorance and a greater proclivity toward nostalgia). [11] I have proposed elsewhere that the contemporary perception of crisis (individually and collectively) is the manifestation of a cultural crisis, owed – in part – to the inability of the current dominant cultural frameworks to make sense of, and contextualize, the transformation that is occurring. [12]

Fundamentality, modernity, with its desire for rationalism, reason, and certainty, is ill-equipped to navigate our transformational epoch. Furthermore, because of modernity's propensity to downplay change in the face of change, a collective sense of uncertainty governs decision making and suffocates our ability to leverage the current transformation toward new cultural archetypes and norms. [13] With this, our cultural processes gridlock, stifling creativity, in what the futurist and historian Marcus Bussey calls postnormal paralysis. [14] Proponents of postnormal times theory argue that a postnormal landscape challenges well established futures approaches. Normal strategic planning and foresight work cannot succeed in postnormal times as long as uncertainties continue to be ignored.

To be clear – our postnormal times cannot be controlled, mitigated, or curbed, simply navigated. [15] Postnormal times theory focuses our attention on change in the present and aims to understand and describe the changing nature of change, to develop ways and means to navigate our contradictory, complex, and chaotic landscape. Navigating the imbroglio of postnormal times requires imagination as an intangible function that creates and shapes our reality. [16] As Sardar contends, 'the kind of futures we imagine beyond postnormal times would depend on the quality of our imagination'. [17] This is because imagination is culturally bound, nested in time and space; we are unable to imagine that of which we have no

experience. [18] Imagination is the antecedent of creativity. Thus, postnormal times theory is a reframing of the importance of futures approaches and a gesturing toward the importance of the imagination in navigating the change of our age. [19]

My argument is that, considering our postnormal times, the way we have manifested creativity within modernity requires reformulation. If navigation in postnormal times ruminates on the way that thinking about the future may be used as a tool that embraces ignorance and uncertainty. [20] I propose that the future in postnormal times should be considered with the sophistication anticipated by Bussey: an entity that is yet to happen, freed of the burden of content knowledge – no facts to learn, no burden of evidence to weigh, and no information to manage, accessed through our imagination, fuelled by our curiosity. [21] This approach underscores the paradoxical characteristic of the future as an entity that ‘is ahead but also behind us, it never arrives but is always with us, it is unknowable yet there are things we do know’. [22] This is a de-coupling – a breaking free – from the domination of present centred imaginary that shapes our understandings of the future and an embrace of anticipation as a sensory device that moves us beyond conditioned reality toward something new – perhaps even surprising. [23]

To achieve this is to unlock anticipation as part of the imagining process. Anticipatory imagination extends across three domains of imaginations – personal, social, and cultural – while foregrounding the interdependence between all three, as a reorientation toward a future that offers an open set of possibilities and draws attention and awareness toward a yearning for alternatives already embedded in the present data base of imaginaries. [24] This yearning, Bussey argued, is the compass that focuses energy and gives meaning to futures engagements, deepening the utilitarian thirst for ever-expanding possibilities. [25]

Of course, this is all about agency: the capacity of individuals and communities to make decisions concerning all main aspects of their lives in ways that are neither completely constrained nor completely without reference to social, economic, and family circumstances. [26] Agency refers to the agentive dimension of human subjectivity; the human specific capacity to actively influence and change their living conditions. [27] By unlocking anticipatory imagination, agency is ignited and the uncertainty and ignorance that characterises the postnormal condition may be embraced and overcome.

As such, postnormal times theory provides a framework that contextualises contemporary change and opens space for anticipatory imagination to be unlocked. To enact this requires a framework that is rooted in postnormal times theory while also driving an imaging process that elicits creative approaches to thinking about the future.

The Three Tomorrows

Working with my friends and colleagues, Jordi Serra del Pino and Christopher Jones, I have attempted to achieve this by developing a praxis for postnormal times theory. [28] Our praxis seeks to address the chaos, complexity, and contradictions

prevalent in postnormal times, and the speed, scope, scale and simultaneity of postnormal change, whilst simultaneously tackling the postnormal condition that stifles agency. [29] To develop this, we turned our attention to the Three Tomorrows as a framework that moves postnormal times theory beyond an analysis of our epoch, toward a creative practise that unlocks anticipatory imagination and ignites agency. [30] The thrust of our work has been to use the familiar (albeit modern) setting of the futures workshop, as spaces for collective and anticipatory learning. [31] For us, the futures workshop provides fertile ground for futurists to facilitate polylogues. [32] Polylogues, in and of themselves, are a distinctly creative process, providing conceptual spaces and opportunities for the diversity of agendas to come together to negotiate outcomes toward unthought futures. [33]

The Three Tomorrows is deliberately juxtaposed against the Three Horizons, the widely used normative and logical planning tool that presents alternatives available in any situation. [34] As a framework, the Three Tomorrows articulates three distinctly different futures, the 'Extended Present', 'Familiar Futures', and 'Unthought Futures', each with their own unique perspective on postnormal phenomena, and together providing utility in understanding how these phenomena unfold, interact, and impact one another.

The first tomorrow, the extended present, may be understood as our mental projection of the present onto the future. It deals with the most widespread image of the future in foresight analysis, famously coined by futurist and innovator Peter Schwartz as the 'official future'. [35] With postnormal praxis, we explore with our participants the anticipations that are constructed on past and present experiences. This tomorrow is explicitly linear in nature and foregrounds current global crises and conjunctures. With workshop participants we ask the questions: 'what do you know about this issue/topic?'; 'where is it going?'; 'how much has it changes to date?'; 'how much of this understanding can we use to project change into the future?' [36]

WE EMPHASISE THE CHARM OF THE EXTENDED PRESENT AND SPEAK TO HOW REASSURING IT IS TO REST ON DOMINANT WAYS OF KNOWING THE FUTURE; THAT THERE IS COMFORT IN THE NOTION THAT WE CAN LEARN ABOUT THE FUTURE BY USING OUR PAST EXPERIENCES.

Through the process of exploring the Extended Present and developing scenarios, participants are encouraged to list the indicators by which they measure their issue/topic, the qualitative or quantitative measures by which they can demonstrate a history of change and what they will be looking to measure as indicators of change into the future. [37]

For Cassidy, in our never-ending tournament of chess, his mastery of the rules of the game, how the pieces move, and an insight into my habits as his opponent, his approach to the game may be considered through the lens of the extended

present. His competence in these elements and his capacity to read and interpret the interplay between these concurrently, determines how successful he will be in his endeavours to out-strategise me and claim victory. There is comfort for Cassidy in knowing that – for example – once he captures my queen, I am at a significant disadvantage. He has played me enough times to know he can capitalise on my bad habit of flooding one flank and neglecting to protect my key players on the other.

The extended present is the tomorrow participants cannot miss – the future that everyone is expecting to happen, that is readily available, that can be formulated through trends. [38] Participants are provoked to reflect, not only on what they know about their issue/topic, but what they do not know about it.

THE OBJECTIVE HERE IS TO HIGHLIGHT THE VOIDS, THE GAPS IN KNOWLEDGE, FOR PARTICIPANTS TO ARTICULATE FOR THEMSELVES WHAT IT IS THAT THEY NEED TO LEARN ABOUT THEIR ISSUE/TOPIC.

The second tomorrow, the familiar futures, seeks to challenge and overcome the appeal of the dominant view of the future that underpins the extended present. The futurist Sohail Inayatullah's 'used future' is relevant here, making explicit the question: 'is your image of the future, your desired future, or is it unconsciously borrowed from someone else?' The arts are a particularly rich and diverse data pool from where our collective imagination draws alternative possibilities; painters, poets, philosophers, writers, and artists have often been among the first to identify the emerging issues of change precisely because of the ways they see reality in variance with the 'mainstream'. [39]

Recently, when I was playing Cassidy in a game of chess, I noticed that before he made a move he would pause and take a deep breath. I asked him why he was doing that, and he told me that at his school his teacher had explained to him the importance of slowing down and taking time to reflect before he decided how to move. He was now introducing this practice into his chess game. I also noticed he had begun to use his pieces to draw mine out to mount an attack; he was no longer simply anticipating my moves and responding, rather using his moves to tactically incite particular moves from me.

Here, in the familiar futures, participants need to be open to new sources of inspiration and to spot change or innovation in places that may seem unconventional in traditional approaches to planning. We encourage participants not to dwell on notions of likelihood or probability of transformation, rather to focus in on the impact that change may cause the issue/topic. [40] Black swan events have shown that small probability events may have a big impact and, therefore, it just does not make any sense to analyse them according to their likelihood. Thus, more scenarios may be developed, using different futures methods, or existing scenarios further interrogated and developed.

The third tomorrow, the unthought futures, refers to what is outside the assumptions and axioms of our worldview. This is difficult for us to grasp, not because it is truly unthinkable, but precisely because it is beyond the scope of what we consider imaginable. This is typically the most uncomfortable and challenging part of the Three Tomorrow's process. Here, the principal call to action is to embrace anticipation, and use imagination, to focus our attention outside the framework of conventional thought and dismantle dominant cultural agendas. By unlocking anticipatory imagination, the Unthought Futures is a space that reinforces and reframes agency. With reinforced agency unlocking anticipatory imagination, one builds confidence and capacity to actively reframe contexts, and deploy skills and materials in problem solving endeavours.

The unthought futures demands a different kind of exercise. Unlike the previous tomorrows, the emphasis here is not so much on looking at the futures in a particular way, but to examine the previous scenarios through a diversity of perspectives. [41] Essentially, we need to understand why the preceding scenarios have favoured some future options and ignored others. By fortune or design, Cassidy often finds himself viewing our game through the lens of the unthought. Not only because his age means his cultural footing remains embryonic, but because his little brother Patrick forces his way into the game, insisting on being involved in the decision-making process for which piece should be moved where. 'Why did you move your knight there?' Patrick will ask with dogged earnest. 'What are you going to do now Dad has moved there?' But Patrick won't just stop there. He may switch ends of the table, and come and sit on my lap: 'why haven't you moved your pawn there, Dad?', 'why does your pawn only move in that direction?', 'why can't all three of us play at once?'

The realm of the unthought is not about visioning desired futures, it is about interrogating the plethora of offerings at hand through a diversity of perspectives. It is about laying out all the scenarios, visions, images of the futures that have been produced before, and seeking and bringing forth everything from the synergies and the overlaps, to the complementary and the contrary. Here, polylogues truly come alive. Workshop participants, having worked together through the extended present and the familiar future, now huddle in the unthought. This is not collaboration, cooperation, or co-design, this is a negotiation, where agendas are named, and outcomes fought for. Polylogues are the manifest and tacit uncomfortability of working through the Unthought. As Sardar likes to point out – unthought futures are the realm where human agency can be rescued and reinforced.

For Cassidy and me, Patrick cannot be ignored. No matter how hard we try, the three-year-old that lingers by the chessboard will sooner or later make his presence known, influencing and impacting our game. We may ask him to be quiet, but he won't be quiet for long. We may move our game to another room in the house, but he will find us. We may give him another game to play, to keep him occupied. But he will soon be done with that, realising our ploy to preoccupy him, and he will come back bolder than ever! Thus, as Cassidy and I have learned, we cannot ignore Patrick.

We must bring Patrick into our games of chess, hear his voice, and acknowledge his agenda, embrace his perspectives and ideas, work with him to ensure he is achieving the outcomes he desires just as we are achieving ours. Lingering in the unthought, this is chess by negotiation!

Cassidy and I have found we have a great deal more fun playing this way. Decisions are reached through careful and colourful conversations. We learn more about each other, by hearing how each other view the game, their perspective on where we are all up to and what should happen next. When we play like this, there are never really any winners or losers, rather the game of chess becomes a process of exploration and cocreation.

Postnormal Creativity

There is more to this story. A new chapter that introduces a radical way of thinking; a way of thinking that deliberately seeks to disturb the human-obsessed (anthropocentric) approach of modern society (see earlier remarks regarding Enlightenment thinking dictates – reality equals human subject plus perception of the objective world), toward an approach that promotes and embraces ecological thought. This, somewhat jarring notion wants us to acknowledge that no being, construct, or object can exist independently from the ecological entanglement of our universe.

I AM ARGUING HERE THAT THROUGH POSTNORMAL CREATIVITY WE MAY ACCESS AN UNDERSTANDING OF OUR ECOLOGICAL ENTANGLEMENT IN A WAY THAT NOT ONLY ACKNOWLEDGES THE IMPLICATIONS THIS TYPE OF THINKING HAS ON REALITY MAKING, BUT ON HOW WE CONCEIVE OF THE FUTURE AS WELL.

Let's explore this notion via three salient points. One, polylogues provide conceptual spaces and opportunities for the diversity of agendas to come together to negotiate outcomes toward desired futures. With polylogues, postnormal creativity embraces tradition as part of progress (the voices and perspectives of indigenous and first nations peoples as an example). Moreover, polylogues should not only occur across the diversity of voices and perspective but across the diversity of all entities that make up the material world (the environment, animals, matter, for example). [42] Everything in the universe has a voice.

Two, through anticipatory imaginings, agency is unlocked, not to prioritise the individual over the communal, but to ensure that the individual may make sense of their place in our transformational epoch. This is to foster an understanding of their nonlocality in a way that brings awareness that we are all enmeshed in something that may not be reduced simply to the sum of our relations. Postnormal

creativity, by nurturing anticipatory imaginings, not only unlocks human agency, but the agency of all things in the universe. It is through postnormal creativity emergent realities may reveal themselves, and so too new approaches to the future flourish.

Three, that through polylogues and anticipatory imagining, subjectivity may be reimagined in a manner that signals an ontological shift, from Enlightenment notions of 'Being' to new notions of 'Becoming'. [43] This takes us toward a re-grounding of the subject of modernity (we humans) in the material world in a way that draws the future from a fixed point of the proverbial horizon, into the present where change is actually happening and where issues need to be addressed. In doing so, postnormal creativity reformulates the notion of the future entirely.

Remember Huxley's world, universe, nature, and agency quadrilogy? The modern approach to reality making is that the subject (humans) perceives of our objective world (the things all around us); agency may only dwell within the human subject. We humans are dislocated and held at odds from our reality in ways that perpetuate our estrangement from the objects around us. [44] Thus, the future is approached as an entity outside us, beyond us, interpreted and understood through inquiry into our perceptions of it.

Postnormal creativity seeks to do away with the Western ontological constructs of subject/object, in favour of a flat ontology; a universal ontology where all are objects and are given equivalent credence. In this way, Munch, Picasso, Matisse, Duchamp, Kandinsky, Dali, and Warhol, as the artists, have as much meaning and agency as the pieces of art itself. Further, the paints, the canvas, the wood that frames that canvas – all have the equal meaning and agency. Further, Hemingway the writer, is an autonomous object, just as his stories are autonomous objects, and are equally as real and relevant as any other object that exists. Similarly, words on a page, and the manner in which they are articulated, shared, understood, digested, and interpreted; the characters within stories; the places those characters live, visit, and work in – are all objects, and should be treated as such. This is a rejection of the anthropocentrism of traditional philosophy (that human access sits at the centre of being, organising, and regulating) and asserting that all entities share the similar characteristic of sublime unknowability. [45]

So rather than to interpret and make problematic the assumption and cultural constructs that we use to make sense of our world, creative inspiration in postnormal times is found in the complexity, chaos, and contradiction of a universe where all things have a voice and agency, equally. As Bussey argues, 'this offers new ontological possibilities for individuals, communities, and more widely, for our relational being with non-human fellow travellers'. [46] What this means for me is, culture – and the cultural codings that influence and induce creativity – may be hacked and reformulated toward a more ecological conception of our relationships with the objective world.

Postnormal Futures

There are spatiotemporal implications of this approach that define how the future may be understood in postnormal times. Postnormal futures accept that we are part of something far greater than us, that impacts us, but something we cannot tangibly conceive of. As we seek out the future, to know the future, we find that there is no future to know: well not when it comes to our future alone, anyway. Our nonlocality in postnormal futures means that the effects of the future are experienced across huge distance and time scales: you can experience the effects of global warming – rain, temperature, and so on – but you can never experience global warming, an entity unto itself, in its entirety. Just as every decision we make is about the future, our decision-making is enmeshed in the vast ecology of our universe; we are constantly functioning within the multi-faceted influence of unseen forces. We are always inside the future; it is a haunting omnipresent force distributed across continuums of experience. It haunts our very existence – no matter who we are, or how we try to avoid it. Through the setting of the sun, the change of seasons, the progressive warming of the globe, its effects are experienced, although we can never comprehend it in its entirety.

**IF YOU ARE STUDYING AN IMAGE OF THE FUTURE, YOU ARE NOT
STUDYING THE FUTURE, YOU ARE STUDYING A DROP OF RAIN THAT IS AN
IMAGE OF THE FUTURE AS CLIMATE.**

Yet, while a postnormal future is felt as the haunting omnipresent, its causal marks help us identify and understand it. This is an embrace of Rao's notion that the future is something that is actually happening – now – rather than something that is going to happen. [47] Postnormal times inspires the futurist to approach the future from the purview of the present moment as a shifting, ambiguous stage set, rather than the dominant metaphysical notion of presence as time; as a succession of *now* points.

Thus, postnormal futures are about an inherently ecological awareness that liberates and consoles us, that shepherds us toward an understanding of our truly intimate relationship with nonhuman parts of the biosphere. Postnormal futures are epistemologically and ontologically non-hierarchical, a mesh of open and complex systems that remind us that the future is an already existing totality for which we are all directly responsible. In doing so, the postnormal futurist is able to comprehend the truly futural nature of the future; postnormal times forces us to consider the vastness of reality (the real), on time and space scales far beyond our very being.

As an example of what I mean by this, consider for a moment my mobile phone: designed in an office, crafted in a studio, and constructed in a factory, from ancient minerals mined from the ground, will spend the best part of its working

life intimately pressed against my flesh, keeping all my secrets, and after my death, the mercury from its battery will still exist beneath the earth's crust in 250,000 years' time. This is not really a mobile phone is it? I don't really own it at all. And we are not really able to address its existence on any preconceived past, present, future continuum. Its matter, its energy, its essence shares our universe. It has its own distinct subjectivity. As such, it has agency, voice, and an agenda, all of which must be considered as part of our negotiation when it comes to polylogues. The postnormal futurists know this, and this knowing becomes part of our navigation through postnormal times.

Postnormal creativity turns these emergent ideas into reality. Thus, postnormal culture is borne. What we have then is a shift from asking, 'how do we plan for the future?' to the question, 'what do we do now?'

Back at home with Cassidy, our never-ending tournament of chess continues. His dogged enthusiasm to learn more about the game is infectious. 'Do you have a plan, Dad?' he now asks me before each game. At five, he senses that his grasp of the chessboard, the pieces, and the rules, is adequate - it is me, his opponent, that he needs to master. 'Dad always does that!' he will tell his brother, Patrick, whenever I make a move that he has anticipated. And when he beats me, which he is now genuinely doing more and more these days, he will look me in the eye and say, 'Your plan didn't work Dad. Checkmate!'

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AFROFUTURES FOR POSTNORMAL TIMES

C Scott Jordan

Did you hear that?

Perhaps it was just the residual flutters of presbycusis.

First, we are shown a couple eerie production title cards reminding us, the audience, that we have bought tickets for what is indeed a horror film. Raucous, then silence. Then to blackness. A hard cut into a cold open. The suburbs. A man wanders through the all-too-normal neighbourhood. He is lost. He is also black. He shuffles in fright. This is a contrasted mirror of the innocent white person lost in the rundown 'hood,' a jungle of low-income urban decay, haunted by the ever suspicious Other. In place of the abandoned shell, green lawns, cookie-cutter family homes, the inviting glow of illuminated streetlights.

Adding to our black hero's terror, a car passes playing loudly from its radio a nostalgic classic. The song is Flanagan and Allen's *Run Rabbit Run*. The song is that upbeat, barbershop quartet style, foot-tapping music that provided the soundtrack to a simpler time, the good old times, of course before the troubles of desegregation, homosexuality, and drugs. After a little game of stalker, the car stops, its door opening as the music roars louder, run rabbit, run, run, run...

And then a masked man, our hero subdued, and the slamming of the trunk as the cue to cut to:

Rapid fire fiddling, sharp cuts, a scratching, which returns, uncomfortably, too soon. The screeching tunes and tempo solidifies any doubt you had that you are, in fact, in a horror film. Suddenly, we are of the perspective of driving through a wooded timber and credits flash upon the screen. The classic New England woods of American horror. The fiddles cease as a more traditional tasting song crescendos. The lyrics may at first sound like sung English, but quickly spoils the ear to it being different. The song is Swahili. The song is also equal parts ritualistically dance-like and prelude warning to a cautionary folktale. The lyrics roughly translate to meaning 'Listen to your ancestors, Run!'

Half a frame of pitch black accompanied by a breathless pause, cut to:

The everyday struggle of life in America. Except the subjects of this photographic art collection are African Americans somewhere between living and surviving in the contemporary world. The music drastically transforms from classic horror-shop to

smooth and catchy. Childish Gambino's *Redbone*, while also being a sort of anthem of the times, is the contemporary hit that brings us from Suburban whitewash into the real, normal world of our hero, Chris, who is packing to meet the parents of his white girlfriend. Childish Gambino warns our hero to 'Stay Woke,' as ignorance and uncertainty cloud his nerves like a realistic dream.

Through music Jordan Peele has thrust us forth into his first feature. *Get Out*. [1] From its use of popular music to the blending of the Swahili song's motif into the score, even to the tapping of a spoon upon a teacup, Peele creates a beautiful work of art through his use, and even absence, of sound. The power of filmmaking as art lies in its not simply being a visual medium, but in that its use of sight and sound allow for us, the audience, to see what cannot otherwise be seen. To hear what no one is listening to. Peele's talent with this craft and brilliant play on parody brings the uniquely black viewpoint to the forefront of the minds of those with other worldviews.

THIS POWER, BUILDING OFF OF HUMANITY'S INHERENT SOCIALITY, IS THE OBJECT OF THE SAME GAME PLAYED BY AFROFUTURISM. MORE SPECIFICALLY PUT, AFROFUTURISM IS THE ATTEMPT TO PORTRAY THE STRUGGLE OF BLACK AMERICANS, POTENTIALLY ALL MINORITY AND DISPARAGED COMMUNITIES, SO THAT THE OTHER MAY SEE IT FOR THEMSELVES.

The question we will later address is whether or not the harnessing of this ability can translate into tangible change either through policy or social upheaval. In the spirit of the colloquial conceptualisation of the future, it would only make sense that this is most prominently seen in the genre of science fiction, but it should not be so quickly pigeonholed into being only a tool of pulp sci fi. Even Peele's *Get Out* can be seen as a work of Afrofuturism and perhaps one of its greatest contributions for the effect it triggered.

Like a film, Afrofuturism itself began in sound – music. To this day, it still remains a staple of many black musicians, even if not as overt as in the case of Sun Ra. Afrofuturism dates back as old as the issue of race itself amongst the African diaspora, but was first coined and seriously discussed by the American cultural critic and journalist Mark Dery in 1994. Music journalist Mark Sinker was also credited with investigating the phenomenon in Britain through various articles written for *The Wire*. In his article 'Black to the Future,' Dery wonders as to why more African American writers have not chosen to embrace the science fiction genre especially since it is the ideal medium for discussing slavery, alienation, and xenophobia. Dery interviews one such writer, Samuel Delaney, a cultural critic, Greg Tate, and an academic, Tricia Rose to begin this dialogue. Essentially, there simply is not a large number of black writers, let alone those who look to the universe of science fiction

to create their art. [2] The article does not come to any ground-breaking conclusion, but it does get the ball rolling and, whether intended or not, illuminates a potential within popular culture.

The idea behind Afrofuturism is that it could provide the general public with the epistemologically reflective exposé of the plight of contemporary African Americans on the public opinion-altering level of Upton Sinclair's *The Jungle* or Woodward and Bernstein's Watergate reporting. Yet, Sun Ra and George Clinton led the way for a blend of technology and African tradition in their music since the 1950s. Sun Ra, taking his name from the Egyptian god, spoke of Saturn as his mythical home world and how music was a mode of escape with the power to heal the wrongs of this world. In his film, *Space is the Place*, music is used as a means of time travel. He even applied through NASA, unsuccessfully, to be an artist in residence with the organisation. The work Sun Ra did with his art and especially with avant-garde jazz in Chicago carried on with George Clinton and Parliament-Funkadelic into the stylings of Herbie Hancock and the more commercially known Miles Davis and Jimmy Hendricks.

To this day the movement continues with the obvious influence of technology within the music and, the new performative innovation of music videos, of Beyoncé, Rihanna, and Missy Elliot. Samuel Delany and Octavia Butler have pioneered black sci-fi writing for such contemporary writers as Nnedi Okorafor and N. K. Jemisin. Kendrick Lamar tops billboard charts with his blending of the entire history of African American music into his beats and Marvel's *Black Panther* has broken box office records. [3] The soundtrack of that film was largely developed by black artists and headed up by Lamar himself. Yet racism in America is far from having progressed. The daily news is tainted by police murdering minority citizens, horrific displays of gentrification and institutional racism, and even America's leaders are not above blatantly racist remarks in public addresses.

So, what is happening?

Has Afrofuturism failed to wake the public? Is the dream of pop culture having the power to provoke and inspire real change just that? Or has art simply become the numbing white noise needed to get America's opiate-addicted citizenry through the day-to-day grind?

To begin the long overdue discussion of these questions requires an unravelling and analysis of a multiplicity. Since it is often first nature to assign blame, I will address that now, so as to kill any attempts at pinning fault. This particular blend of problem is societal and, as such, the fault lies not only in all constituents of society, but all such external factors that frustrate a system from randomness to ignorance, uncertainty, and the unavoidable impression of chaos. All of this is exponentially more threatening in postnormal times.

Perhaps the best place to begin in facing such a complex situation is with a Marvel movie.

As a critic, a cinephile, and a comic book nerd I expected a lot, even too much, of *Black Panther*. Donald Trump had been President of the United States for one year.

Ferguson, Flint, Detroit, and a host of other cities and communities throughout the country remained starved of justice. No decisions had been made on the deaths of minority victims of white cops in overly suspicious circumstances capsized within evidence of discrimination and xenophobia. The Affordable Care Act, passed in 2009 by the US Congress by a vote of 220–215, was being drawn and quartered. You might know this act by its colloquial name: *Obamacare*. But even this moniker represents a deeper injustice as the bill actually passed was a widdled down version of what was once a glorious piece of exemplary legislative craft in order to appease the Republican Party, only one of whom who voted for it after all the butchery done on their behalf. Talk of privatisation of prisons and increased election restrictions whispered systemic racism. #BlackLivesMatter resurfaced upon Twitter followed by all of its controversy. Nostalgia for the Obama years reached the point of provoking a fiction mystery series where the former president and his vice president, Joe Biden, adventured around solving crimes as pulpy, gritty detectives. The progressive hope of 2008 was the shell of a corpse, devoid of all organic material.

In Hollywood, a much different tale was unfolding. Resistance found footing in the alliance of #MeToo and #BlackLivesMatter. Crimes of yesterday were being exposed with the fall of Harvey Weinstein and the slurry of other allegations against sexual discrimination and violence surfaced. White washing of foreign tales and characters was being exposed and stood trial before the modern revolutionary guillotine of public opinion and social media – Cancel Culture. Inclusion riders, female directors, and gay heroes were all the rage. Patty Jenkins's *Wonder Woman* single handily revived the DC cinematic universe. Guillermo del Toro, an immigrant, took home 2018 Oscars for both direction and best picture for *The Shape of Water*. Oprah Winfrey gave the call to action at the ceremony, earning herself the public's official endorsement as the perfect foil to Donald Trump in the, then, upcoming 2020 election (there were even campaign posters made following her Oscar speech).

Black Panther wasn't an origin story. Check. After all, if American audiences are not completely showing superhero fatigue, they are at least burnt out on the same old fallen man becomes a risen hero, chapter-one storyline. We met T'Challa in an earlier Marvel film, 2016's *Captain America: Civil War*, which was essentially a trial run of the universe encompassing Avengers films to come. *Black Panther* was unique in that we discover a whole new, hidden country, and we discover it at a time of flux, a regime change. We are introduced to a whole new world of characters that, aside from being well acted, are written to be original and the kind of persona that sticks with the audience. The audience sees themselves within these characters with realistic personalities and relatable flaws. The audience finds themselves saying 'that is totally me' or that one character or another is reminiscent of an old friend recalled from the oblivion of time. The effects and cinematography are some of the best that Marvel had dished up to that point. Overall, this film will be remembered not simply for it being a delightful ensemble of African American art, but as a key piece of cinema in general.

It makes sense that *Black Panther* is seen as a revival of Afrofuturism. The film's imagery is richly engrained with classical elements of precolonial Africa and space-age technology. Cloaking technology allows Wakanda to appear to the outside observer as a grassy oasis in the heart of Africa's jungle near a simple, yet impressive waterfall overseen by farmers clad in multi-coloured robes wielding archaic spears. Revealed, a bustling, densely populated metropolis with an impressive skyline mixing pre-colonial huts with Western skyscrapers. Vehicles fly about this presently grounded version of a Jetsons-like city that could be easily taken for any other major urban centre in the East or West. In fact, I would not be surprised if a McDonalds or Starbucks (or four of each, every few blocks) resided within this setting that could easily be inspired from London, New York, or Dubai. One of the Wakandan king's councillors perfectly exemplifies the blend desired by Afrofuturism. He wears a lime green lip plate that blends seamlessly with a vibrant lime-green Western business attire suit. But wait, Wakanda is supposed to have been untouched by colonialism or globalisation.

While *Black Panther* does a remarkable job of exemplifying and, to some, reviving Afrofuturism, it also points out a key flaw in the genre through a logical inconsistency. Afrofuturism is deeply rooted in a historical narrative. Usually, the stories in this genre draw from a mythical ancient Nubian civilisation or a black Egypt of the Pharaohs and anthropomorphised gods. This past is then projected into a Western standard of cosmology. While the product is very groovy, it is fundamentally limited. Afrofuturism, for instance, is dependent on racism, a constructed social form devised by colonialists and perpetuated by the phenomenon of globalisation.

**THE ARTIFICIAL ENTITY OF RACISM ALLOWS FOR AN OPEN DISCUSSION
OF SLAVERY, ALIENATION, CONQUEST, SEGREGATION, JIM CROW,
GENTRIFICATION, AND THE MULTIVERSE THAT IS XENOPHOBIA.
THE COLOUR IS MOST CERTAINLY BLACK, BUT THE STRUCTURE IS
FUNDAMENTALLY WHITE.**

Under a more critical eye, *Black Panther* is riddled with details that breakdown the ideal of Wakanda and provide a clue to a more sophisticated Afrofuturism. The reason for this is that Marvel created a film that fundamentally tells an African American story in the context of Africa. Less scrutiny is spent on emphasizing the language of Africa's plight against conquest at the risk of costing the narratives ability to speak to the contemporary struggle for racial equality in the States. While white men in the film are referred to as colonisers, the intent is to emphasize the Otherness and tyranny of the white majority experienced in the United States. To Africa the threat of colonisers is the destruction and exploitation of black Africa

in order to gain wealth for the colonists, be that the Europeans of the last century or the contemporary threat of China, America, Russia, or generic multinational corporations themselves. It is a subtle difference, but these small cracks chip away at what Wakanda stands for. If Wakanda has managed to evade the threat of globalisation since time in memorial, why do kids in the streets wear the slickest Western styles, struggle with Western monarchical patriarchy, or Wakanda's cities reach to the stars with their phallic buildings, a typical Western urban architectural design? Ryan Coogler may launch a thousand ships for the future of black science fiction and film. But will they be able to overcome the limits of Afrofuturism?

HERE, IT IS IMPORTANT TO POSE THE QUESTION. IS IT ENOUGH FOR AFROFUTURIST PIECES TO CONVEY, FROM ARTIST TO AUDIENCE, THE HISTORICAL STRUGGLE OF AFRICAN AMERICANS? IF SO, THEN THE PROJECT CAN TAKE A DIFFERENT PATH OF INFORMING. IS IT SIMPLY MORE ESCAPISM?

But there is no escape. And what might be waiting out there beyond what is being escaped? But perhaps that is not enough. In fact, perhaps Afrofuturism can take the next step and inspire action. Maybe this is not simply a lofty dream of Afrofuturism, but a need demanded by the rapidly burning out contemporary discussion of race in the West.

Michael Eric Dyson's 2018 book looks at a point in United States history when racial tensions were overflowing and beginning to mix dangerously with other vocalised instances of discord in the country. [4] Following the assassination of John F. Kennedy in 1963, his brother Robert Kennedy, who had recently taken a change in priorities towards the race question in America, called a meeting. Did this meeting include Martin Luther King, Jr. or Malcolm X, the leaders of the movement at the time? No. He turned to artists. James Baldwin, Henry Belafonte, Lena Horne, Lorraine Hansberry, and Jerome Smith. As if dreamed up from the mind of philosopher Richard Rorty, Kennedy, at the darkest hour of the 1960s, held this meeting of artists in search of a resolution. Perhaps when all other action fails, we must turn to the artists to have the creativity and openness to seek the unthought and plot a course for navigating hard, and potentially postnormal, times. Dyson's conclusion following the analysis of this historic meeting and the contemporary discussion of race in America is for us to 'be Wakandan.' Go out there and listen to as much rap and R&B music as you can, read as many stories of Afrofuturism, and see as many Black Panther movies as possible. Not only view, but participate. Create and through this maybe understanding and progress can be distilled. Pop culture is powerful, as Anas Al-Shaikh-Ali beautifully demonstrates in his *Bias in Popular Culture*. [5] Perhaps the work done by Donald Glover aka Childish Gambino can give us some insight to this power.

The same day the multi-artistically talented Childish Gambino was to be the musical guest of Saturday Night Live, he dropped an emotionally raw and visually moving music video titled 'This is America'. [6] The music video all takes place in a massive empty warehouse. A man plays guitar upon a plastic chair as Gambino, with dishevelled hair and the trousers of a Civil War-era confederate soldier, begins dancing. The music is very uplifting sounding like an old tribal song of celebration from the Africa of old, complete with a church's chorus singing back up. Gambino makes faces and body gestures that impersonate the old caricature of Jim Crow period posters and blackface reproductions. Then seemingly out of thin air Gambino draws a gun and shoots the guitarist in the head. The gun is taken away, two-handed, in a fine cloth as the body is dragged away like rubbish. The music rapidly changes tempo to something more synthetic. Gambino walks on as people behind him run about and then the music again becomes more playful as younger individuals join him in a dance fashioned after the dance performed by black students in celebration of the end of Apartheid in South Africa. Then as everyone is in celebration a church chorus is revealed as Gambino dances with them, then is thrown an AK-47 which he uses to gun down the chorus. A familiar symbol of church shootings in the United States. As the music again changes tempo, the scene moves to chaos with cars on fire and people running and dancing about. Overhead, children stare on but only through the lens of their smartphones. The music cuts as Gambino pretends to shoot a gun and then proceeds to light a cigarette and dance upon substandard cars in a mockery of rich rappers dancing on top of sharply painted sports cars. Meanwhile the car factories in Michigan remain closed. We close on Gambino being chased by faceless white men.

The video is jarring, and the lyrics mock a consumerist America intentionally ignorant of the disaster in her communities, focused on making wealth and a social media persona, in love with the second amendment of the constitution. Powerful is one of the most under representative words you could use to describe this video and the song attached to it. Both pull impressively from history and project themselves into the future. Nonchalantly, Childish Gambino reminds us over and over again, that this is America. Childish Gambino's alternate persona, the actor Donald Glover had just finished staring as the younger Lando Calrissian in *Solo: A Star Wars Story*. What Glover did through his music video in all its poignancy, only begins to tap at what has been made a career by the filmmaker Spike Lee.

Rolling Stone magazine recently did a cover story on Spike Lee where he talks about his latest film *BlacKkKlansman* and life in Trump's America. [7] Other news outlets took on this story and asked, 'where did Spike Lee go?' Spike Lee's response is that he hadn't gone anywhere. For thirty years he was breaking waves in independent and black cinema. Each of his pieces provide another view on racism and black America. Some widely received like *Do the Right Thing*, *Chiraq*, and more recently *BlacKkKlansman*. Others have faded into obscurity. While he has been outspoken about politics and current affairs, his films have never gotten mass release, yet always hit, hard breaking standard and parlance. *BlacKkKlansman* is very

much a spiritual sequel to his debut *Do the Right Thing*, in their frank discussion of racism in everyday America. *BlacKkKlansman* would be best viewed with Spike Lee sitting across from you giving you the look that resembles the look on a mother's face when their child deliberately disrespects them. He intercuts his film with celebration amongst members of the Ku Klux Klan and filmstock from the highly racially charged films *Gone with the Wind* and *Birth of a Nation*, the first film made in America that was even shown at the White House under the administration of President Woodrow Wilson. He has some very hard-hitting scenes where the actors themselves should have simply looked plain faced into the camera to recite. In these scenes our hero, Ron Stallworth, the first black man hired onto this small-town Colorado police force, is being comforted by his white fellow officers on the reality and danger that still exists in racist America. This movie also takes place in the 1970s/1980s. Ron utters such phrases as 'we would never elect someone like that as President of the United States and leader of the free world!', referring to attributes that are shared by the, then, current President Trump. There is something striking in this image of a hopeful black man and the realist strike back of white police officers. Lee speaks to something higher in this film. A general but genuine comment on the racial debate in America.

The discussion of race in the West is, simply put, exhausting. Emotion has over taken logic and stubborn refusal to question one's educational or cultural up bringing has brought the dialogue to a dead halt. Everyone has appeared to have made up their mind on the issue. This frustration is expressed in Reni Eddo-Lodge's book summed up by its own title, *Why I'm No Longer Talking to White People About Race*. [8] Since the discussion of race has continued to go on, seemingly regardless of whether or not progress has been made, white people seem to want to forget about *that* dark mark of history and move on. The problem lies in that if the institutions that run our everyday are endemically racist, then we can't move on. When historians aren't busy trying to figure out which historical figures were or weren't homosexual, there was a major push to say that the Civil War wasn't about slavery. This was a major shift in the discussion that drove Ta-Nehisi Coates into the American dialogue.

Ta-Nehisi Coates entered the limelight when he began writing for *The Atlantic* just before the election of Barack Obama as President. His main crux was to explain how while the Civil War may have been driven by economic and political factors, at the end of the day, the conflict came down to the issue of whether or not it should be allowed for one person to own another. His career continued as he continued writing as a sceptic of Barack Obama, fearing he was not 'black' enough to make much of a difference as the country's first black President. In his 2017 book *We Were Eight Years in Power*, aptly subtitled 'An American Tragedy', Coates takes the pulse of black in America and watches as the Obama presidency becomes, even for him, the sceptic, a beacon of hope for the black future. [9] As the subtitle denotes, Coates also traces back from the election of Donald Trump, how the well-intentioned rise of black self-esteem also laid the groundwork for the rise of nationalistic and fear

driven white supremacist attitudes in dangerously subtle shades. By the end of the eight-year gig, Coates learned to love his black President, but could not help but watch, in that slow-motion fashion we come upon disaster which we cannot prevent, as Donald Trump became, in his words, our first *white* President.

**ALL PROGRESS THAT WAS MADE DURING OUR FIRST BLACK PRESIDENCY
SO AWOKE A FEAR IN A FORGOTTEN AMERICA, THAT A PERCEIVED
IMBALANCE HAD TO BE CORRECTED AND AMERICA'S WHITENESS AGAIN
NEEDED TO BE DISPLAYED IN CASE ANYONE HAD FORGOTTEN.**

Clad in Sperry's, wielding tiki torches, the march on Charleston brought scary images of memories past to the forefront of the 24-hour news's view. As someone who gained his formative education under the auspices of the Bill Clinton administration and the intoxicating calm waters of the nineties, I'm not surprised. The theme was fairness (ironically enough, one half of Fox News's claimed tagline). Every day of the week attempted to be a holiday in order to recognise another's culture and the struggle of the past. P.C. (political correctness) was law. No derogatory language, no putting others down. It was the great equalisation. Racism had been defeated. We can forget the past now, yet we had catch phrases like 'forgive, but never forget.' The impossibility of dissociating these emotions essentially sums up America's attitude up to 11 September 2001. Unfortunately, this equalisation meant that as of whatever day we all agreed on this in 1996, we assumed everyone was on even ground. We assumed our institutions were not racist. Yet housing and residential zoning clearly shows racist origins that are perpetuated to this day. Prisons are still holding unprecedented numbers of blacks, forced to work, for pathetic wages to pay off unsurmountable debts birthed in ridiculous fines driven mad by the passing of time. Vicious cycle does not even begin to give the description of the situation justice. Yet, America felt it was unnecessary to even discuss reparations, let alone consider them. America felt that maybe even affirmative action was a bit unnecessary halfway through the second Bush administration. After all racism is done and everyone is equal, right?

All of this nonsense is observed year by year through Coates's writing during the Obama years. And all of this occurs with the backdrop of Trayvon Martin's being gunned down for wearing a hoodie in front of the wrong cop. As hell breaks loose in Ferguson and ripples rush out, throughout the historic southern United States. Meanwhile, other forms of xenophobia from homophobia to Islamophobia overtake the headlines. But this is not the end of the story.

Coates is not currently writing for *The Atlantic*. Coates has gone from fly-on-the-wall to actor, but in the most peculiar way. Through Afrofuturism. Coates has authored Marvel's run of the comic *Black Panther* that ran from 2016–2018. Through his pages assisted by the beautiful images of Brian Stelfreeze, Coates moves from

observer of racism in the world, to offering ideas for change. Coates' T'Challa offers us a portrait of what the film *Black Panther*, and Afrofuturism in general can offer. Through his run, T'Challa is challenged to both be a world superhero, with the Avengers, and the ruler of his nation, Wakanda. He must compromise his people for the greater good of humanity, likewise, to maintain order he must partner with vicious and evil men, dictators of other African and even Western nations. All along, terrorists and enemies attempt to dethrone him. At first glance, Coates' *Black Panther* beckons to post 9/11 America under George W. Bush, fear, and the Patriot Act (the one that allows the government to spy on its own citizens). Upon a more sophisticated lens though, perhaps he is giving sight to the world of Trump's America and whatever might come beyond that.

In, *We Were for Eight Years in Power*, Coates uses his thought of each of the four years of the Obama presidency to retroactively deconstruct the road to the unthought election of Donald J. Trump. This partnered with his continued work on Marvel's *Black Panther* comic can provide a framing for how the Three Tomorrow's method of analysing and providing policy recommendations for postnormal times can be put into action. What Afrofuturism tends to lack is the ability to move from the familiar future of traditional sci-fi into the unthought third tomorrow of postnormal times and the taking of power in one's own future. As Coates continues from *Black Panther* into the 2018–2021 run of *Captain America*, a character who was just revealed to be a sleeper unit of the Hydra organisation, a team of racist and white supremacist baddies in the Marvel comic universe, we will continue to see what power lies awaiting an awakening within Afrofuturism.

Afrofuturism has a strong potential for being a navigational tool to action in postnormal times. First, Afrofuturism, whether or not is it aware of it, is an ideal incubator for ignorance and uncertainty. Both in visual and audio forms of art, Afrofuturism's grappling with the concept of the Other works to both expose ignorances held by the audience and to analyse the ignorances held by the creator or the perceived self.

IRONY AND NARRATIVE ARE MASTERFUL WAYS OF BRINGING

UNCERTAINTY UNDER SOME SHADE OF LIGHT. THUS FAR,

AFROFUTURISM'S HEROES, CAUGHT BETWEEN PAST TRADITION AND

FUTURISTIC TECHNOLOGY, CONFRONT UNCERTAINTY IN A WAY THAT IS

OFTEN LEFT OUT OF THE DAY-TO-DAY HUSTLE AND BUSTLE.

Science fiction is a genre built upon consequences and in those consequences, uncertainty must be not only a constant struggle for the characters, but an internal struggle within the thinkers and writers as much as it is for the sugar-coated minds of the audience. Maybe as the old Sun Ra mantra goes 'space is the place' to deal

with the anxiety and nausea that cripples so many caught in postnormal times. Yet the challenge for postnormal times, where Afrofuturism could gain some ground, is in seeing through tomorrow.

In postnormal times, it is important look at the future as a multi-potentialized concept. Commonly we break this up into three tomorrows. They are not strict, rigid definitional entities, but rather descriptors that allow us to conceptualise and move beyond the limitations of our own biases. Each tomorrow has within it, the preconceived notion of the other tomorrows. Perspective is critical. Movement from self-reflection to commiseration with other's worldviews advances the horizons attainable in unravelling the three tomorrows. Creativity and flexibility are one's precious commodities. First is the extended present. The not-so-distant-future. The revelation of trends and the status quo. Beyond this first tomorrow lies the second tomorrow of the familiar future. The flying car. It is futuristic for it is a cool, space-aged way to get around, yet familiar in that we are still, supposedly, using cars to get around. This is the pitfall of science fiction. The all-too-human tendency to remain within the safety of sobering sanity. Robots, but humanoid, and we fear their emotions and sentience, for then they'd be like us. Smart societies driven by automation and social networking, cool, slick, yet beholden to our contemporary structural flaws of being misogynist, racist, consumerist, and overall standing on the classic foundational theme of unifying us by dividing us into various classifications. Afrofuturism and the rest of science fiction do a brilliant job of getting us to this point and even in explaining the postnormal creep that lies within each step, but can it get us to the third tomorrow.

The truly unthought is a new frontier. As futurists Ziauddin Sardar and John A. Sweeney tell us, 'collaborative creativity and 'ethical imagination[s]' are not simply the best tools for constructing scenarios in this tomorrow, 'they are the only tools'. [10] Furthermore, unthought futures are not simply something that is not expected or anticipated; rather, they are something outside the framework of conventional thought – something that does not allow us to focus on or think about it.' The unthought is not unthinkable, but might be useable from a certain vantage point. It is the marriage of complexity, chaos, and contradiction. Distortion of scope, scale, speed, and simultaneity are commonplace here. Blackness and white supremacy can vanish in the unthought. Race can be uncreated. Slavery and Jim Crow are ideals to be aspired to in this realm. Xenophobia is the tyranny of the minority and historical narrative need not apply. Afrofuturism can unlock its true power by tapping into the unthought. But, as has been explicitly stated in postnormal times analysis: power is seldom given; it must be taken.

Now, caution should be advised here. A drastic jump from the ethereal fiction of thought to the reality of the present is jarring and action without moral reflection and continued futures thought can be dangerous. A fearful association can be drawn between the creative and the destructive. This is the rationale used for the banning of certain artistic expressions. It lies at the heart of John Lennon's assassin, who totted along his person a copy of J. D. Salinger's *A Catcher in the Rye*. Also, in former

US President's Ronald Reagan's would-be assassin's motivation to win over the heart of Jodi Foster after seeing Martin Scorsese's 1976 film *Taxi Driver*. The debate will continue with each new example of youth and violence, from the pop cultural influences on the young shooters at Columbine High School in 1999, to the 2012 shooter, dressed as Heath Ledger's character The Joker, at an Aurora movie theatre on the opening night of Christopher Nolan's *The Dark Knight Rises*. Afrofuturism, in being a truly futures study, must keep its potentialities open to all possible outcomes. This means that it can be hijacked and used for the ulterior motives of the militant and fascists. Yet in all the bad, an equal, if not greater, multiplicity of good lies within the potentiality. A sound morality is as paramount as a respect for mental illness and other social ailments that can bastardise a policy or a movement.

Afrofuturism provides for us a mode of reflexion as well as insight for navigation of postnormal times that need not only be a way forward on the issue of race in the United States or the West, but can be a cowl put on by other disadvantaged communities or groups who find themselves in postnormal creep or looking to prevent postnormal lag. As the film *Black Panther* speaks to and Dyson echoes in his writing, we can all be Wakanda. In the comics of Coates, our hero T'Challa is caught between being the King of Wakanda and a superhero for the world. There is a fine balance to be maintained there. For even in the throes of PNT, there are constants such as home and family that need tending to, yet the demands of good acts and the pursuit of navigation are needed in these troubling times. In looking towards policy in postnormal times, we can take a page from T'Challa's book.

At the conclusion of the film *Black Panther*, T'Challa decides that it is time for Wakanda to come out from hiding. That the risk of continued threats of attack can be tackled by giving back to the world. He does what his cousin-turned-enemy wanted; much as Martin Luther King, Jr. and Malcolm X wanted similar outcomes, but differed in method. T'Challa would not arm his disadvantaged African diasporic brothers and sisters, at least with weapons, but share the benefits to humankind that Wakandan thought, and innovation delivered through the use of its secret element, *vibranium*. In the closing scene of the film, T'Challa and his sister Shuri are undercover, visiting Compton where Killmonger, one of the films antagonists for T'Challa, was born and raised. T'Challa reveals that he has bought a large block of land there to build Wakanda's first outreach centre. The first steps towards walking through postnormal times should be small, short term, but with long term ambitions, constantly monitored by specialists, and always open to revision.

A group of kids are playing basketball on the land T'Challa has bought. They stop as T'Challa uncloaks their flying jet to the kids' amazement. One of the young boys walks up to T'Challa. Echoing the deeply needed self-reflection of politicians and policymakers. The powerful. The boy asks, 'who are you?'

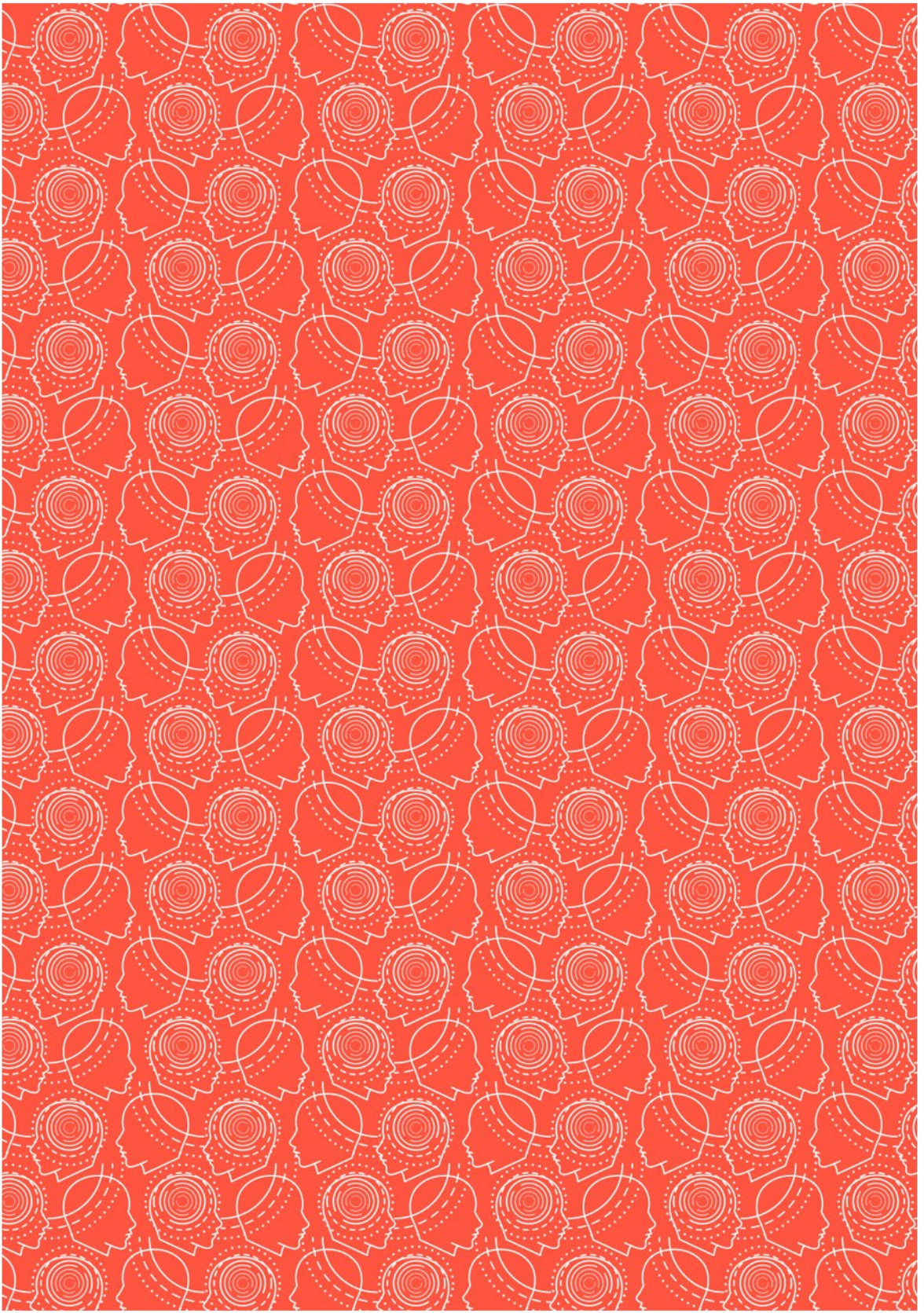
Afrofuturism echoes out, from the funky grooves and electronic sounds improvised by Sun Ra and George Clinton through to Beyonce and Missy Elliot and even into the contemporary with Childish Gambino and *Black Panther's* credit song, Kendrick Lamar and sZA's 'All the Stars', that follows the child's posing of that

question. 'This may be the night that my dreams might let me know that all the stars are closer.' The world is lived out between stanzas. Both the existence and absence of sound weave together to create a soundtrack for our lives. It appears to be escape, but in reality, it is the passage onto something higher, into something unthought. Random combinations of notes can evoke emotion, retrieve a lost memory, and even provoke a person to action. Such a mysterious force demands the austerity of our intellectual rigor.

Can you hear that?

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**BEYOND
POSTNORMAL
TIMES**

GOING BEYOND POSTNORMALITY

Alfonso Montuori

Creativity and imagination are the most important ingredients for coping with postnormal times, according to Ziauddin Sardar. This paper looks at the way creativity itself is being transformed in the West, from the individualistic/atomistic view of Modernity towards a more contextual, collaborative, complex approach. It explores the potential and possibilities for this more participatory creativity to help go beyond the 'crisis of the future', and argues that the centrality of creativity must go beyond the mythology of genius and inspiration to inform philosophy, ethics, and action. Philosophical reflection and the imagination of desirable futures can emerge from a creative ethic that stresses the value of generative interactions and contexts that support creativity.

In his provocative and important paper Sardar argues that chaos, complexity, and contradictions are central to 'postnormal times'. [1] He goes on to write that,

the most important ingredients for coping with postnormal times, I would argue, are imagination and creativity. Why? Because we have no other way of dealing with complexity, contradictions and chaos. Imagination is the main tool, indeed I would suggest the only tool, which takes us from simple reasoned analysis to higher synthesis. While imagination is intangible, it creates and shapes our reality; while a mental tool, it affects our behaviour and expectations. We will have to imagine our way out of the postnormal times. The kind of futures we imagine beyond postnormal times would depend on the quality of our imagination. Given that our imagination is embedded and limited to our own culture, we will have to unleash a broad spectrum of imaginations from the rich diversity of human cultures and multiple ways of imagining alternatives to conventional, orthodox ways of being and doing. [2]

Sardar's essay raises a host of interesting questions and possibilities, and in these pages, I want to address several aspects of creativity that are particularly relevant to the discussion of postnormal times, specifically by reflecting on the ways in which

the discourses and practices of creativity in the West are themselves changing. I discuss the who, where, and how of creativity and how they are changing from an atomistic/individualistic to a more collaborative, contextual, and indeed ecological perspective that has considerable implications for the creativity of the future and the future of creativity. I conclude by presenting one possible way in which a more collaborative creativity can assist us in imagining different futures.

Creativity and Modernity

Creativity was not quite 'normal' in Modernity, if we are to believe the popular Romantic mythology of tortured geniuses and lightning bolts of inspiration. [3] We should therefore expect that in postnormal times creativity will have a few surprises in store for us. In fact, creativity itself has changed, and in postnormal times creativity may paradoxically become normal in the sense that it will not be the province of lone tortured geniuses any longer (which it was not anyway), but an everyone, every day, everywhere, process. [4] If, as Sardar suggests, creativity will be essential for coping with postnormal times, then changes in the manifestation and conceptualisation of creativity in the West deserve our attention.

History and Myths of Creativity

Let us step back and unpack some of the underlying 'myths' of Modern creativity, as this view of creativity is quietly and rapidly changing. Traditionally, the research on creativity focused on the three Ps: Person, Process, and Product. [5] In the romantic mythology, from which this atomistic view originated, the person was mostly a lone, eccentric genius. The "Who" of creativity could therefore only be an individual person. Not a group, an organization, or a culture. If anything, groups, organizations, and cultures were representatives of conformity and compliance, and were viewed only as potential obstacles. The creative individual could always 'transcend' his environment. [6]

The 'How' of creativity consequently occurred exclusively 'inside' the individual. [7] The classic image of the creative process involved a light bulb going on over the creator's head during the Eureka moment. The creative process was viewed as a solitary process. In this atomistic, individualistic view, relationships and interactions were not taken into consideration – unless it was to refer to interruption by gentlemen from Porlock that made the pleasure domes of inspiration collapse, or the masses mocking and misunderstanding the incomprehensible genius.

The 'What' or creative product was typically a major contribution to physics, a symphony or transformative work of art. [8] Creativity was associated with 'big bang', earth-shaking insights that were not the kind of thing the average person could understand or be involved with. This takes us to the 'Where' of creativity, which was almost exclusively the arts and sciences, and in the latter preferably physics. If having the Creative Person as the unit of analysis, by definition ruled out creativity as a possibility for groups and organizations, the Where of creativity by definition made it virtually impossible for somebody not in the arts or sciences

to consider herself creative or to be engaged in an enterprise that was considered creative. This meant that creativity could only 'exist' in a limited number of human activities. This characterisation of creativity made it a very unusual, subjective phenomenon that was limited to very few individuals during rare moments of inspiration in a closely circumscribed set of human endeavours.

Creativity was a puzzling phenomenon in Modernity. Because the Modern scientific worldview was so Objective and Order-driven, [9] creativity was associated with a breakdown in Order and therefore with Disorder, whether socially or personally, and consequently with the popular belief that creative people are all to some extent unhinged. [10] Creativity was also viewed as essentially contingent and subjective, rather than lawful, orderly, and objective phenomenon. Science itself could therefore not account for creativity. The creativity of scientists did not begin to be systematically addressed until the 1950s. The Austrian British philosopher Karl Popper stressed the context of justification, and by leaving the context of discovery to psychologists he was essentially dismissing it as a worthy subject for science and philosophy, and hence serious inquiry. [11] In the US, the Ph.D. dissertation is supposed to be an original contribution to one's field, but tellingly originality and creativity are barely ever discussed during the educational process, unless it is in the context of plagiarism. [12] Creativity was a subject addressed by the Romantics, who emerged in reaction to the dark satanic mills of capitalist techno-science, but worked in the arts rather than the sciences. Modernity was therefore split in two, and creativity was firmly on the side of *sturm und drang* and subjectivity as opposed to cool reason and objectivity.

BUT MANY OF THE UNDERLYING ASSUMPTIONS OF BOTH SCIENTIFIC AND ROMANTIC CAMPS ABOUT THE WHO, HOW, WHAT, AND WHERE OF CREATIVITY WERE SURPRISINGLY SIMILAR, AS WE HAVE SEEN.

Particularly in the US, the Person was the unit of analysis, and the social and natural environment were essentially considered epiphenomenal. [13] The environment of creativity, and creativity's effects on its environment, were mostly not taken into account. Social, political, and economic conditions were not a consideration. The creative genius emerged no matter what the social conditions. Hence also the dearth of research on creative groups, relationships, environments that foster creativity, and generally on the social dimensions of creativity.

In Modernity, creativity was essentially decontextualised at the level of person, process, and product. The creative person, viewed atomistically, did not need to interact with, and was not influenced by the social world, a view still held by some eminent creativity researchers today. [14] The creative process occurred inside the person's head and was not influenced by the environment. The creative product was likewise not context-dependent, and the great work of art could be moved from

museum to museum, inventions worked in any part of the world, and initially great factories required no more than a handy river to dispose of pollution. [15]

The consequences of this decontextualisation can be seen at the individual and the social level. In Modernity, the body was to the mind as nature was to society. And creativity manifested in the myth of the self-destructive genius dying of alcoholism or drug-abuse or mental illness is just as unsustainable as the techno-capitalist myth of the 'atomistic' individual factory oblivious to its natural and social environment. [16]

The creativity of Modernity did not consider Nature a partner, but rather something to be dominated. Its purpose was to understand how nature operates, and then use that information within an essentially technological framework, based on the metaphor of the Universe as a machine. This creativity led to the design of ways to protect human beings from nature – from disease, weather, or famine, for example – and to extend human powers over nature. This took the form of extensions of human capacities such as vision (microscope, telescope), and ways to control nature to ensure more extensive food and energy production. But nature seemed so inexhaustibly big and powerful, little if any thought was given to making sure that nature's capacities were not depleted, polluted, or even destroyed. As English anthropologist Gregory Bateson summarized:

When you narrow down your epistemology and act on the premise 'What interests me is me, or my organization, or my species,' you chop off consideration of other loops of the loop structure. You decide that you want to get rid of the by-products of human life and that Lake Erie will be a good place to put them. You forget that the eco-mental system called Lake Erie is part of your wider eco-mental system – and that if Lake Erie is driven insane, its insanity is incorporated in the larger system of your thought and experience. [17]

The creativity of Modernity, in the manifestation of capitalist techno-science and industry, essentially sought to dominate the natural environment for the benefit of humans. The pollution of great factories and cities was conveniently disposed of in rivers and oceans, with dire consequences. They were the equivalent of a rubbish bin. Context was essentially an afterthought. For all intents and purposes, Modernity operated with a closed system view of the world.

A more relational, open systems, complex view sees system and environment in an interactive, mutually constitutive role. [18] In the twenty-first century, contextual, relational, and processual creativity is manifesting in fascinating ways. One example is Biomimicry, the development of sustainable human technologies based on nature. Modern engineering was based on a machine (and therefore artificial) model. Biomimicry is engineering inspired by nature. [19] The relationship is based on partnership rather than domination. As an example, ecological designers John and Nancy Jack Todd have created 'living machines'. [20]

A living machine can be created in a school for purposes of waste disposal. Instead of using the traditional approaches, the Todds create an ecosystem using diverse communities of bacteria and other microorganisms, including living creatures such as algae, plants, trees, snails, and fish. A school's sewage disposal therefore takes the form of a small ecosystem with the appropriate living organisms that turn sewage into clean water by consuming the various pollutants. [21] This approach does not only take the environment into account in order to avoid pollution, but actively works on developing a generative ecosystem that enriches the community as well as the natural environment.

Underlying this approach is ecological design, which involves learning from, and collaborating with, nature to deal with human challenges. [22] Ecological design differs from the design and creativity of modernity because it approaches the relationship between system and environment as one of partnership rather than domination. [23] Creativity therefore in this new view is deeply relational and contextual. The focus is not on the creation of an object that can be abstracted from the environment, but rather on a relational, embedded, contextual creativity where the environment itself is the creative process and product.

AND MOST IMPORTANTLY, ECOLOGICAL DESIGN IS A FORM OF CREATIVITY THAT STARTS FROM THE POINT OF VIEW THAT THE ENVIRONMENT ITSELF MUST REMAIN AND INDEED BE MADE MORE GENERATIVE. THE UNDERLYING DESIGN PRINCIPLES SHOW MUCH PROMISE FOR THE FUTURE OF CREATIVITY AND INNOVATION.

Transforming Creativity

Today dramatic changes are occurring in the way creativity is conceptualised by scholars, and also in the way it is experienced by younger generations. [24] Postmodernism in its various forms led to new ways of conceptualising self, society, production, art, science, and creativity. [25] In art and entertainment we see this in a shift to what has been called a participatory culture, which involves a blurring of boundaries between 'artist' and audience. [26] The seemingly trivial example of karaoke provides a glimmer of how entertainment now involves greater and active audience participation, and where in fact the lead role in the performance is taken by a participating 'audience' member. Wikipedia is another example of the, admittedly controversial, 'wisdom of crowds'. Video games like LittleBigPlanet have users design their own series of levels. According to Jenkins, participatory culture involves a quite dramatic shift from individual expression to community involvement.

Creativity research now includes a strong emerging focus on everyday creativity rather than on 'eminent creatives' or major contributions and not limited to the

arts and sciences. [27] The notion of everyday creativity suggests creativity can occur in everyday life, and does not have to take the form of a major work of art or scientific discovery. This opens up the possibility of the recognition of creativity as a phenomenon that can permeate every dimension of life. The Where of creativity is now potentially everywhere. There is also an increasing recognition of group and collaborative creativity, which can be found in new research on innovation, group creativity, jazz, and an increasing appreciation of ‘the wisdom of crowds’ as opposed to an exclusive focus on the individual genius. [28]

Millennial college students associate creativity with everyday activities, and with social interactions. [29] Whereas for Baby Boomers, creativity came from ‘eminent creatives’ in the form of the guitar of Jimi Hendrix or the pen of Ken Kesey or Thomas Pynchon, in today’s ‘participatory’ culture the focus is not so much on ‘eminent creatives’, but on participatory processes in video games like Beaterator, and the Garageband music application. [30] Individuals share their own music – music they have created, not just that of established bands – over the web and jam virtually. And while this is being viewed as the death-knell for traditional business models of music production, new, mostly web-based models are emerging, and it remains to be seen how the participatory culture will transform the arts.

The new participatory culture has been likened to a networked return to an earlier form of creativity, when amateurs engaged in what we now call ‘creative’ activities at home and quilted, told tales, played piano, and so on, because entertainment was not directly available in their homes through the radio, television, internet, and so on. [31] Twentieth century technology arguably created an essentially passive culture of art and entertainment consumers. Trends suggest that now there may be shift, a return to a cyber-amplified and networked everyday creativity, now with technology that allows for active participation, and where file sharing can involve, for instance, musical collaboration across vast distances. [32]

**THE IMPLICATIONS OF THE SHIFT TO A NEW, IF NOT AS YET
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We have seen hints of the implications for the environment and the arts. In the business world, as innovation becomes an increasingly central competency for organisations, the importance of collaboration and creating work environments that foster creativity has led to more research on collaborative creativity and on environments that foster rather than inhibit creativity and innovation. [33] The Modern organisation, with its roots in the Americans Frederick Winslow Taylor, a mechanical engineer and Henry Ford, the industrialist, was not designed for creativity, innovation, or collaboration. [34] Taylor referred to what we now called groups as ‘gangs’ and discouraged communication, essentially working on a divide

and rule principle. Taylor's guiding metaphor was the Machine, and machines do not innovate or collaborate. The machine's designers do, as the *Deus ex machina*. In highly innovative organisations creativity is a distributed, participatory process, and the organisations are designed so that ideally every member can innovate. [35]

The crucial question now is whether this 'everyone, everyday, everywhere' creativity will lead to a growing narcissism and consumerist self-absorption that will make the 'Me Generation' seem positively altruistic, or whether it can be channelled this creativity towards worthy human aspirations. At this point, the jury is out, with wildly different prognostications, but there are signs of hope in the emerging contextual and collaborative forms of creativity. [36]

The move towards collaborative, participatory, or grass-roots creativity has implications for the future, and for how we envision the future. If the metanarratives of Modernity are indeed gone and being replaced by Lyotard's *petits recits* or 'little narratives', we could say this mirrors the shift from a 'great man' and 'great narrative' creativity to a more every day, every(wo)man creativity, from a 'universal' to a local creativity. [37]

Participatory Visions of the Future

The Dutch futurist Fred Polak wrote that,

the rise and fall of images of the future precedes or accompanies the rise and fall of cultures. As long as a society's image is positive and flourishing, the flower of culture is in full bloom. Once the image begins to decay and lose its vitality, however, the culture does not long survive. [38]

Whatever we may ultimately think of Polak's controversial thesis, his statement is provocative, and provides one very interesting entry point into postnormal times. The US and much of Europe are facing what Morin calls a crisis of the future, and there is much talk of 'decline.' [39] The anxiety many Europeans and Americans are experiencing could be attributed, therefore, not only to the more obvious issues such as the economy, terrorism, environmental degradation, immigration, and so on, but also to a larger sense of vision and direction for the future. Today's emerging generations are experiencing lowered expectations: they fear – and expect – their standard of living will be less than that of their parents, and that life will be far more difficult and uncertain for them, not to mention, actually shorter. And yet at the same time, they are more ambitious than their predecessors. [40]

Polak's thesis about the image of the future raises a big question: what's next? What can we hope for? What lies beyond this crisis? Now that 'progress' has become an unfashionable term, we are also left with a lack of a sense of direction, and no sense of what constitutes something better. What has happened to the image of the future? Drawing on popular culture, and particularly science fiction, we can see how images of the future informed our vision of what lies ahead. [41] In the 1950s and

1960s, a whole world of science fiction imagery promised a shining, silvery future. Men and women in silver space suits were conquering the solar system, enjoying space odysseys, getting lost in space, and occasionally having to address pesky monsters from outer space or black lagoons. The 'hard' science fiction typified by the American writer Robert Heinlein stressed the science and technology driven nature of the future. Looking back on these images of the future one notes that American science fiction in those days tellingly had no room for people of colour or, for that matter, for nature, unless it was in the form of monsters.

IN THE 1970S, 1980S, AND 1990S THE UTOPIAN ASPIRATIONS OF THE 1950S AND 1960S TURNED DYSTOPIAN, AS THE SEX PISTOLS SANG 'ANARCHY IN THE UK' WITH, PERHAPS PROPHETICALLY, 'NO FUTURE'.

Cinema brought us *Soylent Green*, *Mad Max*, *Blade Runner*, and *Gattaca*. The appropriately named cyberpunk fiction of the American Canadian writer William Gibson and others, presented bleak futures. Cyberpunk precursor, the American writer Philip K. Dick's, future worlds drifted uncomfortably between mysticism and authoritarianism, metanoia and paranoia. As of 2010, the future seems to have stalled at 2012, a year that in the Mayan calendar is said to coincide with a cataclysmic transformation. From utopian technology to dystopian haves and have-nots we have ended up on a mythological date. The 2012 phenomenon is perhaps best captured in Pinchbeck's *2012*, a bizarre and fascinating tale that ranges from psychotropic drugs to crop circles to Mayan prophecy. [42] Categorized in non-fiction, it reads not unlike a Philip K. Dick novel.

The 2012 phenomenon suggests we are unable to envision a new world. In 2010, 2012 has become the mythical wall where the imagination of the West comes to an abrupt end. From 'hard' science-fiction to 'hard' techno-psychedelic mysticism-fact, extra-terrestrial visions interwoven with chaos theory and neurotheology. 2012 is symbolically the point at which the imagination fails. Where do we go from here? What can the West dream of? And this is not strictly a Western issue. The economies of China and India are moving at a great pace, but we have to ask, towards what? From the Middle East to Africa to Latin America this has become a global issue, a question for our planetary culture, and one that can emerge as we – meaning all humans – become aware of our interconnectedness and our community of destiny, in one of Morin's typically complex formulations. [43]

When viewed from this perspective, the sustainability movement is working on 'saving the environment', but, perhaps because of the incredulity towards any global normative scenarios, there is no larger vision of an alternative future in which there is truly a different relationship between humans and the environment, and how that plays out globally in terms of the economy, our cities, in our everyday lives. We are left with the hope that we will not destroy the environment and ourselves, but it

is not clear what we will be left with and whether it is worth striving for. In Polak's terms, the West's image of the future has not just decayed, but vanished. And as we have seen, today's youth in the West has to look forward to a future that has been painted as almost inevitably less healthy and less wealthy. Whether it will be wise or not does not seem to enter the picture.

The problem is also that we are not clear how to think about the future, and how to envision the radical nature of some of the changes that are required. Morin has stated that,

we need a kind of thinking that relinks that which is disjointed and compartmentalized, that respects diversity as it recognizes unity, and that tries to discern interdependencies. We need a radical thinking (which gets to the root of problems), a multidimensional thinking, and an organizational or systemic thinking... [44]

In order to address the complexity and radical nature of our Postnormal Times, we need to develop new forms of education and imagination. [45] A kind of thinking that embraces complexity and contradictions, does not recoil from chaos, and a willingness to envision alternative futures. Morin's efforts towards 'complex thought' – a kind of thinking that embraces paradox, complexity, and uncertainty are invaluable here. [46] But along with the capacity to think about complexity without simplistic reduction and polarisation that mutilates the very web of interconnections that weaves complexity, what is also needed is the ability to engage in complex dialogue. In other words, to address complex, chaotic, and contradictory issues and be able to dialogue about them in a civil and generative manner with others. This means ways addressing humanity's most pressing issues in a context of creative collaboration in which complexity does not become lost in the rhetoric of argument and debate in favour of simplistic slogans and either/or logics. As anxiety rises over the complexity, chaos, and contradictions of postnormal times, it is increasingly apparent that there is also a rise in polarising, exclusive rhetoric, and an unwillingness to listen or dialogue. There is, rather, an increasingly bellicose, authoritarian response, which precludes any social creativity by imposing a simple order, often through scapegoating and polarisation. [47]

The social creativity of complex dialogue can involve grass-roots efforts to explore the future together, to envision alternatives, because this also means learning to talk across differences in ways that see difference as the source of creativity rather than mutual destruction. A complex world does not merely require the ability to address complexity individually, to be able to think about it and think it through, but it also requires the ability to engage in dialogue in a way that reflects this complexity, and to envision complex and pluralistic futures. This in turn requires what was lacking from the creativity of Modernity, namely generative environments where creativity, exploration, hope, and dreams of a better future can be nurtured and developed collaboratively. This is really a form of complex ethics,

which is inspired by the Austrian American scientist Heinz von Foerster's Ethical Imperative: 'act always so as to increase the number of choices'. [48]

What would a 'better future' look like? Can we conceive of flourishing, positive images of the future? We have been told about the postmodern incredulity towards metanarratives, the rejection of the idea of progress. [49] Incredulity towards metanarratives and disenchantment with progress do not mean that we should reject more global assessments of what used to be called 'the big picture', or that there can be no such thing as human betterment. No unquestioned faith in the power of science, religion, revelation, or communism perhaps. An understanding of the role of uncertainty, complexity, contingency, and human fallibility, and hence an awareness that there is no predetermined path. [50] No security in the 'ultimate,' 'absolute' statement. And no need to stop thinking and questioning, either. This may be viewed as a catastrophe from the authoritarian perspective, but it can also be viewed as a call for greater human creativity and responsibility. [51]

With the loss of faith in science and technology and politics to lead the West into the future, with the traditional touchstones questioned, it seems there is uncertainty not just about the future, but about how even to begin to think about the future. There is also considerable anxiety about whether there will even be a future, based on the interest in apocalyptic predictions. But surely, we should not throw out the baby with the bathwater. For a tragically high percentage of the world's population, access to potable water is key to a better future. The economic system, education, the environment, these are just some of the key problems facing humanity. The problem is not that the West has it so good it cannot think beyond its present blissful state. It is that the problems are so radical, they require stepping beyond the present ways of thinking. They also require a deep reflection on the nature of the Good, and the nature of human nature and human potential. [52]

The new collaborative creativity may be one way of beginning to stimulate the collective imagination. As the changes in creativity in the twenty-first century suggest, the generation of images of the future will not be confined to a priestly class of artists and futurists. The new, participatory, grass-roots creativity can be mobilized for the creation of better futures. Envisioning the future has historically been a task left for artists or futurists. Asking the big questions has historically been left to philosophers. The time has come for a process of grass-roots philosophical futurism, drawing on some of the techniques of scenario planning to envision alternative futures. [53] Very important in this process of envisioning *petits recits* is ensuring the participation of groups that have been traditionally underrepresented in the discourse of the future, including women, so-called 'minorities', and young people, and the emphasis that this should be a creative process – not a deterministic techno-forecast, but a creativity as ethical aspiration and ethics as creative aspiration. [54]

One simple way to begin might simply be to stimulate the development of *petits recits*, with community collaborative creativity sessions in which citizens are invited to share their personal and/or collaborative vision of what a better world ten

or fifteen years hence might be like, and then dialogue with others in small groups to weave the visions together and look for common themes and patterns. [55] A variety of methods can be drawn upon to structure the process of collaboratively envisioning alternative futures, from Open Space Technology to Search Conferences to Scenario Planning, with appropriate modifications to suit the context. [56] The scenarios with visions of desirable futures can be articulated by a variety of individuals and groups all over the world and presented through narratives, video skits, illustrations, and other media, again ensuring the representation of the traditionally underrepresented.

THESE MINI IMAGES OF THE FUTURE CAN BE SHARED ON THE WEB TO PROMOTE DIALOGUES AND THE EXCHANGE OF IDEAS AND RESOURCES, AND ABOVE ALL TO TRIGGER AND MOBILISE THE IMAGINATION OF OTHERS TOWARDS DESIRABLE FUTURES.

This is merely one suggestion to address the vision gap. The larger point is the emergence of a new, contextual, collaborative, emergent, networked, participatory creativity, and the implications it can have for the future. There really is an opportunity now for human beings to join together to envision new, desirable futures together.

Creativity is a vital human capacity for postnormal times. In this reflection on Sardar's work, I have outlined some of the ways in which creativity itself appears to be changing, and some of the implications of these changes. A collaborative, contextual, complex creativity will be a vital ingredient in coping with the present and creating the future. Creativity will cease to be a somewhat magical phenomenon that stands outside the purview of ethics, or of philosophical reflection (as Popper felt it should be). In fact, creativity should be informed by, and in turn inform, philosophical reflection. Postnormal creativity will involve above all the development of a new sense of responsibility for our creative actions, a responsibility informed by both an awareness of the extent to which creativity is already operative in our daily lives and choices, and the extent to which it assists us in moving towards a vision of a more collaborative, ecological, diverse world. As we become responsible for our creativity, we must also face our responsibilities with a creative spirit.

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AFTERTHOUGHTS

Ziauddin Sardar

'The last normal photo.'

In May 2020, Robyn Vinter, a journalist based in Leeds for the Yorkshire Post, started the hashtag #lastnormalphoto. [1] It went viral: she received thousands of replies, with people across the world posting the last picture they took before the Covid-19 global lockdown. Amongst the photos were music concerts, football matches, shopping, restaurant dinners, plates piled up with food glorious food, people meeting elderly relatives, revellers on the beach, fashion, and a truckload of celebrity selfies. Other hashtags followed, including #happiertimes, #beforesocialdistancing, and #misstheolddays, all confirming an instant nostalgia for something called "the normal."

But what is this 'normal' that is so desired by so many people? Conspicuously missing from the last normal photos are pictures of people living from hand to mouth, plates with little or no food, migrant and refugees living in squalor, and the homeless living on the streets. We do not see this as 'normal'. But as Pope Francis I points out, this too is normal for a substantial segment of the global population – a reality we cannot deny: 'to discover such a large number of people who are on the margins...and we don't see them, because poverty is bashful... they have become part of the landscape; they are things'. [2] There is a great deal more that is 'part of the landscape' that we do not see as normal: devastation caused by climate change; the megafires in Australia and the United States; cities, such as Male and Jakarta, drowning underwater; the rising tide of far right in Europe, the United States, India, and elsewhere; gross inequality within and between nations; the incompetence of political and business elite; authoritarian regimes arresting, beating, or torturing dissidents; and the hoarding of global wealth in ever fewer hands. The nostalgic perception of pre-Covid-19 days is thus a rather truncated, myopic normal. The normal, as Indian writer and activist, Arundhati Roy, points out, 'is the wreckage of a train that has been careening down the track for years'. [3] Indeed, from the perspective of those who are suffering from the direct impact of climate change, or migrants and refugees fleeing oppression, or millions of those who lost their jobs due to automation and AI, or those millions who are thrown in internment camps or declared non-citizens simply because of their faith, the pre-Covid-19 world was rather abnormal: this is not how things ought to be, you can hear them scream.

Return to Normal

The clamour for life to get 'back to normal', as evident on the front pages of newspapers as on the news channels and social media, is a demand for return to the status quo ante: the 'normal' state of affairs before Covid-19. But as graffiti in Hong Kong, and elsewhere, declared: 'there can be no return to normal because normal was the problem in the first place'. Indeed, way back in 1983, singer Bruce Cockburn told us that the normal gets worse and worse:

Strikes across the frontier and strikes for higher wage
 Planet lurches to the right as ideologies engage
 Suddenly it's repression, moratorium on rights
 What did they think the politics of panic would invite?
 Person in the street shrugs 'Security comes first'
 But the trouble with normal is it always gets worse. [4]

For Christina Nichol, a California-based novelist, 'normal life' was certainly getting crueller and crueller. [5] She had to live through 'the last year's fire, and the fires the year before that, and the fires year before that'. During 2018, she informs us, 'fires burned nearly two million acres in California. And in 2017, fire ravaged a significant portion of my hometown. When the university where I teach recently closed for the semester because of shelter-at-home orders, it was the fourth closure in three years.' The Indian intellectual Pankaj Mishra suggested that even bigger 'systematic crisis' lay ahead, and as such, return to imagined normal was not on the cards. [6] American journalist Peter Baker concludes his 'long read' article in *The Guardian*, 'we can't go back to normal', by suggesting 'we are not watching a movie, we are writing one, together, until the end'. [7]

What then lies at the end of the Covid-19 tunnel depends on your perception and outlook – whether you are a pessimist or an optimist, politically on the left or the right, realist or a dreamer, or looking at short-term or long-term futures. In the short run, the 'the new normal', the health journalist Alice Park tells us in *Time*, means 'the death of the handshake', 'rethinking how self-isolation fits into broader policy decisions', and 'microbial threats like coronaviruses will inevitably move from the bottom to the top of public health priority lists, and the danger of infectious diseases will loom large on our collective conscious'. [8] According to numerous reports in *The Guardian*, the 'new normal' will include social distancing for years to come, more people working from home, common use of face masks, swift shutdowns, health checks when flying, and end of business travel – namely, the old normal with a few restrictions. Beyond that, the optimistic view suggests that the experience of Covid-19 could enhance our understanding of climate change, there will be mass protests for change, and 'moments of solidarity' could be transformed into 'the broader political sphere'. The pessimists believe that surveillance will intensify, authoritarian regimes will become even more draconian, distrust between government and citizens will increase, neoliberal capitalism will run wild,

and there will be more deaths and suffering worldwide. However, it could take some time before we are out of the crisis. As British journalist Ed Young suggests in *The Atlantic*, the 'end game' has three possible outcomes. First, there is an international unity and collaboration to concurrently stamp out the virus, but this does not look likely. Second, people develop 'herd immunity', but this will 'come at a terrible cost', and 'it would likely leave behind many millions of corpses and a trail of devastated health systems'. The third potential outcome is that the virus is extinguished here and there until a viable vaccine is developed; something that may take 'very long'. [9] We will have to learn to live with the virus until such time.

The Changing Normal

Whatever happens, Israeli historian Yuval Noah Harari argued in a much-quoted article in *The Financial Times* that we will never be the same again. Short 'emergency measures will become a fixture of life', we could 'give legitimacy to a terrifying new surveillance system', and, on the upside, we would probably trust science and expert opinion much more. [10] British journalist Patrick Wintour reported that in Europe, the United States, and Asia almost everything is up for debate: 'the trade-off between trashed economy and public health, the relative virtues of centralised or regionalised health systems, the exposed fragility of globalisation, the future of the EU, populism, the advantages of authoritarianism'. [11] He cites President Emmanuel Macron of France who declared: 'many certainties and convictions will be swept away. Many things we thought were impossible are happening.' The most obvious 'impossible' thing that is all too evident is the return of the big state after a thirty-year retreat. In many countries, states have provided support for its citizens, forced by Covid-19 to isolate; in some countries, even small and big businesses have been rescued and stopped from going bankrupt.

NATIONALISATION, ANOTHER RECENT 'IMPOSSIBLE', IS NOW ON THE CARDS: SPAIN CONSIDERED AND THEN POSTPONED NATIONALISING PRIVATE HOSPITALS, FRANCE IS KEEN TO NATIONALISE LARGE BUSINESSES, AND IN BRITAIN, THERE IS A STRONG POSSIBILITY OF NATIONALISING SOME PARTS OF PUBLIC TRANSPORT. HOWEVER, IT MAY TAKE A FEW YEARS BEFORE WE CAN DECLARE THE END OF COVID-19 DAYS.

In a massive dossier, with contributions from a host of American and European academics and writers, *Politico* magazine provides a long catalogue of how 'Coronavirus will change the world permanently'. The suggestions from the good and the great include the obvious – we will be more reluctant to touch people, there will be less communal dining and more cooking, we will work more from home, and virtual meetings will become common – to not-so-obvious positive

and negative predictions. These include polarisation and individualism: ‘the coronavirus pandemic marks the end of our romance with market society and hyper-individualism’. Or, we could also go the other way: become less communal and more authoritarian. ‘Regulatory barriers to online tools will fall’, and Big Tech would become omnipotent. Governments could become Big Pharma and themselves research and manufacture medicines and vaccines. Cultural critic Virginia Heffernan suggests we will be released from ‘the tyranny of habit’: our fantasy of ‘optimising’ life with emphasis on ‘peak performance, productivity, efficiency’ could give way to ‘stop taking the streetcar, working for money, bowling, and going to the movies’, and devote more time to ‘imaginative and unconventional’ pursuits. Canadian American filmmaker Astra Taylor points out that the rules that have shaped our lives are now mostly irrelevant. And, Matthew Continetti, journalist and resident Fellow at the American Enterprise Institute, predicts that we are heading for a ‘paradigm shift’ which will actually change our understanding of change. [12]

The dominant perception of the normal is also challenged by a short campaigning film by UNESCO. Shown on several networks (including NBC, Euronews, Al Jazeera, France Televisions, Canal+, IPS, as well as on YouTube) across the world, it juxtaposes certain facts we take for granted with other facts that we do not regard as normal. For example:

1. Air pollution causes eight million early deaths a year – normal
2. During Covid-19, Himalayan peaks become visible for the first time in thirty years – not normal
3. One child dies of pneumonia every twenty-nine seconds – normal
4. Coronavirus leads scientists and tech companies to open source their patents – not normal [13]

The film concludes by declaring: ‘now is the time to build a better normal’ and suggests: ‘it all starts with education, science, culture, information’. One can logistically ask: are the existing values and structures of science and education, or the dominant paradigms capable of producing a ‘better normal’? And is a ‘better normal’ actually *a*, or indeed *the*, new normal?

The New Normal

While Covid-19 has made ‘the new normal’ ubiquitous, the term itself is not particularly new. It has a long history in education going back to the late nineteenth and early twentieth century when American textbooks were rewritten, undated, and modernised. There we will find such titles as *The New Normal History of the United States*, [14] *The New Normal Music Course*, [15] and *The New Normal Mental Arithmetic*. [16] More recently, in a 2003 report, the US NGO Human Rights First described the post-9/11 American landscape as ‘the new normal of US governance’, which is defined by ‘the loss of particular freedoms for some, and worse, a

detachment for the rule of law as a whole'. [17] So, some forms of the new normal have existed for some time!

However, what can we say about the post-Covid-19 new normal? There has been a veritable avalanche of scenarios and prediction of potential futures from various outlooks and perspectives. One can argue that the new normal is what you want it to be, as can be seen in *Aftershocks and Opportunities: Scenarios for a Post-Pandemic Future* where futurists provide a variety of predictions and forecasts on a range of subjects, from an array of perspectives. But most of the scenarios in *Aftershocks and Opportunities* and in other places are firmly focused on economic recovery. For example, foresight experts Rohit Talwar, Steve Wells, and Alexandra Whittington, the authors of *Aftershocks and Opportunities*, suggest that 'the shape of economic recovery' gives us four scenarios:

1. The Long Goodbye (poorly contained pandemic, deep and prolonged downturn),
2. The VIP Economy (poorly contained pandemic, vibrant economic rebound),
3. Safe but Hungry (eradication of the pandemic, deep and prolonged downturn),
and
4. Inclusive Abundance (eradication of the pandemic, vibrant economic rebound). [18]

McKinsey & Company, the global management company, offers a similar four-stage analysis for emergence of the new normal. The first stage, resolve, will require governments and businesses to assess the scope, scale, and depth of action that is required. The second state, resilience, a period of financial stress, requires businesses to develop plans to accommodate the shock. Stage three, return, requires supply chains to be strengthened so the economy can return to pre-Covid-19 levels of production and sales. And finally, stage four, re-imagination, where shifts have to be made on the way we live, work, and how we use new and emerging technologies. [19] In contrast, the ecological economist Simon Mair paints a somewhat different picture of the new normal as four possible futures. On the BBC Future website, Mair asserts that the dominant economic paradigm is based on two interlinked beliefs: 'the market is what delivers a good quality of life, so it must be protected' and 'the market will always return to normal after short periods of crisis'. Mair wants to emphasize value and centralisation in shaping his post-Covid-19 four potential futures:

1. State capitalism: centralised response, prioritising exchange value
2. Barbarism: decentralised response, prioritising exchange value
3. State socialism: centralised response, prioritising the protection of life
4. Mutual aid: decentralised response, prioritising the protection of life.

Mair favours state socialism where 'the state steps in to protect the parts of the economy that are essential to life: the production of food, energy, and shelter for

instance, to ensure that the basic provisions of life are no longer subject to the whims of the market' and 'mutual aid' future where 'we adopt the protection of life as the guiding principle of our economy' and 'individuals and small groups begin to organize support and care within their communities'. [20]

Whatever the new normal, what we can say about it with some confidence is that it is a contested territory: a futures-oriented struggle over different visions from different perspectives. The very concept of the new normal is a fantasy that provides a false sense of certainty in a time of deep uncertainty, an intentional move to remain at the level of surface uncertainty when postnormal times requires delving into the depths. Or, as Canadian critical theorist Max Haiven puts it, the post-Covid-19 future will be 'defined by either the desperate drive to "return to normal" or a great refusal of that normal'. [21] Indeed, if the new normal is simply an extension of the neoliberal, free-market, technocratic worldview, then Haiven's warning is worth heeding. 'In the wake of the pandemic,' he writes,

there will almost certainly be efforts by those vastly enriched and empowered in the last decades, notably in the intertwined technology and financial sectors, to leverage their influence and resources, as well as the weakness and disarray of traditional institutions, to lead the reorganization of society along neo-technocratic lines. They will continue to generously offer the services of their powerful and integrated surveillance, logistics, financial and data empires to "optimize" social and political life. This corporate dystopia can wear a human face: basic income, hypervigilance for new epidemics, personalized medicine. Already they arrive, bearing gifts to help us in this emergency: tracking disease vectors, banning disinformation, offering states help with data and population management. Underneath the mask will be the reorganization of society to better conform to the hyper-capitalist meta-algorithm which, though driven by capitalist contradictions, will essentially be nonfeudal for most of us: a world of data and risk management where only a small handful enjoy the benefits. [22]

The new normal, then, is the same old way of colonising the future. It could result in the tech giants – what American futurist Amy Webb describes as The Big Nine (Google, Amazon, Facebook, Microsoft, IBM, Apple, Technet, Baidu, and Alibaba) – [23] becoming even more powerful and entrenched than before the crisis started. Indeed, as Chris Meserole, of the Brookings Institution points out, 'techlash' could evaporate into thin air: as we become more and more reliant on smartphone data location, Zoom meetings, and shops online, anti-trust activity against the largest technology companies will wane, and regulation of these giants will be eased or may even disappear. [24] The new normal, then, could turn out to be, to use the words of Haiven, a 'vindictive normal'.

Many of the optimistic scenarios and visions for a more just and equitable post-Covid-19 world underestimate the resilience of neoliberal capitalism. It has deep roots and can bounce back even after a deep recession; ‘the market will always return to normal after short periods of crisis’ may be a belief, as Mair notes, but it is a belief based on entrenched economic system with formidable momentum. In general, systems – including global economic system – are structured to return to established, entrenched norms.

THE COVID-19 PANDEMIC HAS LOOSENED OR DECOUPLED THE SYSTEM, UNHINGED ASPECTS OF SYSTEMS' INTERCONNECTIONS. IT MAY EVEN HAVE FREED UP SPACE MOMENTARILY FOR ALTERNATIVE ACTIONS. BUT THIS IS A TEMPORARY PHENOMENON; THE SYSTEM WILL READJUST RAPIDLY TO RE-SOLIDIFY IN OLD PATTERNS.

Prodigious entrenched resources are focused on re-inscribing old systems. The Covid-19 affair is an extreme event, defined as ‘a dynamic occurrence within a limited timeframe that impedes the normal functioning of a system or systems’, [25] which has to be seen in all its complexity, but it does not necessarily mean that it will overturn the entire system.

There is, however, a probability that the new normal could turn out to be even worse than the old normal!

The Complex Normal

There is, however, something special about the Covid-19 pandemic. We have never experienced anything like it in living memory. It has brought the entire world to a screeching halt. It has shown, as journalist James Meek suggests, that ‘the boundary between the normal and abnormal, between the state of social security and social breakdown, is elusive’. [26] It has displayed how science and ignorance go hand-in-hand. It has demonstrated, to the extent that even the most myopic can see, that the curtailment of human activities has a profound impact on the environment. [27] It has exposed the belief that ‘we have achieved mastery over nature’ and thus can ‘exercise control over events’ as a superannuated illusion. [28] It has generated a host of ‘new moral questions’, ranging from the ethics of social distancing; [29] to the interaction between climate chaos, ecosystem collapse, and the pandemic; [30] to the importance of communitarian ethics. [31] And, what is particularly special about the pandemic is that it is the first global, clearly recognisable, postnormal event.

In her introduction to the special issue of *Futures* on Postnormal Times, the late anthropologist Merryl Wyn Davies asked: ‘are we there yet?’ Davies argued that evidence for postnormality was not particularly strong and that perhaps it

was too early to suggest that ‘the specific features of postnormal times (are) unlike anything encountered in the past’? [32] This question has been answered by a number of ‘extreme weirding’ events over the last decade. [33] Indeed, as *The New York Times* columnist Farhad Manjoo has noted, ‘the world has become unmoored, crazier, somehow messier. The black swans are circling; chaos monkeys have been unleashed.’ [34] But if there was still any doubt about the arrival of postnormal times, Covid-19 has resolved them. [35]

Postnormal times is an in-between, transitory period but how long the transition will last is anyone’s guess. The transition is from what we have thought of, and may still think of, as normal, what we may contemplate as the new normal, the multitudes of new normals that may emerge in the future, toward a radically different world. As such, all the normals and new normals will be integral parts of the extensive age of postnormal times. Covid-19 has clearly moved the planet toward the edge of chaos, but it has not actually brought us to the tipping point. There will be other postnormal events in the future, each nudging the globe closer and closer to the edge of chaos. Right at the very edge of chaos, the tipping point itself, there are only two options: collapse or a new order.

**WHILE POSTNORMAL TIMES ARE A PRODUCT OF OUR COMPLEX,
INTERCONNECTED WORLD, WITH INSTANTLY AND CONSTANTLY
GENERATING FEEDBACK LOOPS, COMPLEX SOCIETIES THEMSELVES ARE
NOT PARTICULARLY UNUSUAL.**

As anthropologist Stephen Lansing and geneticist Murray Cox show in *Islands of Order*, emergent complexity is evident in even historic societies presumed to be ‘simple’. They look at the historic societies of the Malay archipelago and the wider Pacific; examine language, kinship, large-scale population movement, genetic makeup, cultural change, and racial topology; and the impact of colonialism and show that the complex patterns of these societies are not random; rather, order and chaos emerge out of non-linear dynamics or complexity. In a non-linear, complex situation, states of stable equilibrium – such as persistent language communities – ‘appear as Islands of order in a sea of change’. [36] Out of equilibrium, social dynamics, often produced by contradictions within societies, lead to chaos and collapse. Collapse can occur for many reasons from resource depletion and environmental change but, as the American anthropologist Joseph Tainter demonstrates in his monumental study, *The Collapse of Complex Societies*, complexity is a ‘continuous variable’. [37] Both a sharp increase as well as a sudden decline (as we witnessed with the global Covid-19 lockdown) in complexity can lead to collapse. Complexity makes it more and more difficult for organisations to function adequately. Eventually, complex societies reach a point of ‘declining marginal returns’ when things begin to fall apart, leading to collapse.

To some extent, it does look like we are following the footsteps of the Mayans, the Aztecs, the Chacoans, and the Roman Empire. As the American historian Patrick Wyman suggests in an article in *Mother Jones*, we are witnessing the fall of an empire: ‘the end of a polity, a socioeconomic order, a dominant culture, or the intertwined whole’. [38] The ‘empire’ in question is Western civilisation, which requires limitless resources in a finite earth to keep itself afloat. But in *This Civilization is Finished*, philosopher Rupert Read and sustainability expert Samuel Alexander argue the global capitalist system, the foundation of this civilisation, ‘will come to an end, destroyed by its own ecological contradictions’. [39] In *The Precipice*, moral philosopher Toby Ord marshals strong evidence in support of a string of existential threats: climate change, environmental damage, nuclear weapons, pandemics, ‘unaligned artificial intelligence’, nanotechnologies, and dystopian scenarios which can have self-fulfilling affect or even be desired by certain groups of people. [40] The “Declaration of Rebellion” by the global non-violent environment movement, Extinction Rebellion, declares that humanity is facing ‘our darkest hour’: ‘humanity finds itself embroiled in an event’ – sixth mass extinction, also known as Holocene – ‘unprecedented in its history, one which, unless immediately addressed, will catapult us further into the destruction of all we hold dear’. In the Extinction Rebellion handbook, environmentalist Jem Bendell suggests:

we should be preparing for social collapse. By that I mean an uneven ending of our normal modes of sustenance, security, pleasure, identity, meaning and hope. It is very difficult to predict when a collapse will occur, especially given the complexity of our agricultural and economic systems. My guess is that, within ten years from now, a social collapse of some form will have occurred in the majority of countries around the world. [41]

However, as futurist Jim Dator has repeatedly pointed out, we should not see all collapses as negative. Indeed, some types of collapses are essential for a major transformation to occur: for example, the collapse of capitalism, which Dator argues may be welcomed by those who desire an end to the ‘economic rat race’, the laborers and wage earners who struggle daily to put food on the table. [42] The collapse of destructive dominant paradigms may be necessary for new ones to emerge. Moreover, the postnormal condition has also brought certain societies to the threshold of collapse. The United States is unravelling fast, may descend into civil war, [43] or move toward fascism, [44] and could collapse suddenly. [45] The European Union too could be heading toward collapse. [46] We have witnessed the collapse of Syria due to civil war, the economic collapse of Greece as a result of the 2008 financial crisis, the collapse of the Rohingya through genocide, and the Maldives due to sea level rises. Many indigenous cultures and non-Western societies have experienced collapse during the last century. Digital media expert, Abigail De Kosnik, points out:

I am from the Philippines, a twice colonised archipelago, and I grasp very well that when a foreign people have arrived on your shores, taken over your lands and waters, banned your language, changed your names, killed and injured millions, forced you to convert to their religion, seized control of your economic, political and cultural systems, labelled you subhuman, and imposed colonialism and other forms of racial/ ethnic and national hierarchies, your society has known Collapse. [47]

It would thus be hardly surprising if most of the non-West felt a sense of relief with the collapse of Western civilisation. Actually, that date may not be too far away, as recent work at MIT, based on the World One computer model originally devised by Jay Forrester for the 1972 Limits to Growth study, predicts the 'end of civilization' around 2040. [48]

There is, however, a key difference between collapse of historic empires and civilisation and collapse that may greet us at the finale of postnormal times. Earlier collapses were societal, local, regional, and civilisational in nature. There may be similar collapses, in degrees or stages, in the future. Societies, economies, cultures, paradigms, and worldviews may collapse. But a universal Collapse – as De Kosnik points out, 'will not be confined to either Global North or Global South; it would be global Collapse.' [49] It thus presents an existential threat to both – humanity and the planet. When Western civilisation goes down, it will also take the rest of the people and the planet with it!

Transnormal

The challenge of postnormal times is to navigate from our current unstable state to another more structurally stable state without reaching the tipping point where overall Collapse of apocalyptic proportion causing immense misery and suffering becomes inevitable. This is a process of systematic movement leading to transposition: acts of changing relationships, structures, and values that interactively and collectively relocate humanity to a trans, or stable, state or realm of existence. Trans confirms the meaning of 'going beyond' the current positions in all fields of human behaviour, thought, and endeavours to reach a state of dynamic equilibrium. To go beyond – rise above, cut across, leave behind, and surpass – is also to prudently navigate our way to the other side of postnormal times. The world beyond postnormal times will be a radically different world; not so much a world of new normal, but a transnormal world. We do not know what it will look like, but we do know what we need to transcend to get there!

The transnormal has two dimensions: the logical imperatives needed to avoid the real possibility of collapse and the visionary element that involves the collective and collaborative visions of most, if not all of us, of viable, thriving futures of humanity on an ecologically healthy Earth. Here, I am concerned with the logical imperatives to avoid collapse and lay the foundations for wholesome and inclusive

social and cultural notions which could form the basis of futures' visions.

What exactly do we need to transcend? There is no lack of candidates in postnormal times. But let us begin with the black elephant that all, other than the most myopic, can see: planetary boundaries, of which climate change is only one limit. As the American author Jeff Goodell points out in *Rolling Stone* magazine, 'climate change isn't an "event" or an "issue". It's an era, and it is just beginning.' [50] The era began when we started to violate planetary boundaries. According to the Stockholm Resilience Centre, there are nine planetary boundaries which regulate the stability and resilience of the Earth system and bind us to a circumference within which we can survive and thrive: climate change, change in biosphere integrity (biodiversity loss and species extinction), stratospheric ozone depletion, ocean acidification, biogeochemical flows (phosphorus and nitrogen cycles), land-system change (such as deforestation), freshwater use, atmospheric aerosol loading (microscopic particles in the atmosphere that affect climate and living organisms), and the introduction of novel entities (such as organic pollutants, radioactive materials, nanomaterials, and microplastics). Four of these boundaries have already been crossed: climate change, loss of biosphere integrity, land-system change, and altered biogeochemical cycles, presenting a serious risk to the entire Earth system and the survival of humanity. [51] To transcend climate change is to return to the planetary boundaries – a journey that requires profound changes in all spheres of life – a logical necessity to avoid further turmoil, even collapse, and ensure sustainable survival of all life.

CLIMATE CHANGE, AND ASSOCIATED ENVIRONMENTAL PROBLEMS, IS A CONSEQUENCE OF HOW WE PERCEIVE AND TREAT NATURE. THE NOTION THAT NATURE MUST BE DOMINATED, INDEED TORTURED TO YIELD ITS SECRET, THAT EMERGED FROM WESTERN THOUGHT HAS NOW BECOME A UNIVERSAL PHILOSOPHY.

The emergence of Covid-19 has been described as a 'message from nature' by many environmentalists. However, the realisation that our attitudes to nature are producing an unsustainable world is not new. In its modern form, it can be traced back to the famous 1967 article, "The Historical Roots of Our Ecological Crisis" by the American historian Lynn White. 'What we do about ecology depends on our ideas of the man-nature relationship,' wrote White. 'More science and more technology are not going to get us out of the present ecologic crisis.' [52] White suggested a return to the metaphysics of Saint Francis of Assisi. A year later, in his 1968 book, *The Encounter of Man and Nature*, Iranian philosopher Seyyed Hossein Nasr argued that 'there is everywhere the desire to conquer nature, but in the process the value of the conqueror himself, who is man, is destroyed and his very existence

threatened'. [53] Nasr suggested a return to non-Western metaphysics of Islamic, Hindu, and Chinese traditions. Whether we opt for White's recommendation, or the Nasr option is beside the point; what is important is the realisation that metaphysics is 'the essential ingredient that's gone missing' from our attitude to nature. [54] So, transnormal is also trans domination of nature and requires us to reintegrate metaphysics into our approach to nature.

The unbridled exploitation of nature is a consequence of neoliberal capitalism, a system based on cruelty, competition, and contradictions, promoting extreme inequality. Capitalism monetises everything: human actions, desires, indeed human beings themselves as well as flora and fauna, and the environment to extract maximum value and profit. [54] It is a system based on the logic of perpetual growth and continuous linear 'progress' leading to rampant deforestation, devastating industrial agriculture, caustic intensive farming, and corrosive infrastructure developments. As the American author Edward Abbey has said: 'growth for the sake of growth is the ideology of the cancer cell'. [55] But it is also not a question of low growth or even zero growth; planetary boundaries now demand degrowth. Progress based on everlasting growth, which has brought us to the precipice, has to be abolished and replaced with homeostatic progress, a dynamic state of balance between human activities and ecological imperatives. Transnormal then is also trans capitalism, trans inequality, trans growth, and trans progress.

**THE NOTIONS OF PROGRESS, GROWTH, EFFICIENCY AS WELL AS
OUR CONTEMPORARY ECONOMIC THOUGHT AND FRAMEWORKS ARE
PRODUCTS OF CURRENT MODES OF KNOWLEDGE PRODUCTION.**

Contemporary knowledge structures with their associated disciplines are embedded in Western narratives and privilege and give unwarranted acclaim, dominance, and extension to Western culture and its products, at the expense of knowledge systems, ways of thinking, and cultural outputs of non-Western people. [56] However, knowledge production is changing rapidly. Knowledge production has now become complex and incorporates knowledge based on Big Data, dubious and opaque mathematical models, racialised artificial intelligence, weaponised disciplines, and what is described as 'forbidden knowledge' (such as genetic engineering and synthetic biology). It has thus acquired a strong toxic component – 'the smog of ignorance' which cannot be isolated or quarantined through existing disciplinary structures. [57] Knowledge production then has to embrace social construction of ignorance as one of its central themes; the role of ignorance as a methodology, as a tool for valuing and managing the unknown in science, technology, and medicine; the use of ignorance as power and as an instrument of oppression; ignorance as economic theory, risk management, and security studies [58] as well as strategic ignorance and the role of ignorance in foresight – all play a major role

in the production of knowledge. [59] We need to rethink what exactly is science and how it should function in 'the Anthropocene'. [60] Trans normal therefore implies transdisciplinary structures; a clear movement toward multi-, inter-, and transdisciplinarity; serious engagement with all varieties of ignorances; and generating new, more diverse and open discourses of knowledge. Transnormal also requires us to embrace what is uncommon or infrequent, what is unconventional and extraordinary, and come to terms with uncertainty. In a transnormal world, knowledge, ignorance, and uncertainty will be deeply integrated.

Toxic knowledge is also a by-product of technological determinism, the view that technology and innovation must proceed whatever the moral consequence to become the primary drivers of economic, social, cultural, and political change. This dogma turns technology into an ideology. As the economist Glen Weyl and computer scientist Jaron Lanier categorically state in the technophile *Wired* magazine, 'AI is an ideology, Not a technology', at its core is the 'perilous belief that fails to recognize the agency of humans'. [61] Similarly the promotion of synthetic biology, genetic engineering, and killer robots are based on instrumental rationality – the pursuit of ideological goals by any means necessary without moral qualms. 'Because our technological creations are challenging historical limits through climate change, artificial intelligence and synthetic biology', says the Chinese philosopher Yuk Hui, 'it is critical to re-examine the diversity of cosmotechnics, or how technology is infused with a worldview'. [62] To go trans from instrumental rationality and technological determinism is to explore 'how non-European thought and corollary ways of being can affect the development of technology.'

This brings us to the worldviews that have to be transcended to realise the transnormal: modernity and postmodernism. Modernity can be traced back to the Enlightenment, while postmodernism emerged in the 1970s. Both worldviews have shaped the world and brought us to postnormal times. As the English sociologist Anthony Giddens has shown in his classic work, *The Consequences of Modernity*, the social order of modernity is capitalistic in both its economic system and its other institutions. [63] Modernity 'ensures that political, military, and ideological power come together in hitherto unimaginably concentrated form'. [64] Postmodernism, with its emphasis on absolute relativism and the collapse of the grand narrative, has led to the fragmentation of the world, increasing strife and discord, and ushered in the post-truth regimes. It has served as a hand-maiden to neoliberalism and the 'death cult', as British comedian John Oliver describes it, of free market and has arrived at a globalised levelling of differences which threatens the extinction of culture altogether in what the Canadian author Richard Appinganesi has described as 'terminal post-culture'. [65] Both modernity and postmodernism are failed projects that have brought us to the postnormal condition. They function, to use the words of German sociologist Ulrich Beck, as 'zombie categories', which govern and direct our thinking, ushering us toward self-destructive outcomes. [66]

The Indian intellectual and cultural theorist, Ashis Nandy, described modernity as a secular theory of salvation. [67] Postmodernism attempted to replace modernity

by constructing secular liberalism as a new theory of absolutism. Both theories trap us in a manufactured normalcy field: a product of our perception of what is and what is not normal. The postnormal condition, as futurist Liam Mayo notes, 'is a cultural crisis owed to humanity's inability to move beyond a manufactured normalcy that perpetuates a familiar sense of present'. [68] Our desire for stability and certainty, 'to deemphasise change, and make all things normal, fundamentally expedites a sense of crisis', which itself 'nurtures ignorance and fosters uncertainty; the distinguishing characteristics of the postnormal condition'. Thus, the demand for a return to normal, or even an acceptance of a modified new normal, is a yearning for the safe bosom of the manufactured normalcy field.

To locate ourselves in a transnormal domain, we need to break the chains of the manufactured normalcy field and move beyond modernity and postmodernism. [69] This demands the creating of a radically novel cultural space that synthesizes the best of tradition and modernity; does not privilege any cultural standpoint or orthodoxy; and creates radically transformed social and cultural dynamics. Transmodernity provides us with such a framework.

Transmodernity and Mutually Assured Diversity

Transmodernity is based on the assumption that cultures do not, and have never, existed in isolation. All cultures interact, and all future actions are located in the interactions of cultures. [70] It is a concept designed to address the positive element of self-renewal and self-reorganization in diverse world cultures. It proposes to encourage change transculturally, and it is decentred in its scrutiny of trans cultures and characterised by a sense of mobility. Transmodernity aims to produce a trans discourse of knowledge which gives equal importance to knowledge systems of non-Western civilisations and cultures, including indigenous cultures, tacit and intuitive methods, and promotes the realisation that in a diverse and dynamic world, there are many ways to be human. It looks at cultural diversity 'on the move'.

Transmodernity offers the potential for new ways of looking at culture and shaping the world that goes beyond all our conceptions and perceptions of normal and pilots us in the direction of the transnormal domain. More specifically, the trans dimension of transmodernity stands for:

1. The continuous and constant transformation of all cultures;
2. The ceaseless transmission of cultures between cultures;
3. The incessant and perpetual transitions within cultures;
4. The valid transitive relations within particular cultures;
5. The constant to-and-fro translation of cultures between cultures;
6. The regular translocation of cultures in geographical space in a globalised world;
7. The transparency of power relations between and within cultures;
8. The transference of cultural desires to new cultural goals;
9. Trans disciplinary modes of study and inquiry and understanding cultures; and

10. Transcendence of the given future of modernity and colonized futures of postmodernism into a plethora of viable and desirable, autonomous and interconnected, transmodern futures.

Finally, there is one more relational notion that needs to be transcended: alterity. In its conventional, philosophical, and anthropological sense, alterity refers to 'otherness'; something other than 'sameness', outside the dominant worldview, its conventions and principles, external from the given notion of the normal and the new normal. We are concerned with the fear of the Other, whether the Other is perceived as other people or cultures; or other ways of being, knowing, or doing – other cosmologies. It is about such things as fear of migration and Islamophobia, fear of different ways of life, as well as representations of the Other, and the fear of the sacred and nature itself. What we end up talking about is the fear of diversity in all its multiple forms.

BOTH OUR SURVIVAL AS HUMAN COMMUNITIES AND CULTURES AND THE SURVIVAL OF OUR PLANET DEPENDS ON DIVERSITY – THE DIFFERENCE THAT MAKES THE DISTINCTION BETWEEN SURVIVAL AND OBLIVION.

Diversity is more than acceptance and respect of other cultures or simply recognising that each individual, culture, and community is unique. It is also appreciating the simple fact that our own happiness and enrichment depends on the happiness and enrichment of others. We are not just different; but our difference depends on and is connected to all other different cultures and communities. If one different culture becomes extinct, all humanity suffers. That's where the notion of Mutually Assured Diversity (MAD) enters the equation. [71] MAD is based on the assumption that there is no such thing as a distinct culture: all cultures are always diverse and always complex, never static but always adoptive and changing, particularly in a globalised context. Moreover, internally, individual cultures or subcultures are heterogeneous and speak with multiple voices; externally, they do not engage in a dialogue but a polylogue, where different voices are talking simultaneously to each other and Others. Thus, cultural relations are all about maintaining the external and internal diversity of cultures and ensuring that all the different voices can be heard. The notion of mutuality and respect are essential for polylogue and creating spaces for the articulation of different voices and for them to be heard.

But 'mutually' in MAD is about more than mutual respect. It is explicitly a definition of what we are being mutual about. And what is mutual is that the human condition is a cultural condition, and that culture is an essential relational attribute, an enabling feature of knowing, being, and doing. It is the acceptance that all cultures are equally important, that culture is the source of identity for everyone, and that identity provides a hand and eye to manipulate the kaleidoscope of diversity, both within culture and between cultures. It is the acceptance that for all

people everywhere, identity is not formed in a vacuum but within a cultural realm that comes with values, history, traditions, contradictions, and perennial questions. Mutually assured diversity is the universal acceptance of an obvious fact that there is more than one way to be human; it requires rejecting the notion that there is only one way, the right way; and recognising the multiple ways the world's people have of seeking meaning, of comprehending values, and means of delivering values in daily life. What needs to be grasped is that all societies, cultures, and civilisations have undergone change and are in a process of negotiating change. What is significant is what kind of change they accept, find problematic, reject, or have mixed feelings about and have alternate responses to, and for what reasons. It is the transmission of identity across change that is the cultural reflex *par excellence* because identity is the attribute of belonging that grows from knowing oneself so that one has the ability to know others and learn about other cultures.

What are we giving assurance about? The assurance is the universal acceptance of the continuity of cultural identity for everyone on the planet as a negotiated, adaptive, and meaningful space. It is the acknowledgment that for difference to exist as difference, it needs cultural space to be different. It is the proposition that all cultures have the right to know themselves, to understand and interact with their cultural self, and to do this within their own cultural space. In other words, all cultures have a right to enhance their cultural power and to represent their cultures with their own concepts and categories.

1. Mutually assured diversity is not focused on a single arena or issue. It is a holistic concept, and, as such, to be meaningful, it must operate across a whole range of cultural, social, political, and discursive fields. There are twelve varieties of mutually assured diversities to be considered:
2. Mutually assured definitions: The greatest power we have is the power to define. If we define other people out of existence, then there is no point to mutually assured diversity! Other cultures have the right to use the categories and concepts of their own worldview to define what are freedoms, what are rights and responsibilities, what is important and what is not, and what they consider to be immutable. Everyone must be allowed to live by the worldview which seems true to them. This is not about absolute relativism of the postmodern variety but about different ways of being human.
3. Mutually assured dissent: To make difference possible, to ensure the right to critical engagement, and to agree to disagree.
4. Mutually assured discourse: Each culture has its own way of knowing, being, and doing. We therefore need to appreciate other forms of knowledge and allow the discourses of other cultures to come to the fore.
5. Mutually assured demarcations: To ensure that difference can exist as difference and boundaries are negotiated. Not just that we do not know how to demarcate, but it is a particularly difficult thing to do in a globalised world. This is something we have to learn.

6. Mutually assured democracy: Which does not marginalise the minorities or lead to their displacement from power. We need to conceive genuinely participatory democracy which has priority over the orthodox and self-replicating mechanics of politics.
7. Mutually assured degrowth: Which is essential to ensure sustainable futures for all cultures, future generations, and the ecological survival of the Earth – the terrestrial abode of humans as well as flora and fauna.
8. Mutually assured dematerialization: Reduction of growth depends on drastic reduction in the sheer quantity of resources and materials used to serve the production and consumption needs of our wasteful society; it is not just a question of reducing carbon emissions but also a dramatic change in our consumer-oriented profligate lifestyles.
9. Mutually assured defence: It is not just our security that matters. The security of others is equally important. We cannot invade other countries simply to ensure our security. By putting others in danger, we also put ourselves in danger.
10. Mutually assured dependence: Which is a prerequisite for an interdependent, interconnected, and complex world.
11. Mutually assured desires: Our desires should not undermine the desires of others. If we consume most of the resources of the planet, we deny others their right to adequate and viable consumption.
12. Mutually assured dignity: Beyond human rights, we must also ensure that the dignity of other individuals, cultures, and communities are maintained – so that our own dignity is ensured.
13. Mutually assured destinies: It is not just our future but the futures of all cultures and communities are equally important. The future belongs to every culture and community on the planet, and every culture and community has the right to determine its own future.

The verities of mutually assured diversities are a connected ensemble. Each enhances the others across a range of human endeavours; collectively, they move us past what futurist Richard Slaughter calls ‘the trap our species has created for itself’ and the ‘mosaic-like but almost singular macro-future’ that we are hurling toward. [72]

In the final analysis, transmodernity and MAD are all about power. They seek to undermine the sources, means, and relations of dominance, control, and subordination, as they are enacted in political, social, and cultural processes, and structures and methods of knowing, doing, and being, between cultures and within cultures. The aim is nothing less than transforming the world, moving it to a new level, where mutual diversity and cultural equality are the norms.

Toward Transnormal

The transformations needed to move forward toward a transnormal world are truly profound. They require abandonment of a great deal of what we have

hitherto taken for granted, natural, and normal. Moreover, we feel helpless at the pace of accelerating change, increasing uncertainty and complexity, astounding contradictions, and cumulative chaos. Think how the Covid-19 global pandemic stopped the world in its tracks, isolated us from each other, and made us feel exceedingly vulnerable. Future postnormal events could be even more devastating and thus further enhance our feelings of powerlessness.

BUT AGENCY HAS NOT BEEN LOST. RATHER, BOTH AS INDIVIDUALS AND COMMUNITIES, WE NOW HAVE MORE AGENCY THAN EVER BEFORE. INITIAL CONDITIONS AND SMALL PERTURBATIONS ARE VERY IMPORTANT IN OUR WORLD OF CHAOS. THE ACTION OF AN INDIVIDUAL, OR AN APPARENTLY INSIGNIFICANT EVENT, CAN HAVE THE 'BUTTERFLY EFFECT' – TRIGGERING A CHAIN OF REACTION THAT COULD LEAD TO NEW DEVELOPMENTS OR EVEN A NEW ORDER.

Think of the Arab Spring, the rapid globalisation of the MeToo movement triggered by accusations against Harvey Weinstein, and the swift evolution of Black Lives Matter after the murder of George Floyd. Recognising the legal rights to flora and fauna as living entities, as granted to the Whanganui River in New Zealand or to all rivers in Bangladesh, is a small step that can trigger a chain reaction. [73] What we think and do as individuals and communities is important; our actions can multiply in geometric proportions, leading to chaotic events with the potential to usher both positive and negative change. Postnormal time is a period of change: what happens next is up to us. We can use the period of change to elicit the change we want. We need to realise that in these transformative times, 'everyone can lead' and that 'everybody contributes to, and in fact cocreates, the world we live in, whether conscious of their agency or not'. The transnormal world will be created through what futurists Alfonso Montuori and Gabrielle Donnelly call 'transformative leadership' which 'invites everybody to ask what kind of a world they are creating through their thoughts, beliefs, actions, and interactions' – to think creatively and imaginatively about their 'being, relating, knowing, and doing'. [74]

What distinguishes us from all other species on the planet is our ability to understand that futures exist, our inclination to study and explore alternative futures, and our willingness to shape viable, sustainable, and ethical futures. [75] Postnormal times force us to take our futures seriously. To use all the agency we have wisely and steer our communities and societies toward the transnormal. Historic societies used stars to navigate. Then, maps were provided as additional tools. Nowadays, we rely on GPS (although there are many other technology-based ways of navigating). Navigating postnormal times requires us to use the metaphorical

equivalent of all three. Metaphysics and other cosmologies are our guiding stars. Transmodernity and mutually assured diversity provide us with a map of the terrain we need to navigate. Our moral conscience, creativity and imagination, and our abilities to perceive and shape better futures are our GPS. Collectively, they can guide us toward the transnormal – our destination out of these postnormal times.

In his online 2020 Easter Sermon, Justin Welby, the Archbishop of Canterbury, reflected on what should happen after the Covid-19 pandemic has been brought under control around the world. ‘After so much suffering’, he said, ‘so much heroism’ and ‘so much effort’, ‘we cannot go back to what was before as if all is normal. There needs to be a resurrection of our common life, something that links to the old, but is different and more beautiful’. [76] The transnormal is the first step toward that ‘more beautiful’ world we all ought to be seeking; beyond that, its beauty depends on the magnificence of our collective visions. The journey to transnormal requires both thoughtful future visions as well as serious future-oriented action.

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Kjellrun Hiis Hauge is a professor of climate change, sustainability, and education in the Department of Language, Literature, Mathematics and Interpreting at Western Norway University of Applied Sciences. Her research largely focusses in the areas of critical mathematics education, fake news and education, education for sustainable development, critical citizenship, and uncertainty in quantitative information. She is associated with the Lived Democracy and Education for Sustainability research groups and is also a member of The National Committee for Research Ethics in Science and Technology (NENT).

Christopher Burr Jones, a futurist, is the founder of the Transnormal Institute and a senior fellow at the Centre for Postnormal Policy and Futures Studies (CPPFS). He was the Secretary-General of the World Futures Studies Federation. His interests include space development, cyber security, women’s futures, indigenous futures, global weirding and accelerating warming, non-Western futures, and high technology. He has served on journal editorial boards, non-profit NGO boards, and has published and presented extensively in the futures studies field. He also has extensive experience teaching futures studies in higher education systems throughout the US. His 2005 novel, *Fire and Ice*, explored eco-terrorism, alien First Contact, and the collapse of Western civilisation.

Chris Jones is Chief Researcher: Systematic Theology and Ecclesiology and also Head of the Unit for Moral Leadership at Stellenbosch University in South Africa. He has published extensively in the fields of ethics and moral leadership. He has a wealth of experience in theology, ethics, and community development, and holds a C rating with the South African National Research Foundation (NRF). His book *Moral Issues in the Natural Sciences and Technologies*, co-authored with Juri van den

Heever, was recognised as the Most Downloaded Book of 2020 in the Humanities & Social Sciences AOSIS Scholarly Domain.

C Scott Jordan, philosopher and political scientist, is the Executive Assistant Director of the Centre for Postnormal Policy and Futures Studies (CPPFS). He is also a writer, editor, and podcaster currently working extensively in Malaysia and Southeast Asia. A specialist in East-West Studies, he writes extensively on postnormal times, politics, governance, international policy, culture, philosophy, and education, which he often explores through films. He is the author of *A Very British Muslim Activist: The life of Ghayasuddin Siddiqui*. He has worked with the Asian World Center at Creighton University in Omaha, Nebraska, where he produced the radio podcast show, *Tea Talk Asia*. He is also a Deputy Editor of the influential quarterly, *Critical Muslim*.

Liam Mayo, a futurist and social theorist, was the first person to be awarded a PhD for research in postnormal times theory. He has worked globally with marginalized communities and vulnerable people in complex environments to achieve sustainable, just, and desired futures. He is a transformational change specialist dedicated to incorporating futures thinking in the design and delivery of policies, strategies, and action plans. He is currently the Chief Executive Officer of Comlink Australia, a large not-for-profit that supports aging, vulnerable, and disabled people living independently. He is also a guest researcher with the Department of Environment, Planning and Geography, at the Radboud University in the Netherlands, a lecturer in Social Sciences and Humanities at the University of the Sunshine Coast in Australia, and a Senior Fellow with the Centre for Postnormal Policy and Futures Studies.

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Alfonso Montuori is a Professor in the Transformative Inquiry Department at California Institute of Integral Studies. He is the author of several books and numerous articles on creativity, transdisciplinarity, complexity, the future, social change, management, leadership development, and education. His books include the two volume *Social Creativity* co-edited with Ronald E. Purser, *Journeys in*

Complexity, and *The Routledge International Handbook for Creative Futures*, which he co-edited with Gabrielle Donnelly. He is a San Francisco Library Laureate. He was the founder and General Editor of *Advances in Systems Theory, Complexity, and the Human Sciences*. He is currently Co-Editor of *World Futures: The Journal of New Paradigm Research*, and on the editorial board of numerous academic journals.

Maru Mormina is a Senior Researcher and Ethics Advisor at the Ethox Centre at Oxford Population Health in the UK. Spanning ethics, political philosophy, social epistemology, and science and technology studies, her research is concerned with the relationship between strategic ignorance and epistemic injustice, and how these might shape processes of scientific knowledge production and of knowledge use in evidence-based policy, particularly in public health. She has applied these conceptual lenses to the study of global inequalities in knowledge production and their intersection with colonial and postcolonial structures that help maintain and reinforce historical patterns of injustice. Her current work focuses on the use and non-use of expert knowledge in public policy during crises, especially considering the Covid-19 pandemic.

Yelena Muzykina, researcher, lecturer, and futurist, is a co-founder of the Central Asian Futures & Foresight Association. Her research interest and work cover education, planning, Islamic societies, futures studies, and postnormal times. Yelena also has extensive experience in the banking sector, private and international business, trade, and bidding. A member of the editorial board of *Islamoved*, a peer-reviewed journal of the Dagestan State University in Russia, and an invited editor of the *World Futures Review*, she has published extensively in Russian as well as translated a number of books and papers. Her engagement with Postnormal Times started with her doctorate research, since then she has been organising workshops and lectures on postnormal matters in Russia and Central Asia. She is a Fellow of the Centre for Postnormal Policy and Futures Studies (CPPFS).

Lata Narayanaswamy, a research practitioner, consultant, and lecturer in gender and development, is Associate Professor in the Politics of Global Development at the University of Leeds in the UK. Her expertise is in decolonising development, gender and development, knowledge, civil society, and power particularly in South Asia and East Africa. Her research, inspired by her time working as a knowledge-for-development practitioner, critically reflects on gendered/intersectional and post/decolonial dynamics of development knowledge and its perceived contribution to global development challenges. She is currently involved in applied, interdisciplinary research related to climate change, water security, and decolonising development.

Olga Van Oost, a museum consultant and coordinator, is the general manager of FARO, a Flemish cultural heritage centre in Brussels, Belgium. Her personal

research interests lie in the field of museology, with ‘museum in transition’ as a common thread. She has published articles on the digital, the liquid, the agonistic, and the postnormal museums. In *Museum of Feeling*, she laid the foundation for her vision of the ‘museum of the future’ in which equal attention is paid to thinking and feeling. In addition to her work at FARO, she teaches cultural issues at the Department of Communication Sciences at the Vrije Universiteit Brussel.

Caroline Osborne is a postdoctoral research fellow at the University of the Sunshine Coast, Office of Community Engagement, in Australia. Her current research is investigating participatory community engagement models as part of an innovative partnership between universities and local government that can strengthen connection, social capital, and community capacity to respond to opportunities and challenges in the coastal city-region in Southeast Queensland (SEQ). She has also conducted extensive post-graduate research into seniors housing preferences and neighbourhood design. As an urban planner her research examined how social capital can contribute to best practice urban planning outcomes. She has also served as a Community Planning Officer with the Sunshine Coast Council.

Jerry Ravetz, a renowned philosopher of science, is known for his challenging works on risks, scientific objectivity, and history of science. His *Scientific Knowledge and Its Social Problems* is regarded as a seminal work. His other books include *The Merger of Knowledge with Power*; (with S.O. Funtowicz) *Uncertainty and Quality in Science for Policy*; and (with Ziauddin Sardar) *Cyberfutures* and *Introducing Mathematics*. Regarded as the father of postnormal science, he developed, together with Silvio Funtowicz, a notational system, ‘NUSAP’, for the representation of uncertainty in quantitative information. Currently he is an Associate Fellow at the James Martin Institute for Science and Civilization at the University of Oxford.

Ziauddin Sardar, writer, futurist, and cultural critic, is an internationally renowned public intellectual. He has published over 50 books, including *Rescuing All Our Futures*, *Islam, Postmodernism and Other Futures: A Ziauddin Sardar Reader*, and *Future: All That Matters*. He was editor of *Futures*, the monthly journal of policy, planning and futures studies, from 1999 to 2012, and served as a Commissioner on the UK Equality and Human Rights Commission, UK, from 2006 to 2009. He currently edits *Critical Muslim*, a quarterly literary magazine that focusses on topics important within Muslim thought and between Muslims and the rest of the world. He developed the postnormal times theory and established the Centre for Postnormal Policy and Future Studies.

Julia Schönebergand, a post-doctoral researcher in socioeconomics, peace studies, and political science, is a Research Associate with the Department of Development and Postcolonial Studies at the University of Kassel, Germany. She focuses on the theories and practices of post-development and has worked extensively on

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Jordi Serra del Pino, futurist, consultant, and educator, is the Deputy Director of the Centre for Postnormal Policy and Futures Studies (CPPFS) and coordinates the CPPFS Barcelona Office. He is also Associate Professor at the Communication and International Relations Faculty of Blanquerna University (Universitat Ramon Llull), where he teaches Postnormal Times Theory and Foresight, and acts as the Academic Director of the Social Economy Observatory (OES21). As a consultant, Jordi has collaborated with a variety of public, private, and international organizations all over the world, but mostly in Europe and South America. He has published numerous papers and books in English, Spanish and Catalan as well as many articles in newspapers and magazines. Currently, he is on the editorial board of *Futures*.

Philip Spies, a futurist and educator, is the Primary Consultant with *Creative Futures*, an independent consultancy on futures studies, foresight, and strategy formation. He was Professor Emeritus at Stellenbosch University in South Africa, where he served as Director of the Institute for Futures Research, which he founded. The Institute grew out of a unit established in Stellenbosch University's Bureau for Economic Research, while Spies was a lecturer in agricultural economics. It was the first and remains the only futures institute of its kind on the African Continent. His work has strongly focussed on the philosophy and methodology of futures studies, especially in introducing it to a turbulent South Africa as it underwent monumental change. He is also an enthusiastic wine farmer.

Elizabeth Stephens, a cultural critic and literary historian, is an associate professor at the Institute for Advanced Studies in the Humanities at the University of Queensland, Australia. She has also served as an Australian Research Council (ARC) Future Fellow. Her research brings together critical theories and cultural histories of the body, with a focus on gender studies, queer theory, critical race and disability studies, and continental philosophy. She is a founding member of the Somatechnics Research Network. She also authored the book *Normality: A critical genealogy* amongst other books and articles. Currently, she is an Associate Investigator in the ARC Centre of Excellence in the History of the Emotions.

ACKNOWLEDGMENTS

Three articles in the *Postnormal Times Reader Volume 2* originally appeared in *Futures*, the monthly journal of policy, planning and futures studies. These include: Ziauddin Sardar, 'The smog of ignorance: Knowledge and wisdom in postnormal times' (*Futures* 120 102554 June 2020), which is based on the lecture given as the recipient of Association of Muslim Social Scientists (AMSS) 2019 Lifetime Achievement Award presented at the Digital Futures Conference held at Tamu Hotel & Suites, Kuala Lumpur, Malaysia on 2 November 2019, and is reprinted in his edited volume, *Emerging Epistemologies: The Changing Fabric of Knowledge in Postnormal Times* (IIIT, 2022). Kellrun HiisHauge and Richard Barwell, 'Post-normal science and mathematics education in uncertain times: Educating future citizens for extended peer communities' (*Futures* 91 25–34 August 2017) revised and modified in this volume as 'Science and Mathematics Education in Uncertain Times'. And Alfonso Montuori, 'Going Beyond Postnormality', which was originally published as 'Beyond postnormal times: The future of creativity and the creativity of the future' (*Futures* 43(2) 221–227 March 2011). These articles been reprinted with the kind permission of Elsevier.

The influential quarterly, *Critical Muslim*, has been one of the leading publications featuring articles and essays expanding on postnormal times theory, several of which are featured here. Liam Mayo's 'Sea Glass' is a modified version of 'Through the Sea Glass' (*Critical Muslim* 34: *Artificial*, March 2020). Christopher Burr Jones's 'As Things Fall Apart' first appeared as 'When things fall apart: Global weirding, postnormal times, and complexity limits' originally published in *Building Sustainability Through Environmental Education* edited by Ediola Pashollari (IGI Global, Hershey, 2019, 149–165), a modified version was published in *Critical Muslim* 39: *World Order*, Summer 2021. Jerry Ravetz's article 'Adventures in Postnormal Times' is a modified version of 'Postnormal Adventures', published in the *Critical Muslim* 35: *Muslim Atlantic*, July 2020. Christopher Burr Jones's 'Four Scenarios for the Third Rock from the Sun' is an extended and modified version of 'Four Earths', originally published in the *Critical Muslim* 34: *Artificial*, March 2020. C Scott Jordan's 'Postnormal Times & Minced Words' and 'Afrofutures for Postnormal Times' are modified and updated versions of 'Postnormal Words' (*Critical Muslim* 28: *Narratives*, October 2018) and 'Afrofuturism in Postnormal Times' (*Critical Muslim* 29: *Futures*, January 2019).

In 2021, in the wake of the Covid-19 pandemic, CPPFS senior fellows Maya Van Leemput and Christopher Burr Jones, and CPPFS fellow Linda Hyökki, served as guest editors for a special issue of *World Futures Review* on 'Postnormal Matters'

(Volume 13, Issue 2, June 2021). The following articles first appeared in this special issue: Christopher Burr Jones, Jordi Serra del Pino, and Liam Mayo's 'The Perfect Postnormal Storm', a modified version of 'The Perfect Postnormal Storm: COVID-19 Chronicles (p. 71–85), which was originally published as parts 1–3 of the CPPFS blog *Insights* as 'The Covid Chronicles'. The blog is available at <https://postnormaltim.es/covid-chronicles>. Jordi Serra Del Pino's 'Building Scenarios in Postnormal Times' is a revised version of 'Building Scenarios with the Three Tomorrows' (p.101–114). Liam Mayo and Shamim Miah's 'Zombie Disciplines', was originally published as 'Zombie Disciplines: Knowledge, Anticipatory Imagination and Becoming in Postnormal Times' (p. 157–171) and reprinted in *Emerging Epistemologies*.

Ziauddin Sardar's 'Afterthoughts', was originally published as 'Afterthoughts: Transnormal, the "New Normal" and other Varieties of "Normal" in Postnormal Times' (p. 54–70).

Other journals in the field of futures also published papers on postnormal times, particularly, Ziauddin Sardar's 'On the Nature of Time in Postnormal Times' *Journal of Futures Studies*, (25(4) 17–30 June 2021) modified and presented here as 'Time in Postnormal Times'; and Liam Mayo, Caroline Osborne, Marcus Bussey, & Timothy Burns's 'Engaging Communities Through Uncertainty: Exploring the Role of Local Governance as a Way of Facilitating Postnormal Polylogues' which appeared in *World Futures* (77(4) 245–265 June 2021), and is revised and modified here as 'Engaging Communities in Polylogues'

Elizabeth Stephens's article 'The End of the Ordinary' was originally published as 'Post-normal: Crisis and the End of Ordinary' in *Media International Australia* (177(1):92–102 September 2020) and is available as open access. Philip Spies and Chris Jones's 'The Postnormal Landscape' is a translation of the article 'Explorations in a post-normal landscape: South Africa this side of and beyond Covid-19', originally published in *Tydskrif vir Geesteswetenskappe* (Jaargang 60 No. 4–2: Desember 2020) doi.10.17159/2224–7912/2020/v60n4–2a2. The original article was written in Afrikaans. A modified and updated version in English is included in this volume. Maru Mormina, Julia Schönebergand, and Lata Narayanaswamy's 'Re-Imagining Expertise for Postnormal Times' was originally published as 'Knowledge and Science Advice During and After COVID-19: Re-Imagining Notions of Expertise for Postnormal Times' in *Oxford Population Health* (24/02/2021). Jane Gilbert's 'Education for the Anthropocene' was originally published as 'Transforming Science Education for the Anthropocene – Is It Possible?' in *Research in Science Education* (46(2) 187–201 2016). A modified version of the article appears in this volume. Michael Anderson's 'Drama Education and Applied Theatre in Postnormal Times' is a revised version of the original publication, 'The challenge of post-normality to drama education and applied theatre' *Research in Drama Education: The Journal of Applied Theatre and Performance* (Volume 19 – Issue 1: Borders and Translations 110–120 2014).

Yelena Muzykina's 'Confronting Postnormal Times' has been translated from Russian. It was presented at the xxiv World Philosophical Congress in Aalmaty,

Kazakhstan in 2018. It appeared in the Congress's proceeding *Learning to be Human*, edited by Yu Kolchigin (Kostanay: Centrum LLP, 47–62, 2018.)

Olga Van Oost's 'Museums in Postnormal Times' has been revised from its original publication as 'More than Words. Museology in Postnormal Times (Belgium)' in *The Future of Tradition in Museology: Materials for a discussion* edited by Kerstin Smeds (ICOFOM, Kyoto, 174–178, 2019). Ziauddin Sardar's 'Polylogues' was first published as 'Polylogues: Connecting Minds to Create the Future' as part of Expo 2020 Dubai, UAE, publication: *World Majlis: The Essays – Conversations About Our Future* (Expo 2020, Dubai, 202) edited by Leonard Stall. Liam Mayo's 'Capturing the Queen and Other Creative Moves in Postnormal Times' was originally published in *The Routledge Handbook of Creative Futures* edited by Gabrielle Donnelly & Alfonso Montuori (Routledge, 2023) as 'Postnormal Creativity'.



THE POSTNORMAL TIMES READER VOLUME 2 UPDATES THE THEORY AND METHODS, OFFERS NEW WAYS OF DEVELOPING SCENARIOS, AND SUGGESTS WAYS AND MEANS TO ENGAGE COMMUNITIES IN POLYLOGUES. IT EXPLORES THE NOTIONS OF TIME, KNOWLEDGE, IGNORANCE, AND MODERNITY, AND OUTLINES POTENTIAL FUTURES BEYOND POSTNORMAL TIMES BASED ON DECOLONISED CREATIVITY AND MUTUALLY ASSURED DIVERSITY. THE READER ALSO SHOWCASES HOW POSTNORMAL TIMES THEORY IS BEING USED IN DIVERSE DISCIPLINES – FROM POLITICAL SCIENCE AND INTERNATIONAL RELATIONS TO SCIENCE STUDIES, EDUCATION, MUSEOLOGY AND DRAMA AND THEATRE.

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