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EMERGING EPISTEMOLOGIES

The Changing Fabric of Knowledge in Postnormal Times



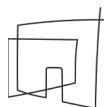
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Afterword by Anwar Ibrahim



The Centre for
Postnormal Policy
& Futures Studies

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CONTENTS

Introduction:	Beyond the Epistemologies of Conquest and Desire	1
	<i>Ziauddin Sardar</i>	
Chapter 1	The Smog of Ignorance: Knowledge and Wisdom in Postnormal Times	18
	<i>Ziauddin Sardar</i>	
Chapter 2	Epistemologies and Change in Postnormal Times	44
	<i>Christopher Jones</i>	
Chapter 3	Manufactured Worldviews and the Shifting Landscape of Digital Knowledge	65
	<i>Liam Mayo</i>	
Chapter 4	Zombie Disciplines, Anticipatory Imagination and Mutually Assured Diversity in Postnormal Times	84
	<i>Liam Mayo and Shamim Miah</i>	
Chapter 5	Return to Metaphysics: Knowledge, Science and the 'Art of the Insoluble'	109
	<i>Colin Tudge</i>	
Chapter 6	Epistemology and Higher Education in the Muslim World	135
	<i>Shamim Miah</i>	
Afterword:	The Journey for Epistemological Justice	156
	<i>Anwar Ibrahim</i>	
Contributors		173
Editor's Note		176
Index		177

INTRODUCTION: BEYOND THE EPISTEMOLOGIES OF CONQUEST AND DESIRE

Ziauddin Sardar

‘What do you do when your world starts to fall apart?’ When we face numerous threats and trepidations of which the Covid-19 pandemic is only the latest. When ‘the world’s climate is going haywire, and industrial progress has proved much more deadly to life on earth than anyone imagined a century ago. The economy is no longer a source of growth or optimism’. Uncertainty abounds, all our lives are precarious, we in the north and south, ‘confront the condition of trouble without end’ (Tsing 2015, p.2,3).

Well, anthropologist Anna Tsing goes out to the forest to look for mushrooms. More specifically, wild matsutake mushrooms that live in human-disturbed forests like rats and cockroaches. But they are not pest, she tells us in *The Mushroom at the End of the World* (2015), they are valuable gourmet treats, prized for their distinctive spicy and musky flavour. They can be found in the forests of Japan, Korea, China and North America. You have to look underneath the debris and litter, where all the forests muck resides.

Matsutake mushrooms are a real thing. But they are also a metaphor, value, an economic activity, an organic product, gourmet food, a gift - and still many other things. In particular, they are an artefact of what Tsing calls ‘third nature’ – something that manages to survive despite capitalism, and in spite of capitalist destruction of the environment, that still manages to live in the ruins we have created. It is capitalism, the terror inducing morbid pathology, that Tsing

is sharply focussed on. With its obsession on individualism, free market, perpetual growth and one-dimensional progress, capitalism hinders our collective survival. It turns humans and other beings into commodities. Unending competition is nothing more than incessant war – one against all others – ‘a synonym for conquest and expansion’ (Tsing 2015, p.27). Individual interest and competition, ‘one-against all survival,’ has become, Tsing argues, the bed rock of the epistemologies that shape contemporary knowledge. Under revengeful capitalism, ‘the stuff of collaborative survival are blocked’; including collaboration across self-contained disciplines, and different branches of knowledge. Democracy, science, hope, and even our personal dreams are thwarted. Uncertainty and precarity are now the condition of our time. The widely accepted assumptions about what it means to be human are no longer valid.

The subtitle of the Tsing’s engaging book on Matsutake mushrooms is ‘on the possibility of life in the capitalist ruins.’ But it is a rapidly shrinking possibility. Thanks to the capitalist notions of perpetual growth and development, the human-made mass – known as ‘anthropogenic mass’ – now exceeds all living biomass on Earth. The ‘anthropogenic mass’ has been doubling roughly every 20 years; for every living person on the globe, more than his or her body weight of human-made mass is generated every week. Modern agriculture is gobbling up increasing land use and ‘the total mass of domesticated crops (about 0.01 Tt) is vastly outweighed by the loss of plant mass resulting from deforestation, forest management and other land-use changes. These trends in global biomass have affected the carbon cycle and human health. Additional human actions, including livestock husbandry, hunting and overfishing, have also strongly affected the masses of various other taxa’ (Elhacham et al, 2020). The cross over point was the year 2020; so, in the near future there will hardly be any nooks and crannies untouched by capitalism for mushrooms or any other flora to exist in ‘capitalist ruins.’

What capitalism has also ruined is our understanding of what actually constitutes knowledge. Epistemology does not exist in a vacuum; it is embedded in the worldview and culture of society. Or, as Shoshana Zuboff puts it in an article in *The New York Times*, ‘in an information civilization, societies are defined by questions of knowledge — how it is distributed, the authority that governs its distribution and the power that protects that authority. Who knows? Who decides who knows? Who decides who decides who knows?’ (Zuboff 2021). Capitalism, or more specifically surveillance capitalism, has hijacked epistemology and now holds the answers to each of these questions. And it does so, Zuboff suggests, in four distinct ways: it appropriates epistemic rights by claiming property rights on people’s lives and behaviour which is turned into raw data, it increases epistemic inequality, creates ‘epistemic chaos caused by the profit-driven algorithmic amplification, dissemination and microtargeting of corrupt information, much of it produced by coordinated schemes of disinformation’; and institutionalises epistemic dominance (Zuboff 2021).

So, how we produce knowledge, and what constitutes knowledge itself, have been radically transformed. As I show in chapter one, data has now become Big Data, which has transformed information into gargantuan proportions. As a result, emergent knowledge – a product of interconnected, networked, evolving, complex system, that can spontaneously generate order,

adaptation, and feedback loops – becomes an amalgam of three distinct but interconnection components. First: what we may (still) call, after Karl Popper, objective knowledge. Second: what we may describe as toxic knowledge, which includes not just fake news, alternative facts, and other paranoia of social media, but also knowledge that scholars, philosophers, novelist and most particularly religious thinkers have cautioned against – eugenics, or weapons of mass destruction, or to cheat death. Third: all varieties of Ignorances – disciplinary ignorance due to myopic boundaries, zombie disciplines, products of data and information based on epistemological bias, misogyny, xenophobia, ideology, empire and imperialism – that masquerade as knowledge. For want of a better term, we can label the amalgamated emergent knowledge as TRIGOXIC: ‘a complex, evolving entity that combines true and toxic knowledge that is shrouded by the smog of Ignorance.’ This knowledge is largely being shaped by Artificial Intelligence (AI), which works solely on the basis of patterns and correlations; and, in the future, we – human beings – will play increasingly little or no part in generating new knowledge.

In this volume, we explore the changing nature of knowledge production, how emerging epistemologies are transforming our perceptions of the present and the future, and the overall implications for society.

The Imperatives of Postnormal Times

The evolving horizon of knowledge not only affects how we see the present, and perceive futures, but also raises fundamental questions of meaning and being. It strikes a double whammy on the epistemological front: it makes it difficult to map the rapidly changing nature of emerging knowledge; and, given a host of ignorances and uncertainties, understanding and navigating epistemological change becomes a formidable task. Indeed, as Christopher Jones points out in chapter two, we are not dealing with a single epistemology but ‘a myriad of ontological and epistemological streams that feed a global ocean of shared/conflicting meaning.’ This is where postnormal times theory is particularly useful. Postnormal times (PNT) envisages the present as a transitional in-between period, characterised by complexity, contradictions and chaos (3Cs), which are driven by speed, scope, scale and simultaneity (4Ss) of issues and events, ‘where old orthodoxies are dying, new ones have yet to be born, and very few things seem to make sense’ (Sardar 2010). PNT is a theory of change; and its function is both to understand and map the rapidly changing present, including the evolving epistemological landscape, and help us navigate the changing, chaotic present towards shifting sustainable futures. Contributors to this volume use aspects of PNT theory, where possible and applicable, to explore emerging epistemologies and their potential impact on society and futures; and suggest ways and means of steering out of the current impasse.

Jones explores the connections between worldviews and behaviour, and ontology and epistemology, through the menagerie of postnormal potentialities, a key component of PNT theory.

The menagerie consists of the black elephant, the black swan and the black jellyfish, each representing the transformational change and phase shifts that we experience in postnormal times. Black elephants are extremely likely and widely predicted events that are usually ignored but with the potential of a big impact on society. Black swans are unknown unknowns, often seen as outliers, difficult to perceive but with the potential of major transformations; and, as such, they can be positive or negative. And black jellyfish represent events and phenomenon that have the potential of going postnormal by escalating rapidly, even instantaneously. After taking us through the basics of PNT theory, Jones shows how black elephant, black swan and black jellyfish events, issues and phenomenon are transforming our world and what it means in epistemological terms.

Postnormal times are, to considerable degree, a product of digital cultures. Digital technologies are omnipresent, providing hyper-connectivity and hyper-activity, interconnecting individuals and communities with speed, scope, scale and simultaneity. In chapter three, Liam Mayo explores how digital culture is increasing uncertainties and transforming epistemes. He distinguishes between the ‘postmodern condition’ – which shaped the world from the 1970s onwards to the beginning of the twenty-first century – and the postnormal condition of the present; and, using the PNT notion of manufactured normalcy field, shows how digital cultures manufacture worldviews. Mayo goes on to illustrate how the concepts of postnormal lag, creep, tilt and burst can help us navigate our way out of the postnormal condition.

Digital knowledge incorporates many assumptions of what Jones calls ‘the dominant western, liberal democratic secular worldview’ and shapes emerging epistemologies. These assumptions, Jones tells us, manifest themselves in ‘the typology and morphology of city infrastructure, global transportation and communications networks, and exchange flows’ as well as in ‘a preference for hierarchy, male dominance, progress, material growth, throughput, increased energy use, and anthropomorphism.’ A particular sign that things cannot continue under these normal western assumptions is the emergence of the Anthropocene, which describes a new geological era. The Anthropocene points out that the impact of human activities is drastically changing the geology and ecology of the planet. The exponential increase in human-made mass is a manifestation of the human-induced epoch of the Anthropocene. Land use is one of the four planetary boundaries, ‘the environmental limits within which humanity can safely operate’ (Stockholm Resilience Centre 2015), that have been exceeded in recent years; others include climate change, biodiversity loss, and shifts in nutrient cycles (nitrogen and phosphorus). Other boundaries yet to be exceeded include: stratospheric ozone depletion, chemical pollution, ocean acidification, freshwater consumption, and atmospheric aerosol loading. However, the Anthropocene is not just about ‘environmental crisis’ – a crisis can be overcome, it is an ephemeral condition with a strong possibility of returning to some sort of status quo ante, or normalcy. Rather, the Anthropocene is a point of no return where the abode of our terrestrial journey is changed forever and we along with it. It marks the end of modernity and postmodernism; and the domination of western epistemologies and modes of thought. It is about the way we live, the way we think, the way we know and what we know. As Anne Fremaux notes,

the Anthropocene is rather an era of ‘non-knowledge’ or rational ignorance linked to uncertainties and ontological indeterminacy than a period of human mastery of earth systems. But further, it also displays the helplessness (impotence) of already accumulated scientific knowledge to trigger necessary changes. Indeed, the issue today is not any longer to get a clearer picture of the situation by accumulating scientific data but to understand ‘how we entered the Anthropocene *despite* very consistent warnings, knowledge and opposition’ (Fremaux 2019).

What brought us here to the Anthropocene, can be described as an epistemological juggernaut that has finally led to a gigantic pileup on the highway of history. Indeed, the Anthropocene designates the logical culmination of the epistemological base of modernity and postmodernism, as well as western culture and civilisation. The intellectual and epistemological history of western civilisation can be seen as a series of conquests based on reductive steps. Each reduction led to the removal of one or other parts which collectively make life what it is – whole. In separating out the parts which provide a wholistic picture, ostensibly to make things simpler to investigate, study and understand, the collective nature and spontaneity of life on earth has been truncated. Along the way, western epistemology has been embroiled in a string of physical or metaphysical deaths.

One consequence of western epistemology, as the UNEP report *Making Peace With Nature* (2021) points out, is the creeping death of nature, which the report attributes to the ‘triple crisis’ of climate emergency, the massive loss of biodiversity, and escalating pollution that kills millions of people every year. However, making peace with nature, and tackling the problems of the non-knowledge era of the Anthropocene, requires us not just to transcend dominant epistemology but also to go beyond the disciplinary structure developed and sustained by this framework of knowledge. Disciplines do not arrive ready made from heaven, but evolve within a cultural milieu according to its needs and requirements, within a given agenda. As Shamim Miah and Liam Mayo point out in chapter four, ‘the current disciplinary ordering and structuring of knowledge is largely a product of the enlightenment movement in general, and modernity in particular’; and is associated with domination and control both of other people as well as nature. Miah and Mayo argue that modern disciplines are ‘no longer representative of reality but continue to shape minds and imagination, education and policies, outlooks and futures.’ In fact, they are zombie disciplines: ‘products of modernity, diseased by neo-liberalism, unchanged and increasing irrelevant in postnormal times.’ These disciplines, suggest Miah and Mayo, include anthropology, sociology, economics, political science, development studies, cultural studies, media studies, all varieties of ‘area studies,’ certain types of history and philosophy, and particular perspective on biology. They ‘straddle the divide between living and dead, are unintelligible yet communal in their proximity to one another, seemingly unattached to one another, they are heedless, fierce and threatening but are not evil – rather scrabbling to satisfy a base instinct of their own craving. Indeed, zombie disciplines within the university lack dignity – in pursuit of their consumption they will destroy themselves! And us!’

Miah and Mayo suggest moving forward to epistemologies based in anticipatory imagination, which is future focussed, embedded in reflective practice, ‘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.’ Anticipatory imagination has to be combined with mutually assured diversity where cultures are seen as diverse, complex, dynamic and adaptive, and speak with multiple voices and engage in polylogue (Sardar 2021). In the spirit of inclusiveness – central to the notion of mutually assured diversity – Miah and Mayo do not advocate that we decimate zombie disciplines. Rather, we should ‘embrace the Otherness of the zombie, engage and learn from zombie disciplines and seek to navigate the future together.’

Science and Civilisations

A great deal of hope and faith is placed on science, and associated gee whizz technology, in solving the problems associated with the Anthropocene in general, and climate change in particular. Bill Gates, the co-founder of Microsoft, for example, believes in the environmental equivalent of the Manhattan Project or the moon landing to solve the problems of climate change. There is no problem faced by humanity, he suggests, that cannot be fixed by science and technology (Gates 2021); his faith in technical rationality is akin to the economists’ faith in the free market. The UNEP report consistently harks back to ‘science-policy interface’ to provide evidence-based solutions to ‘complex problems of climate change and biodiversity loss’ (UNEP 2021, p.47). Neither realise that science itself has gone postnormal, that science and politics in the case of Gates, and ‘science-policy interface’ in the case of UNEP, have been transformed beyond recognition; and all comfortable assumptions about science, its production, use and impact on society, are being questioned. Indeed, the problems inherent in science have been questioned for several decades – not least in the notion of postnormal science advocated by philosophers of science Jerry Ravetz and Silvio Fontowicz some thirty year ago. We are now dealing with a science, Fontowicz and Ravetz have shown, in which ‘facts are uncertain, values in dispute, stakes high and decisions urgent’ (Fontowicz and Ravetz 1993) – so aptly demonstrated in the case of COVID-19 pandemic. The present postnormal nature of science would no doubt become more and more evident in the coming years.

The present, as Gyorgy Lukacs, the Hungarian philosopher and literary historian, pointed out, is a problem of history (Lukacs 1972). In chapter five, Colin Tudge delves into the history of modern science to show how science has changed since the eighteenth century ‘Age of Enlightenment.’ The Enlightenment took both reason and feeling to extremes – it drained reason of all values, and deprived emotion of rational thought. But this was not always so. Throughout most of history, science and faith have been two sides of the same coin. In truth, Tudge writes ‘science is not unalloyed rationality. If it was, it would not work. Many or most of the greatest scientists of all can properly be called Romantics.’ Religion on the other hand, ‘has and must have a very strong cerebral tradition. Furthermore, the two overlap very considerably – each, historically, feeding off the other.’ The perception of science as omnipotent, and

the desire of some scientists to acquire God-like power is a product of modernity. In reality, Tudge asserts, 'the whole of science is like a floating island – floating in the pool, or indeed the ocean, of metaphysics.' Epistemologically, science – the art of the soluble – must unite with metaphysics – the art of the insoluble.

The pre-Enlightenment science that Tudge refers to was directly influenced by Muslim civilisation. According to George Sarton's monumental *Introduction to the History of Science* (1931) – which has not been equalled in recent times – Muslim scientists and scholars shaped and advanced science from the eighth century up to the end of the fifteenth century. Sarton assigns each half century to a dominant intellectual personality, and devotes a whole chapter to it. So, the second half of the eighth century is the 'the time of Jabir ibn Hayan' the father of chemistry. Ninth and tenth centuries are the times of al-Khwarizmi, the inventor of algebra; al-Razi, who infused medicine with clinical precision; al-Masudi, the geographer who produced a map of the world towards the end of the tenth century; and Abul Wafa, the astronomer and mathematician who produced accurate trigonometric tables. The first half of the eleventh century is the time of al-Haitham, father of optics, al-Biruni, the polymath who measured the latitude and longitude of Earth, and the second half of the eleventh century, the time of Omar Khayyam, the mathematician who solved equations of third degree and wrote poetry in his spare time. Things begin to change at the beginning of the twelfth century:

From here on Western science begins its incursion - accolades have to be shared; three giants dominate each half century with only one of whom represents Muslim civilisation. (Though one might add the Jewish representatives were scientists born and educated and engaged in Muslim societies, which enabled them to be a major conduit for the transmission of knowledge to Christendom). The first half of the twelfth century belongs to ibn Zuhr, who perfected surgical and post mortem techniques, he shares the spotlight with William of Conches and Abraham ibn Ezra. They are followed by the celebrated rationalist philosopher Ibn Rushd, Gerard of Cremona and Maimonides. The botanist ibn al-Baitar, whose encyclopaedia of medicinal plants is regarded as one of the greatest botanical compilations, shares the first half of the thirteenth century with Robert Grossetesta and Jacob Anatol.

The age of Roger Bacon and Jacob ibn Tabbon is also the age of Qutb al-Din Shirazi, the Sufi astronomer who continued the work of al-Haitham and gave the first correct explanation of the formation of the rainbow. Next comes the age of Abu al-Fida, the astronomer and chronicler of human history who gave his name to a crater on the moon and shares his half-century with Levi ben Gerson and William of Occam. Finally, we have the age of the historian and father of sociology, ibn Khaldun, second half of the fourteenth century, shared with Geoffrey Chaucer and Hasdai Crscus (Criscus). (Sardar 2016)

Of course, science in Muslim civilisation did not disappear after the fifteenth century. As other historians of science have pointed out, including George Saliba (1994), Jan Hogendijk and Abdelhamid Sabra (2003) and Ekmeleddin Ihsanoglu (2002), major advances continued

till the eighteenth century when the emphasis shifted to learning and assimilating European sciences through translations and adaptations. Modern science is heir of the great science and learning tradition of Islam.

Europe not only inherited classical Greek thought from Islam, but also a wholistic view of the world. Few of the great names of the European Middle Ages could actually read Greek: so what they in fact read was not Plato but Latin commentaries on Plato by al-Farabi, not Aristotle in the original but the Latin translations of Ibn Sina's commentaries on Aristotle, and not the Neoplatonists but the works of Ikhwaan al-Safa, the Brethren of Purity, the tenth and eleventh century philosophers of Basra and other Neoplatonist philosophers and mystics of the Muslim world. Ikhwaan al-Safa, for example, had a particularly wholistic approach to nature. As is evident from *The Epistles of Brethren of Purity*, an encyclopaedia of fifty-two treatises, they saw knowledge as an integrated whole, and nature as an integral part of what it means to be human. In the discussion of all the sciences they consider, from astronomy and mathematics to psychology and theology, the emphasis is not just on theoretical consideration and practical application, but also, as Hossein Nasr notes, 'on the great harmony and beauty of the universe' and 'the necessity for man to go beyond material existence' (Nasr 1978, p.30). To be a wholistic person, the Brethren argued, one has to have a multicultural education, based on inherited knowledge of other cultures. A perfect person was not just simply of Islamic faith, but, as German historian T. J. de Boer notes, 'Babylonian in education, Hebrew in astuteness, a disciple of Christ in conduct, as pious as a Syrian monk, a Greek in natural sciences, an Indian in the interpretation of mysteries and, above all a Sufi or a mystic in his whole spiritual outlook' (quoted by Nasr 1978, p.31). Moreover, Europe learned to reason from Ibn Rushd (Averroes) – 'the Commentator,' 'the Father of Freethought' – and his friend Ibn Tufayl. The twelfth century renaissance was largely shaped by Averroism as the school of philosophy based on Ibn Rushd came to be known in Europe. Ibn Tufayl's philosophical novel *Life of Hayy*, which depicts how reason can lead to the discovery of God, had a phenomenal influence on European thought and literature right up to seventeenth and eighteenth centuries. For both, Ibn Rushd and Ibn Tufayl, reason was not devoid of values, science led you to God not atheism, and, reason and faith collaborated in producing new knowledge at the service of humanity.

The current epistemological impasse is partly a product of the historical reductive leaps Europe undertook after the emergence of the Enlightenment. One of the first steps was to purge Islamic heritage from history. It invented Greece as the origins of Europe and the cradle of all civilisations. When Europe looks for a sense of self it turns to Greece, the imagined uncontaminated birthplace of pure white folks. We jump from Greek thought and philosophy straight to seventeenth century renaissance as though nothing happened in between. After the manufacture of Greek origins, came the construction of Rome as the foundation on which Europe as a historic entity is based. Rome supplanted Greece and excelled in engineering, everything else was left to the devious minded Greek slaves who did all the teaching, thinking and a great deal of the writing for the Roman elite leaving them free for their real interests: world domination. As far as civilisations goes you cannot get more venal, bloodthirsty and brutish than Rome.

Not that this is our usual perspective on the Romans. Despite everything we know about the perversions, oppressions, tyrannies and excesses of the Romans, we still see Roman civilisation as the architect of Europe. The BBC has eulogised this vision of history under the title: *What the Romans Did For Us* (Wilkinson 2001). What they actually did was colonise, exterminate with relish, expropriate and subjugate. Rome is the original home of the colonising mission. Generations of Europeans were schooled in the Roman manuals of how best to dominate other peoples for the benefit of a ruling elite.

Hardly surprising then that conquest is also the main theme of western epistemology. It begins with all round conquest of people and places and ends, as the title of Carolyn Merchant's book suggests, with *The Death of Nature* (Merchant, 1983). Merchant explores the scientific revolution through the lens of feminism and ecology; indeed, it is the first book to do so. In the sixteenth and seventeenth centuries, Francis Bacon was happy to extract the secrets of nature 'under torture.' Nature, seen as famine, had to be conquered and dominated; this was a major pillar of the Baconian programme of progress that Europe embraced. Seventeenth century scientists, reinforcing aggressive attitudes towards nature, spoke out in favour of 'mastering' and 'managing' the Earth. 'Descartes wrote,' writes Merchant, 'in his discourses on Method (1636) that through knowing the crafts of the artisans and the forces of the bodies we could "render ourselves the masters and possessors of nature". Joseph Glanvill, the English philosopher who defended the Baconian program in his *Plus Ultra* of 1668, asserted that the objective of natural philosophy was to "enlarge knowledge by observation and experiment...so that nature being known, it may be mastered, managed, and used in the services of humane life"' (Merchant, 1983, p.188). Robert Boyle, celebrated chemist, made the message of dominating nature explicit in sexual terms: 'for some men care only to know nature, others desire to command her' and 'to bring nature to be serviceable to their particular ends, whether of health, or riches, or sensual delight' (Merchant, 1983, p.189).

The conquest of nature is followed by the epistemological reduction and transformation of reason into instrumental reason, devoid of any value or moral concerns. Reason was the defining power of the Enlightenment; and it was based on the methodological patterns of Newtonian mechanics which became the basic epistemological framework of the enlightenment. However much individual thinkers and scholars agreed or disagreed with the end result, they are all unified in their framework of knowledge. The new tools of reason and analysis were not only for mathematical and physical knowledge but they were also used by the philosophers to dissect all branches of human endeavour. Such traditional disciplines as politics, ethics, metaphysics and religion were analysed on the basis of instrumental reason, with a view to ending their perplexities once and for all; instrumental reason, then, becomes the main instrument through which all ends are pursued, without justifying the means, and the will to conquest is expressed. 'This use of observation and experiment,' writes Isaiah Berlin,

entailed the application of exact methods of measurement, and resulted in the linking together of many diverse phenomena and the laws of great precision, generally formulated in mathematical terms. Consequently only the measurable aspects of reality were to be

treated as real – those susceptible to equations connecting the variations in one aspect of the phenomena with measurable variation in other phenomena. The whole notion of nature as compound of irreducibly different qualities and unbridgeable ‘natural’ kinds was to be finally discarded. The Aristotelian category of final cause – the explanation of phenomena in terms of the natural tendency of every object to fulfil its own inner end or purpose – which was also to be the answer to the question of why it existed, and what function it was attempting to fulfil – notions for which no experimental or observational evidence can in principle be discovered – was abandoned as unscientific, and, indeed, in the case of inanimate entities without wills or purposes, as literally unintelligible. Laws formulating regular concomitances of phenomena – the observed order and conjunctions of things and events were sufficient, without introducing impalpable entities and forces, to describe all that is describable, and predict all that is predictable, in the universe. Space, time, mass, force, momentum, rest – the terms of mechanics – are to take the place of final causes, substantial forms, divine purpose, and other metaphysical notions (Berlin 1956, p.17).

Of course, the Enlightenment was not a monolithic movement. Scholarly arguments and debates about its origins, when and where it happened, who do we regard as its true representatives, and whether we blame or praise it for our current situation have been raging for decades. Not all Enlightenment philosophers were ready to throw intrinsic values overboard. Kant, for example clearly saw in Newtonian mechanics knowledge of the law of the physical universe but he did not submit the autonomy and sovereignty of men to deterministic mechanics. He separated the domains of physical knowledge and intrinsic values by proclaiming ‘the starry heavens above you and the moral law within.’ So, perhaps, as Ritchie Robertson (2020) advocates, we should not judge the Enlightenment with the criteria of the present; particularly when the Enlightenment gave us the standards, we accuse them of lacking. But we can judge the Enlightenment with the overall consequences it fashioned: the ‘Reason’ it flaunted was largely instrumental, its alleged universalism a veil for racism and colonisation, and its goal of domination of nature has been a recipe for an ecological disaster.

The accumulated outcome of the Enlightenment was the separation of knowledge from values – a rapture from classical Islamic epistemological thought. What followed was a true triumph of reason in the paralleled spread of materialism. John Locke set out to discover ‘natural laws’ of social order akin to the mechanical systems based on Newtonian mechanics. Tocqueville sought a city where impulsive individual liberty was the only thing that mattered. Adam Smith taught (*The Theory of Moral Sentiments* notwithstanding) that the most efficient method of economic organisation is laissez-faire – let the selfish individual do what he/she wants, and allow the ‘invisible hand’ of the market to guide society towards more and more inequality. Logical positivism, and its twentieth century counterpart logical imperialism, threw values overboard altogether. Utilitarianism declared that the goal of all moral endeavours is the greatest happiness for the greatest number of people. What came to be practised in fact was the greatest number of material goods for the largest possible number of people. The Enlightenment laid the foundations for capitalism to take over all knowledge production.

Ravenous Capitalism and Knowledge

Capitalism is a ravenous child of the Enlightenment. Even though it mutates, much like a virus, into new and deadly variants, there is underlying continuity based on conquest, freedom, individualism and desire. A string of recent works has highlighted this underlying theme (for example, Halven 2020, Quinn and Turner 2020, Levenson 2020, Zuboff 2019, Fraser and Jaeggi 2018, Giridharadas 2018, and Piketty, 2017). In my 1995 article ‘Cyberspace as the darker side of the West,’ I argued that the cyberspace was the new capitalist frontier, ‘resolutely being designed as a new market,’ a ‘new frontier,’ a ‘new continent,’ being reclaimed from some unknown wilderness by heroic figures not unlike Cristobal Colon. I showed how the new big tech companies were behaving like the old East India Company and the original white colonizers of North America. And, I looked at one of the key documents that was said to be the foundation text of this new ‘American dream’ which marked the dawn of a new ‘American civilization’:

‘Cyberspace and the American Dream: a Magna Carta for the Knowledge Age,’ a document that ‘represents the cumulative wisdom and innovation of many dozens of people,’ including Alvin Toffler, prepared for the right-wing The Progress and Freedom Foundation, states that ‘the bioelectronic frontier is an appropriate metaphor for what is happening in cyberspace, calling in mind as it does the spirit of invention and discovery that led the ancient mariners to explore the world, generations of pioneers to tame the American continent and, more recently, to man’s first exploration of outer space.’ We are not told what the voyages of discovery did to the indigenous populations; or that they were motivated as much by greed as the so-called ‘spirit of adventure.’ Unlike the original Magna Carta, which concerned itself with mundane political and civil liberties, ‘A Magna Carta for the Knowledge Age,’ places cyberspace at the zenith of civilisation: it represents ‘civilization’s truest, highest calling’ and would lead to unparalleled ‘demassification, customization, individuality, freedom’ and will be the main form of ‘glue holding together an increasingly free and diverse society’ (Sardar 1995).

A quarter of a century later, Shoshana Zuboff describes the emergence of ‘Surveillance Capitalism’ in similar terms. Surveillance capitalism replicates the dynamics of colonial conquest, particularly the Spaniards who stumbled into the Caribbean islands and arrived in the ‘New World.’ Zuboff draws parallels between ‘conquest by declaration’ used by Spanish conquerors and the claims of Big Tech ‘pulled from thin air when Google first asserted them,’ such as ‘we claim human experience as a raw material free for the taking,’ ‘we assert the right to take an individual’s experience for translation into behaviour data’; ‘our right to take, to own, to know, and to decide confer our right to take, to own, to know, and to decide’ (Zuboff 2019, p.179). As Lorenzo Viracini notes, conquest is ‘premised on what could be understood as *data nullius*. Not only data is appropriated in ways that resemble the appropriation of land that was deemed *terra nullius*, the development of this new capitalist formation is happening in a “lawless territory”, which is a good definition of what a frontier is’ (Veracini 2020).

For surveillance capitalism, the new variant, everything out there is *terra nullius* waiting to be conquered – from our dreams and aspirations to mortality and the very idea of what is human. Underpinning neoliberal conquests is the western ideal of absolute freedom and unqualified individualism. The freedom that capitalism advocates is not just freedom from responsibility or freedom to exercise unrestrained power. It is not limited to say, for example, the refusal to wear masks or maintain social distance during a pandemic, or spread fake news and white lies, or to humiliate less powerful individual and communities, or to impose your will on other economies, cultures and societies. Individualism and ‘love of freedom,’ the essence of western thought, supposedly go hand in hand, but often turn into unruly lawlessness and primitive atomism. Freedom based on individualism has no notion of community and is thus seldom seen in relation to others. Everything that makes us whole has been banished in the name of freedom. Since freedom itself is the ultimate good, it has no relation to any other social, cultural, political or public good. As Catholic philosopher D C Schindler points out, ‘we have separated what we mean by freedom from a substantial notion of the good, and we have in fact turned it thereby into a *substitute* for the good; that this substitution comes to expression not just in our explicit discussion of freedom, but more generally in our institutions and “values”, and in a variety of other cultural phenomena, which is to say that it both expresses and gives rise to patterns of fragmentation and contradictions’ (Schindler 2017, p.2). It is, in fact, asserts Schindler, a ‘diabolical’ notion of freedom. It seeks freedom from reality based on an insatiable desire for escaping our own nature, for individual immortality, and for technological omniscience. Old age, for example, is not seen simply as a natural process of biological change, but as a disease to be cured (Steele 2020). Death is not the natural conclusion of life but something that can be conquered. Dead dogs are already being cloned so their owners can enjoy the same/similar pet for decades. Eugenics is making a major comeback (Saini 2019; Eberhardt 2019); and human cloning is not far behind. A major achievement of the western civilisation is the globalisation of the assumption ‘that a human desire that is never satisfied and never ending is normal, truthful experience of humankind everywhere’ (Carrier 1993). The dominant ways of knowing, being and doing are all about enslavement to desire – not just for things and objects of consumption but also for freedom from all that makes us human. This, in essence, is the problem of, and with, the dominant contemporary epistemology.

And this is what higher education is nowadays all about: an attempt to educate desire. The function of capitalism is to increase desire, which can never be fulfilled. So, it is hardly surprising that universities have been taken over by neoliberal capitalism, as Shamim Miah shows in chapter six, and we have the spectacle of *Knowledge for Sale* (Busch 2017). Miah is particularly concerned about the expansion of International Branch Campuses (IBC) of western universities which export the neo-liberal model of higher education to the Muslim world. Any discussion of epistemology, Miah asserts, cannot ignore the role of IBCs which ‘fail to include, let alone imagine, knowledge systems which do not conform to Eurocentric notions of epistemology.’ This exclusion is embedded in the values and visions of the university, its curriculum and textbooks, and ‘the pedagogical tools it uses to teach the set western canons. The education that the students receive is often out of sync with their cultures, values and worldview; they

are almost completely ignorant of the intellectual heritage and literary canons of their own civilisation, and, for the want of a better word, brainwashed into uncritical acceptance of neo-liberal capitalism.’ The older, more established educational system in the Muslim world, a colonial inheritance, is also totally out of sync with the needs and requirements of Muslim cultures and societies in postnormal times. The post-truth politics, combined with AI and emergence of cyborg universities, have made the situation worse and we are now facing, Miah suggests, a complete breakdown in the integrity of higher education.

How do we than navigate our way out of the epistemologies of conquest and desire? How should Muslim societies meet the challenge of the changing forms of epistemology infused with the TRIGOXIC knowledge of postnormal times, embedded in ignorances and uncertainties, complexity and contradictions? Miah suggest that we need epistemologies that ‘liberate education from historic, present and future colonisation and are firmly grounded within the Islamic purview.’ An example is provided by ibn Khaldun who advises that tackling epistemological problems requires ‘human action in the outside world,’ which ‘materializes only through thinking about the *order of things*, since things are based upon each other.’ We need to appreciate, Miah contends, what is happening in the postnormal world, the sequence of events, and how events and issues are connected to each other and global and local levels. We also need to invoke, Miah argues further, the *maqasid al-shariah*, the original goals and objectives of the Shariah, such as social justice, welfare and public interest, which provide ‘the contextual understanding of Islamic value structures to be applied in different socio-political contexts.’

Surviving Lethal Epistemologies

The basic premise of postnormal times theory is that we are at a unique turning point in history: we face a simultaneity of complex and contradictory problems and issues that are taking us towards the edge of chaos. These challenges cannot be met with conventional notions of science or social sciences, politics, governance, and international relations; and emerging capitalist modes of knowledge production are adding fuel to the postnormal fire. Can we thus assume that the current epistemological framework, based as it is on conquest and desire, will collapse simply because it has become superfluous and dangerous? Or that the civilisation that underpins it would gain some genuine enlightenment and change its course? Indeed, can, would, and should, the West survive?

Recently, there have been many declarations on the demise of the West. For example, philosopher Rupert Read and sustainability expert Samuel Alexander have suggested that the West will be ‘destroyed by its own ecological contradictions,’ and declare *This Civilization is Finished* (Read and Alexander 2019). In *The Precipice* (2010), Moral philosopher Toby Ord piles up data after data on existential risk and declares both the West and humanity as endangered species. Extinction Rebellion (2019), the global environment and civil disobedience movement,

echoes parallel sentiments. So perhaps we can stop flogging a dying, or soon to be dead, horse; and take the advice of futurist Jim Dator. ‘It is clear,’ he declares, ‘the West is dead. It is time to stop beating a dead West. It is time to start grooming and riding new horses beyond even postnormality.’ The West ended after the first World War, and any pretensions it had to moral responsibility were shattered with the rise of weapons of mass destruction, asserts Dator. The West may give ‘some people reason for hope for a permanently better future’ but only by ‘destroying that hope for many more’ (Dator 2016).

However, it is not as clear cut as this. First of all, like Donald Trump who refused to admit, despite all the objective evidence, that he had lost the 2020 US presidential election, western civilisation refuses to concede its death in spite of mounting evidence; and it could, probably would, cause just as much shock and havoc as the deranged president. There is no point in registering a complaint. The parrot may well be dead, as in the famous Monty Python sketch, but no matter how many different ways you indicate its death, no one is going to accept that it is dead:

‘E’s passed on! This parrot is no more! He has ceased to be! ‘E’s expired and gone to meet ‘is maker! ‘E’s a stiff! Bereft of life, ‘e rests in peace! If you hadn’t nailed ‘im to the perch ‘e’d be pushing up the daisies! ‘Is metabolic processes are now ‘istory! ‘E’s off the twig! ‘E’s kicked the bucket, ‘e’s shuffled off ‘is mortal coil, run down the curtain and joined the bleedin’ choir invisible! THIS IS AN EX-PARROT!’ (Monty Python’s Flying Circus (1969))

There is, however, another problem: the West is now deeply intertwined with the rest. The West is not just a dominant culture, it is also a global socioeconomic order, interlinked and interconnected with the rest of humanity. The collapse of the West will not be confined to the Global North, it will take the Global South with it. As I have said elsewhere, the West ‘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!’ (Sardar 2021). So, are we doomed to be trapped in the time loop of *Groundhog Day* (1993)? Fighting zombie disciplines, vengeful capitalism, rampant individualism, and perpetual desire, without learning anything profoundly different, till the epistemological cataclysm takes up to the inevitable collapse? Or, is there a way to survive the onslaught of lethal epistemologies, and move forward?

‘What is survival?’, asks Tsing. ‘Scholars have imagined survival,’ she answers, ‘as the advancement of individual interests – whether “individuals” are species, populations, organisms, or genes – human or otherwise.’ In biology, it’s the ‘selfish gene’ fighting all and sundry to reproduce. In economics, it’s the selfish *Homo economicus* who follows his own interests at all costs. Not surprisingly, ‘in popular American fantasies, survival is all about saving oneself by fighting off others. The survival featured in US television shows or alien-planet stories is a synonym for conquest and expansion’ (Tsing 2015, p.27). This individualist notion of survival comes at the expense of communal or planetary endurance.

In postnormal times, our collective survival depends on creating mutual worlds based on mutually assured diversity that take us beyond modernity to genuinely sustainable futures. That requires rethinking much of what we take for granted – science, technology, medicine, politics, economic, philosophy and theology. We need to generate new epistemologies of collaboration, by working across difference, by synthesising outwards as well as inner experiences. ‘Without algorithms based on self-containment,’ notes Tsing, ‘scholars and policy makers might have to learn something about the cultural and natural histories at stake. That takes time, and too much time, perhaps, for those who dream of grasping the whole in an equation’ (Tsing 2015, p.34).

You can’t teach old paradigms new tricks! But you can develop new paradigms with anticipatory imagination, with due respect for and incorporation of metaphysics, with focus as much on our ignorances as knowledge, by shaping new disciplines that take us back to planetary boundaries – and, above all, by moving beyond destructive modernity, pernicious individualism, perpetual conquest and unbridled desires. At the very least, we need to start questioning the way disciplines are structured, researched and taught. We need to abandon the idea that, as Tudge notes in this volume, science will make us gods; that ‘science is the only mode of investigation that is worth taking seriously.’ Science, Tudge points out, is often ‘taught primarily as a practical pursuit, as if its task in life was simply to provide high technologies – especially of the kind that contribute most immediately to the crude and doomed ambition of perpetual economic growth.’ But there is an urgent need to conceive and teach science ‘primarily as an aesthetic and indeed a spiritual pursuit: its aim being not to “conquer” nature but to appreciate nature more fully. Neither should it be seen to be innately atheistic, as it has become fashionable to suppose. Science, properly construed, enriches *bona fide* religion; and *vice versa*.’

The struggle against dominant epistemologies, as Anwar Ibrahim argues in his Afterword, is a quest for epistemological justice. The fresh holistic and pluralistic epistemologies have to be a product of genuine synthesis. We need to be aware of the powerful tendency of existing paradigms to appropriate and assimilate. As Chandler and Reid note, the elite figures of the western academy systematically transform indigenous knowledge and non-western modes of knowing into ‘methods or set of analytics,’ and ‘then anoint themselves as the intellectual gurus, leading the struggles of the indigenous and of others, constructed as the collective resistance to the Anthropocene’ (Chandler and Reid 2020). British theorist Mark Fisher points out that the ‘system of equivalence’ that the dominant epistemologies, anchored in capitalism, seek is based on assigning a monetary value to everything. ‘This makes capitalism very much like the *Thing* in John Carpenter’s film of the same name: a monstrous, infinitely plastic entity, capable of metabolizing and absorbing anything with which it comes into contact’ (Fisher 2009, p.6).

There is little prospect, it seems to me, of ‘the possibility of life in the capitalist ruins’ that Tsing seeks. We need to preserve all life and its terrestrial abode beyond capitalism and the epistemologies of desire and conquest. That, I assert, can only be achieved through mutually assured diversity in our ways of knowing, being and doing.

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CHAPTER ONE

THE SMOG OF IGNORANCE: KNOWLEDGE AND WISDOM IN POSTNORMAL TIMES

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 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 be really desired.

In this chapter, I explore how knowledge production has been totally transformed over the last decade, and argue that knowledge is now shrouded in a ‘smog of ignorance’. I use the delineation of ignorance and uncertainty in postnormal times theory to show that emerging epistemologies will make the conventional exercise of wisdom almost impossible. I suggest that postnormal times require a new order of wisdom capable of circumnavigating the smog of ignorance. We need to move 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 post-normal times.

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 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 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’ (Kogan 1995, p.192).

In Muslim civilisation, the conceptualisation of knowledge was a major intellectual activity from the tenth to the fourteenth century, 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, doubt (Rosenthal 1970). For Ibn Rushd, knowledge is a combination of sense perception and ‘intellectual intuition’; an amalgam of essence and being (Kogan 1985). Al-Ghazali suggested true knowledge reveals the reality of things as they are, and transforms the knower (al-Ghazali 1962). Ibn Sabin defines ‘knowledge as that which clarifies the truth and gives information without leaving (the need) for anything to be investigated’ (Rosenthal 1970, p.58). 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 (Chejne 1982).

Explorations 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’ (Confucius 2008). 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 a 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. (Rosenthal 1970, p.40).

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' (Bakar 2018, p.88). 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 mode of existence, wisdom takes a quantum leap to another dimension (Kalin 2010). 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, Nicholas Maxwell (1984) argues that wisdom has been largely forgotten. Most of the problems of academia – fossilised disciplines, bunker mentality, inertia of institutions – is an indication of the absence of wisdom. Mary Midgley, who is seriously concerned with the (lack of) social responsibilities of scientists, concurs. Wisdom that is valued and loved, Midgley suggests, is difficult and requires time to search for (Midgley 1989). Linda Zagzebski (1996) considers wisdom to be an 'intellectual virtue' with flawless moral dimensions. 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 has 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 (Ravetz 1971).

There followed a heated debate between the supporters of what Karl Popper called *Objective Knowledge* (1972) and those who emphasised the subjective side of scientific knowledge such as 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 (1979). The debate was intensified with the postmodern onslaught on knowledge beginning with 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. 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* (1987). In *Laboratory Life*, Bruno Latour and Steve Woolgar (1986) showed that subjective concerns were not altogether absent from 'the construction of scientific facts'. What came to be known as 'Science Wars' followed with all sides taking an entrenched position on science and knowledge (Sardar 2001a, 2001b); and the issues remain unsolved!

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. Buckminster Fuller noted that knowledge doubled every century but by the end of the Second World War knowledge was doubling every 25 years (Fuller 1982). 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 lead to information, which leads to knowledge, which in turn leads to wisdom was introduced by Russell 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. 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 → Information → Knowledge → Wisdom

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’ (Ackoff 1999, p.170).

In this scheme, knowledge was processed, analysed or synthesized 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 computerized 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’ (Ackoff 1999).

Ackoff’s Data-Information-Knowledge-Wisdom (DIKW) scheme has been severely criticised for being too simplistic. Fricke (2009) suggests it is anchored in positivism. Boisot and Canals (2004) 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'. Rowley, (2007) suggests that the distinction between the terms is not adequate. Others have suggested the hierarchy is unsound and methodologically undesirable. Yet, the DIKW scheme has survived extensive criticism and has become 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 (Sardar 2010, 2015a, 2015b, 2019, and Sardar and Sweeny 2016), and what it implies for wisdom.

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' (Kraemer 1986, p.129). Al-Sijistani, much like al-Ghazali and ibn Khaldun, regard 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 (Chejne 1992).

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 and proximity to nuclear power plant, 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 calls 'uncomfortable knowledge' – knowledge that does not support dominant theories and hypothesis or cannot deal with complexity or 'wicked problems,' which is excluded from policy debates (Rayner 2012). Yet, ignorance is a natural product of every advance in knowledge; it comes, 'after knowledge' (Firestein 2012), the more we know the more our ignorance comes to the fore. 'Even as knowledge knows no bounds, so does ignorance' (Rescher 2009, p.2).

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' (Rescher 2009, p.2). Nevertheless, Gross (2010) 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. 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' (Gross 2010, p.68). 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 (Sardar and Sweeny 2016) – and categorised as Plain, Vincible and Invincible. 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. (1) The knowledge that there are things we do not know, such as how consciousness works, or why dreaming is important, or why are moths attracted to light. (2) Constructed misrepresentation based on knowledge, which would not only include Rayner's 'uncomfortable knowledge' but also Orientalism, epistemological bias of western disciplines (Elmessiri 2006, Lal 2002), literary ignorance, ignorance generated by rigid disciplinary boundaries and the weaponization of disciplines (Gross and McGoey 2015, Price 2011). (3) Ignorance that requires knowledge that can only be acquired in the future such as 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' (Sardar and Sweeney 2016).

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 et al entitled ‘Visually exploring gigabyte data sets in real time’ (Bryson et al. 1999). Bryson and 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 (Floridi, Luciano 2010). 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’ (D’Ancona 2017, p.48). Big Data had arrived.

But Big Data is different from the conventional data which basically consisted of facts, signals and symbols; or as Davenport and Prusak (1998) define it ‘a set of discrete, objective facts about events’. 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’ (Mayer-Schonberger and Cukier 2013, p.7).

A good way to see the difference between conventional notion 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 by on-line shops. Mood and emotions in images, videos, audio and other digital media can be recognised and captured as data. Whereas laborious surveys gathered data on attitudes, now it is instantly acquired simply

by clicks. All over 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 select only cases that he or she knows contribute favourably to the hypothesis’ (Levitin 2017, p.181-182). To this type of data manipulation, we can add a string of new entrants.

As 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’ (Pomerantsev 2019). 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 (Cassam, 2019). 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’ (Rabin-Havt and Media Matters 2016, p.5). 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 Republican Party and right-wing organisations’; the breath of lies the network spreads is truly ‘astonishing’ (Rabin-Havt and Media Matters 2016, p.5). 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 *Mail* routinely spread ‘front-page falsehoods’ and journalists on these papers have turned propagandist (Rushbridger 2019). Then there are countless on-line 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 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’ (Fieschi 2019). 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*, 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’ (Frankfurt 2005, pp.60-61).

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 on-line 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, on-line platforms and other digital apparatus. 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 aspect 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 James Gleick's 2011 book, *The Information*, sums up the situation: *A History, A Theory, A Flood*. But more than a flood, information has now acquired gargantuan dimensions. 'With information,' note Mayer-Schonberger and 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 combining through hundreds of billions of search terms – and it can produce answer in near real time, far faster than official sources. Likewise, Ertzoni's Farecast 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. (Mayer-Schonberger and Cukier 2013, p.11).

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 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 apparatus – 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 captures and commodifies the absolute reality of individuals, groups and communities – or 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’ (Consumer Report 2019). 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 12 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. Elsewhere, you can be imprisoned with digital technology.

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 can be as much a work of scholarship as 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 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 it; 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 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, that for bringing certainty information actually increases uncertainty, and that both hierarchical and linear distinction between data and information is evaporating, knowledge itself is set to transformed 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’ (McCarthy 1996, p. 23), 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’ (Amaro 2019, pp.125-126). 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 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’ (Hass 1990, p.74), is increasingly becoming obsolete. The modernist idea of autonomy of knowledge – ‘the conviction that some beliefs do not stand in need of any explanation, or do not need in of a causal explanation’ (Bloor 1976, p.5, who deconstructs it magnificently) – is simultaneously enhanced and disbanded: the autonomy now belongs to AI which generates knowledge solely on the basis of patterns and correlations.

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 no relation to, its component forms.

Emergent Knowledge is an amalgam of three distinct but interconnection components.

First: what we may (still) call true knowledge – that is, objective knowledge as defined by Popper (1972) that can be verified again and again and survives the test of falsification. There

will still be scientists working in laboratories collecting data, processing it into information, testing hypothesis, developing theories and solving puzzles within paradigms, and publishing in refereed journals. Researchers will still gather data in a conventional way 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’ (Taylor and Watts 2019). Much of clinical work is still based on DIKW 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, data mining in medical datasets reveal large amounts of ‘new knowledge’. And in the future, 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 randomized clinical trials in discovering medical knowledge’ (Cooper 2016). 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* (1975), 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* (1993) are on the verge of being realised. 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 the Cambridge Analytica (Bartlett 2018, Runcimen 2018); 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 (Price 2011); and deliberate creation of chaos to disturb an existing system in order to gain financial or political advantage (Martinez 2016, Owen 2015). 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* (Connor 2019).

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 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’ (Barbican 2019). 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 (Ravetz 1990; Rouse 1987). It is the apotheosis of postmodern experience of last decades, a direct product of the total relativization of truth and morality. Whereas postmodernism was ‘the new imperialism of western culture’ that aimed to consume and regurgitate non-western culture (Sardar 1998), the postnormal embodiment of knowledge aims to commodify the very essence and being of all on the planet.

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?’ (Ramirez, Ravetz, Sharpe, Varley 2019). 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 three Cs 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 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 water spout (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’ (Ramirez, Ravetz, Sharpe, Varley 2019). 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? (Ramirez, Ravetz, Sharpe, Varley 2019). The postnormal condition suggests not.

Perhaps AI could come to our rescue. If wisdom, as Swartwood (2013) 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. As Vallor (2017) 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’. 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:

Data → Big Data

Static, accumulative, localised information → Dynamic, Instantaneous, Simultaneously globalised and Localised Gargantuan Information

Knowledge → Emergent Trigoxic Knowledge, and

Wisdom → AI

But there a couple of nefarious ghosts in the machine.

First: AI operates with 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 in 23 March 2016, acquired racist and mesogenic overtones a few hours after its release; it had to be shut down within 16 hours after 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 AIs such as ELMO, ERNIE and GPT-2 have faced similar issues. The very fact that these AIs are named after the characters in American children's show, Sesame Street, indicate the problem here: AIs pick up prejudices and biases 'in the way a child mimics the bad behaviour of his parents' (Metz 2019).

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 all pervasive. 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 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 Weststrate, Ferrari and Ardelt (2016) tell us, three scientific methods of examining and measuring implicit claims to wisdom: 'descriptor-rating, person based, and experimental methods'. 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 possess 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 NordiCHI, 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?' (Pargman et al. 2018). 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 utilize 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’ (Pargman et al. 2018). 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’ (Pargman et al. 2019).

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 (Sardar 2010). Moreover, human wisdom also incorporates the rather essential notion of responsibility. As Vallor (2016, 2017) 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. Responsibility and accountability are essential moral components of the virtuous state that is wisdom. So the wisdom of AI, in the final analysis, 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 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 men, 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. Maxwell 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 realize what is of value for oneself and others, the capacity to help solve those problems of living that arise in connection with attempts to realize what is of value, the capacity to use and develop knowledge, technology and understanding needed for the realization of what is of value. (Maxwell 2007 p.79).

Maxwell suggests that such wisdom can be institutional and social; but I would argue it has also to be communal and networked. Just as knowledge is nowadays acquired in communities of researchers and scholars (Soloman and Fernbach 2017) wisdom too has to 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 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 pass 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

unpicks what it means to deeply listen, growing a “slow-time-space” that is more in alignment with our inner rhythms’ (Sayarer et al 2019).

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’ (Vallor 2016, p.154). 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’ (Vallor 2019, p.153). 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 advocates 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’ (Connor 2019) – and gathering together the knowledge and capability of stillness. 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 less power we have; the more information we generate the more agency and our 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 80 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.

Classical Muslim scholars, steeped in wisdom traditions, often began their scholarly works with a prayer; asking God to grant wisdom to their readers. The opening supplication of *The Philosopher Responds*, the intellectual correspondence of the tenth century philosopher, historian and political scientist, Miskawayh, has particular resonance for our postnormal times:

May God help you attain the truth and open your heart to it. May He preserve you from the folly of false views and help you avoid them. May He give you knowledge as you deserve and grant you a generous portion of learning. May He grant you happiness in the efforts you take and guide you to good. May He make you appreciate the beauty of decent conduct and conceding truth, and may He rouse your repugnance to unjust conduct and disputing untruth. May He help you unearth treasure troves of wisdom and shine a beacon for you to the darker reaches of knowledge. May He inspire you to just words, that you may choose then in all your affairs and concerns, and make them your custom in all you say and do (Miskawayh, 2019, p.3).

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CHAPTER TWO

EPISTEMOLOGIES AND CHANGE IN POSTNORMAL TIMES

Christopher Jones

As a teen in the late 1960s in California, one of my favourite lines from the surreal comedy group the Firesign Theater was ‘everything you know is wrong’—a truth-claim about America’s war in Vietnam, living in the atomic age, but also a more penetrating reflection about post-modernism—now even more true as postnormal times intensify. Post-structuralism and postmodernism swept through the humanities and social sciences while I was in graduate school and made fixed ontological and epistemological standpoints in Western mainstream culture even more problematic. Globalization and the relative cultural decline of the West after WWII further clouded the waters when looking at what knowledge is, how it is acquired, and how it is constituted. Postnormal times analysis has shed some light on the challenges facing those questions, responding to the increasingly fractured worldview that underlies our economic, technological, and social systems, the growing *smog of ignorance* addressed by Sardar (see chapter one), and need for wisdom futures (Lombardo 2017). The COVID-19 pandemic and accelerating climate change have fuelled the concomitant levels of ignorance and uncertainty that follow from the intensification of postnormal change and the rising complexity, chaos, and contradictions of human and planetary systems.

In this chapter, I explore ontology and epistemology and the connections between knowledge, values, worldviews, and behaviour through the lens of postnormal times theory. In particular, I

use the menagerie of postnormal potentialities – black elephant, black swan and black jellyfish – as my basic tool of analysis. As Mayo (2020) notes, there is a fundamental questioning of meaning at the root of our emotional and civilisational angst and also a craving for meaning; yet we face challenges even mapping the problem. The further we drift into postnormal times, the greater the yearning for the old ‘normal.’ Yet, ‘normalization camouflages the epistemological rupturing of established epistemic constructions making it difficult to map change’ (Mayo 2020, p.64). Postnormal analysis and futures studies approaches can help construct a map. I have been trying to better understand the map and contours of postnormal times, and to inform my own teaching and practice within the dynamics of postnormal policy (see Jones, 2018, 2019a, 2019b); and at its root, the question of what epistemology looks like in a postnormal political, cultural, and global milieu.

A good starting point is the realization that there is a proliferation of sources and streams of knowledge, as well as ignorances and uncertainties, as we navigate emerging postnormal times. The traditional sources for the generation of knowledge, such as universities, research institutions, corporations, governments, businesses and news organizations are challenged on multiple fronts driven by technology innovation, telecommunications, globalization, and social media. There is no single postnormal epistemology but a myriad of ontological and epistemological streams that feed a global ocean of shared/conflicting meaning.

Postnormal Times

Postnormal times analysis has emerged as an attempt to grapple with the enormous global forces of change facing individuals, families, organizations, and the species as a whole. It sprang from the work of Funtowicz and Ravetz (1993) on postnormal science. They described a new phase of scientific discourse ‘where facts are uncertain, values in dispute, stakes high and decisions urgent (745).’ Funtowicz and Ravetz advocated for a democratization of science, to involve more than government and corporate research and development labs, consultants, and lobbyists, but also the individuals, communities, and groups that feel the impacts of science and research. They also addressed the increasing complexity of ethical, moral, as well as economic decisions that result from technological innovation and science research. They observed the growing power of large organizations, unintentional consequences, and challenges of science and technology decision-making that increasingly reverberate through social, political, economic, and technical systems.

Sardar (2010) took the idea a step further with a seminal article proclaiming the arrival of postnormal times. He later posited that that we entered postnormal times around the beginning of the 21st century (Sardar 2017). A special edition of the journal *Futures* (Davies 2011) featured additional contributions to the idea, and literature has continued to grow on the theory, alternative futures, and the types of transformational or disruptive postnormal change (Sardar & Sweeny

2016; Sweeney 2017). The key concept of postnormal times what might be called a megatrend of greater *complexity* in the environmental, built environment, technology, social, political, and economic systems. Postnormal times theory rests on an historical analysis that social and organizational complexities have grown over the millennia, at least since the adoption of tools and language by our species. The shift from horticulture to early settlements and then civilisations allowed for greater population densities, but also required greater organizational and infrastructure development. Similarly, the shift to industrialization 300 years ago continued the trend towards greater population growth, larger settlements, densities, and the evolution of cities. According to the UN, nearly 5 billion people will live in cities by 2030—three out of every five people on earth. Human populations will increasingly depend on complex systems to sustain them.

Complexity can be seen in the development of machines, stock markets, educational systems, infrastructure, and virtually all aspects of human existence. But there may be limits to complexity, particularly in energy and resource use, as suggested by the Jevons paradox (1865; see Bauer & Papp 2009) and declining organizational efficiency (Tainter 1988). In the Jevons paradox, greater efficiencies through technological innovation may result, counter-intuitively, in greater rather than less energy use. In other words, greater achievements in efficiency may mask the externalities such as greater energy use, generated by complex systems. Tainter (1988) argued that: ‘1) human societies are problem-solving organizations; 2) social political systems require energy for their maintenance; 3) increased complexity carries with it increased costs per capita; and, 4) investment in sociopolitical complexity as a problem-solving response often reaches a point of declining marginal returns (194).’ Tainter posited that while some complex societies have failed due to environmental change, resource overuse, or moral decline, many societies have collapsed due to growing complexity and increasing inability to respond to the problems created by that complexity. Therefore, complexity may pose an existential threat to civilisation.

Our highly technological society has further accelerated complexity, particularly since the end of World War II. Technological innovation and discoveries accelerated by conflict included radar, nuclear fission and fusion, jet engines, rockets, orbital satellites, and computers. The complexity of these systems has also continued to increase, most notably in the increasing power and complexity of computers and is illustrated best by Moore’s Law that predicts the doubling of the number of transistors on a computer chip and the effective doubling of speed and power of computers every two years.

The second defining characteristic of postnormal times, concomitant with complexity is *contradiction*. Contradiction is easiest to see through the lens of modern media: the disparities between haves and have-nots, between the cores and peripheries of wealth and power, and a scientific worldview, whose extreme secularist wing argues against a higher power or human free will. Particularly in industrialized societies, with the emancipation of women, minorities, sexual preferences and gender choices, and polarization between progressive and conservative ideologies, contradictions have become commonplace and ordinary. What was once perhaps considered normal is fractured and disrupted. Whether this is good or bad, it is a reflection

of postnormal times. Postnormal times analysis argues that there is not necessarily a ‘clash of civilizations,’ but a potential simultaneous accommodation of, and opposition to, difference, modernity, tribalism, individual identity, and emerging potential global society. We can deliberately create new paradigms, if we can all learn to get along.

In postnormal times, contradiction might best be seen as a change driver, not as a problem in and of itself. In fact, the mirror of contradiction may be a key characteristic of emergent postnormal epistemologies, because all of the contradictions and polarities, good, bad or ugly, must be tackled at this point in human history. A prime example of that contradiction is the evolution of capitalism, now confronted not only with its internal contradictions, but a potential technological cornucopia thanks to automation, robotics, and AI that can only undermine the basic assumptions of scarcity economics. One contradiction is that unless human population growth trends can be mitigated, and consumption patterns altered, we will go far beyond the earth’s carrying capacity and scarcity of goods will be the least of our problems.

The concept of contradiction within the context of postnormal times logically leads to the third of the central concepts: *chaos*. Complexity and contradiction by themselves would not create postnormal times, but it is the chaos, the acceleration of change and disruptive nature of technological and environmental change, that creates system turbulence. This is where the language of complex adaptive systems may help the discussion. When biological systems, for example, become too complex, they tend to reorganize, to change shape or structure in order to accommodate system complexity or increased energy inputs. Similarly, highly complex, contradictory systems would logically become more chaotic and turbulent. Ironically, many systems are becoming chaotic at the same time. It therefore makes sense to consider the nature of phase shifts, trigger points, threshold effects, and other characteristics of phase transformation within technological, sociological, political, and economic systems. Sadly, our success with technology and the Industrial Revolution are now accelerating climate change as well, further adding chaos and turbulence to human systems.

Chaos is clearly linked to conflict, as well, and increasingly climate change and resource/water deficits and needs will likely fuel greater large-scale violence and warfare. Growing numbers of climate refugees will add to the challenges in many parts of the world, and the vast majority of climate change refugees are predicted to be Muslim. Warfare and regional conflict will only add to those refugee populations. The vicious cycle of violence is among the greatest concerns about the nature of postnormal times, unless humanity can find the collective wisdom to create and adopt a new worldview. Chaos is clearly exacerbated by new technologies, particularly smart phones and social media. Social media companies such as Facebook and Twitter are facing scrutiny for the proliferation of fake news, propaganda, and misinformation.

Another set of key concepts in the postnormal framework are related to the dynamics of change, especially the acceleration of change that inhabit complexity, contradiction, and chaos: the *speed, scope, scale*, and simultaneity, the 4s of change within these systems. Examples abound,

particularly in cyberspace and social media in the global reach of propagating memes, conspiracy theories, and viral kittens videos. This has profound implications for the shift and spread of epistemological change. The acceleration of change has been addressed by futurists for forty years or more, keenly identified as the acceleration of evolution by Platt (1981) across a number of aspects of humans on physical and biological systems. Moore's Law of the doubling of transistors on a computer chip every 18 months is an indicator of inexorable innovations that drive overall technological acceleration. The COVID-19 pandemic is littered with examples of the speed of change, from the speed of the spread of the coronavirus itself across the planet, to its various mutations and variants that emerged within months. Within days of identifying the virus, its DNA was sequenced, and the first vaccine was created even before the first deaths were made public. The speed of change is matched by its scope.

The spread of the internet, smart phones, and networking platforms have accelerated not only the speed, but also the scope of the flow of information. In the lead up to the US election in November 2020, *The Guardian* chronicled the explosive growth of QAnon conspiracy followers on Facebook: in June the largest groups had as many as 150,000 members with an aggregate of 3 million followers, and by August the aggregate had grown to 4 million (Wong 2020). The speed of meme spread is staggering, but misinformation and fake news spreads faster than the truth. Vosoughi et al. (2018) reported how false news spread on Twitter over a ten-year period, where 126,000 rumours were spread by some 3 million people. 'False news reached more people than the truth; the top 1% of false news cascades diffused to between 1000 and 100,000 people, whereas the truth rarely diffused to more than 1000 people.' The speed of satellite launches has accelerated with the success of SpaceX, but even more their spread through the launch of small satellite constellations: the current 2000 orbital satellites will be joined by tens of thousands more over the coming decade—Elon Musk's Starlink system will contain 12,000 small satellites by 2027 (Ryan-Mosley et al. 2019). The changes are not only technological, but demographic as well: sheer population numbers continue to grow (7.8 billion) projected to reach a high of 15.6 billion by 2100. The COVID-19 pandemic may slow this shift, but the overall speed of the transition from rural to urban living over the course of a century is historic, as is its concomitant spread across the planet.

The speed and scope of change are accompanied by the scale of technological and climate change. Diffusion of telecommunications and the internet across the planet is occurring at phenomenal rates. According to Kemp (2019):

- There are 5.11 billion unique mobile users in the world today, up 100 million (2 percent) since January 2018.
- There are 4.39 billion internet users in 2019, an increase of 366 million (9 percent) versus January 2018.
- There are 3.48 billion social media users in 2019, with the worldwide total growing by 288 million (9 percent) since January 2018.

- 3.26 billion people use social media on mobile devices in January 2019, with growth of 297 million new users representing a year-on-year increase of more than 10 percent.

The scale of change is global and yet it also offers an expansion of personal, individual power by providing information on demand at one's fingertips. What Gutenberg set into motion with the printing press will pale by comparison to this liberation of information. Revolutionary for individuals, evolutionary power in the hands of our species, according to Platt (1981). This evolutionary power underscores the simultaneous nature of the acceleration of change.

Simultaneity is a consequence of the increasing complexity of human and technological systems, globalization, and accelerating climate change and global weirding. As soon as the SARS-CoV2 genetic map was published, research began simultaneously in laboratories around the planet. The stock market decline in April of 2020 and economic disruptions were felt across six continents. Travel restrictions, tourism disruptions, bar and restaurant closings, and widespread unemployment were manifestations of a global pandemic with virtually simultaneous impacts in all regions and at all levels. The acceleration of global warming is another driving force that exhibits 4S change and simultaneity is occurring, but the effects may vary. For example, the heating has been the most extreme at the poles but the rise of the mean global temperature and sea level rise will have cumulative impacts with consequences for billions of humans, in a relatively short time frame, two or three generations. The relative speed may be much slower, but the scope and scale of change pose huge challenges.

The explosion of knowledge—at one's fingertips—is of questionable utility when there is info glut and a pandemic of misinformation about matters political and scientific. To factor in this dynamic, postnormal times theory deals with two other interrelated states: the levels of *ignorance* and *uncertainty* generated by postnormal phenomenon. Postnormal theory argues that as the world becomes more complex, there is less of it proportionally than any person or group of people can understand. There is a postnormal contradiction: as we generate more knowledge, we collectively understand less of it. Uncertainty is seen as an outcome of the convergence and conflict of the global driving forces of change, and interplay of new and diverse values emerging in global culture. Sowing greater uncertainty and distrust of the media has been the goal of state sponsored agitprop and fake news. Ideological media individuation and echo chambers may reduce uncertainty, but enhance ignorance. There are also radical greens, anarchists, and extreme libertarians who are serving as postnormal *agent provocateurs*, who would like nothing more than to disrupt 'normal' systems—normal as defined by one's perspective, expectations, and experience. Unexpected outcomes and wildcard events also add to uncertainty, and unanticipated consequences can be disruptive.

A set of tools for postnormal times analysis, and a creative ways to play with ideas about perturbed systems, is the *menagerie*, which consists of three types of animals: *black elephants*, *black swans*, and *black jellyfish*. They are seen not simply as metaphors, but as tools to overcome bias and explore our assumptions and preferences—as means to refine judgment about the nature

of transformational change. Wildcard events, noted earlier, are examples of black swans—low probability, but high impact events or developments. Black elephants are often Wicked Problems, obvious but ignored global problems, the ‘elephants in the room.’ Black jellyfish describe events like algae blooms and jellyfish population explosions. They are creatures in the normal background, but due to some external input (nutrients or energy) experience population explosion. The menagerie provides tools and mental models to assess postnormal phenomena.

Postnormal Times Menagerie

My exploration of postnormal epistemologies is organized around three key concepts/tools/metaphors for disruptive change produced by the driving forces set in motion by post-industrial technologies – the black elephant, black jellyfish, and black swan represent kinds of transformational change and phase shifts that we will experience in postnormal times. They are presented here as provocations, and although they are discussed in a linear fashion, progressing from the known unknowns (black elephants and jellyfish) to the unknown unknowns (black swans), there is considerable overlap between them, and some phenomena may fit more than one metaphor. What may appear as a black jellyfish for some may be seen as a black swan by others. In general, black elephants are perhaps recognized by many individuals and scientists, black jellyfish are similarly understood until they experience a postnormal burst (see chapter three), and finally the black swans, some of which may be imagined, but by definition are unexpected, low probability events.

Black Elephants

The black elephant - the ‘elephant in the room,’ – is a symbol of intelligence, persistence, and even wisdom. Black elephants are extremely likely and widely predicted events that are ignored or downplayed by many in a given context or a society as a whole. From a postnormal standpoint, black elephants challenge us to ask: what are most people missing or not seeing? The black elephant is an important didactic tool given that average humans do not engage in deep philosophical discourse, particularly about the nature of their own ontology or the biases and assumptions of their own epistemologies. Most humans have shallow knowledge and rarely engage in deep inquiry about the nature of nature herself, human society as a phenomenon, or their personal, idiosyncratic inquiry into the nature of being and acting in the world.

Philosophers across cultures and times have spent considerable energy pondering the nature of reality, the nature and purpose of being, and the number 42—the ultimate answer to the ‘question of life, the universe and everything’ according to the fictional Deep Thought computer that takes 7 1/2 million years to compute and check the answer (Adams 1979). Therefore, it seems probable that there will be competing and entangled traditional, modern, and emerging

epistemologies from the realm of technology, particularly algorithms, artificial intelligence, and cyberspace. The technology-based epistemologies emerging are also likely to generate their own chaos, complexity, and contradictions, both amplifying the scientific worldview, but also facilitating social media conspiracy theories, tribalism, and antisocial behaviour such as trolling, harassment, and anonymous or overt cyber bullying. The unintended and unanticipated consequences of surveillance capitalism, big data, and social control structures are also a part of the mix in trying to grapple with emerging ontology and epistemology. Many of these issues rise to the level of black elephants.

In the West, while the masses may be more distracted by entertainment and endless consumption behaviour in big box stores and online shopping, there has been some popular interest in one black elephant, the culture conflicts over secularism and metaphysics. The Enlightenment and scientific thinking that dominate higher education appear to have prevailed over revealed truth. Science, research and development, and technological tools have transformed work, education, and standards of living throughout the developed, and increasingly larger proportions of the developing world. The power of secularism, embedded in the scientific and technological enterprise, is undeniable. However, the tension remains between rationalism and idealism.

One of the biggest black elephants (the tent is getting crowded!) is the decline of the West, in general, and the decline of European intellectual and philosophical dominance of the planet. The reasons for the decline are many, including demographics, historical trends, postcolonial independence, and globalization itself. Hegemonic studies hold that hegemonic power has shifted from Europe (first the Dutch, then the British) to the United States of America, and will soon shift to Asia (most likely China/India). These trends seem to be a function of economic system shifts (like capital to China), but also of demographic shifts in the world. Europeans comprised about 30% of the world's population in 1500, but by 2150 they are likely to be approximately 10-15% of the world's population, including European descendants of the New World and Oceania. In terms of sheer demography, European culture would be expected to have a diminished influence on global epistemology. The flipside of that is that global capitalism has an oversized impact in terms of its influence and dominance of economics and culture. However, there is ample evidence that the power of capitalism is in decline or at least threatened by its own internal contradictions—another black elephant in the tent. US global hegemony is now rife with contradiction, with forward military bases and drone warfare replacing neocolonialism, erosion of international institutions created at Bretton Woods after World War II, the rise of Chinese economic power (for example, the Belt and Road initiative) and its ownership of American debt, and Trump-era foreign policy isolation and incipient trade wars. The 2022 war in Ukraine adds even more uncertainty to the structures of the global capitalist world system.

There may soon be more black elephants in the tent than wild elephants left on the savannas and in the forests of the tropics and subtropics. These black elephants include most of the interconnected Wicked Problems that face the world today, and that will have, or are already

having implications for our ontology and epistemology. The implications for the dominant economic paradigm of automation, AI, and laborsaving technologies are profound. Unless forms of basic universal income are made available, the shift to automation and robotics, near zero marginal cost margins, and technological innovations will be extremely disruptive (Rifkin 2014) in terms of the basic means of production, creation and distribution of wealth, personal identity, and economic survival across the planet. If, as some have argued, we were moving towards *full unemployment* (Dator 2010) even before the global pandemic, our perceptions of reality and our search for meaning and sources of knowledge could be profoundly transformed.

More alarming is the black elephant of accelerating climate change and weirding (Sweeney 2017; Jones 2018), that is transforming nature from a relatively benign entity/phenomenon—in the period of climate history since the beginning of agriculture—into an unpredictable and often violent element of human experience. Lovelock (2006) calls it the *Revenge of Gaia*. The black elephants may transform or shift to the other animals in the postnormal Menagerie: the black swans and black jellyfish. As the *Limits to Growth* (Meadows, Randers, and Meadows 2004) models suggest, virtually all of the Wicked Problems facing us at a planetary level are interconnected: resource depletion, global pollution, population growth, and industrial output are complexly entrained. At this point in human history, we are both victims of and victors in our dominance of the planet. One of the biggest contradictions is that our success as a key species, one that has come to dominate the planet's surface, is that we are spoiling our own nest and have become an existential threat to our own species.

If there is an emerging postnormal epistemological consciousness, it will need to integrate both the convergent and contradictory aspects of an emerging, supposedly intelligent species (our species is called *homo sapiens*—in Latin, a wise human!) that has taken on the task of guiding its own evolution. CRISPR gene sequencing machines already give us god-like powers to manipulate evolution at the molecular level, not only of other plants and animals, but of our own genome as well. While there is extensive focus on high technology, computers, communications, and entertainment technologies, there is a similarly profound revolution going on in biotechnology as well. The potential for human change based on new knowledge of the biological and molecular world is staggering. The human potential movement argues for further extending human mental, cognitive, intelligence, and somatic control beyond the abilities of average humans alive today. The point is that epistemological choices are multiplying, rather than some approaches being superseded entirely by others.

There are many assumptions contained in the dominant Western, liberal democratic secular worldview. While it is certainly not monolithic, it would be useful to identify the global social enterprise characteristics that drive contemporary epistemology, given the typology and morphology of city infrastructure, global transportation and communications networks, and exchange flows. Those assumptions include a preference for hierarchy, male dominance, progress, material growth, throughput, increased energy use, and anthropomorphism. One

sign this is changing is the realization that the power of human activity on the planet has fundamentally altered the geology and chemistry of change at a planetary scale. A recognition of this change is the Anthropocene used to describe a new geological era. The term originated in the 1960s but was popularized around the turn of the century by Paul Crutzen, to describe the impact of human activity not only on the biosphere, but on the geology. Millions of years from now, alien geologists will be able to discern the impact of humans on geological strata given our transformation of the planet's atmosphere, oceans, and surface. Plastic and detritus of consumer society will define the geological strata as well as other chemical evidence, for example the residue of agrochemicals, pharmaceuticals, and other petrochemical by-products. Other terms have been proposed for the Anthropocene, and arguments continue about when it began – the consensus seems to be after World War II. The evidence grows that the power of our species to transform the planet is large and growing. According to *Scientific American*, the weight of human-made objects now equals 'the combined dry weight of all plants, animals, fungi, bacteria, archaea and protists on the planet (Pappas, para. 2)' We are crowding out the rest of our planetary kin.

Black Jellyfish

The next animal in the menagerie is the black jellyfish. The phenomenon is described by Sweeney (2017) using examples from US warships, nuclear power plants, and other conventional power plants whose intake pipes were fouled by a proliferation of jellyfish, a normal, common community member in coastal areas and harbours, whose growth is accelerated by agricultural chemical runoff and ocean warming. Black jellyfish exemplify a postnormal burst in full bloom. Examples of black jellyfish appear to be proliferating: 'monster' hybrid tumbleweed species reportedly taking over parts of California (Osborne 2019); growing ethical questions surrounding increased AI use in organizations (Capgemini 2019); the growing 'weaponization' of religion as a form of political protest (*The Atlantic*, 2018); and, wild boar mass migrations across the Malacca strait to the 'mystical' Malaysian island of Besar (Lamb 2019). The assumptions of major structures begin to dissolve and transform: industrial capitalism, patriarchy, growth, and the superiority of dominant cultures. Black elephants are revealed to be issues to be addressed when they transform into black jellyfish that can no longer be ignored. Many aspects of climate change seem to fit that model. The growing complexity, fragmentation, and fracturing of cultures and meaning suggest that epistemological jellyfish are everywhere. The echo chambers of social media, particularly with the acceleration of change, have spawned individuation of culture across the planet, particularly among younger generations. The development of postnormal times coincides with the post-truth era, with multi-layered, multicultural, and often deviant cultures.

There are lessons also from the postnormal science literature. Because science itself has become contentious, even fundamental principles of the Enlightenment are questioned and uncertain. For example, quantum physics interpretations suggest that reality is not nearly

as objective as our modern ontology would suggest. In my own lifetime, the theory of plate tectonics has gone from a fringe theory to almost law within establishment science. In an interconnected world, with the challenges of complexity and accelerated change, single scientific disciplines are no longer likely to be allowed the luxury of doing research in isolation. What is developed in labs across the planet is arguably everyone's business. The potential collapse of industrial capitalism and opening of private labs to inquiry and transparency could represent a paradigm shift for science. The growth and proliferation of citizen science projects, postnormal science efforts, and distributed computing research could be a black jellyfish phenomenon.

Extinction threats appear to be proliferating like black jellyfish, although if one occurred it would likely be classified as a black swan (discussed further below). From a global perspective we need to free ourselves, suspend our disbelief, to consider existential threats and the variety of scenarios that could lead to human extinction. After all, what is the value of epistemology when the threats to humanity are existential? For example, there has been considerable interest in the Fermi paradox, the idea that if intelligent life is commonplace throughout the universe, why we have not heard or seen any sentient communication from outside our solar system? The famous Drake equation enumerates the variables that calculate the possibility of intelligence being ubiquitous across the universe. The variables include such things as the rate of star creation, the number of stars that have planets, the number of planets that might support life, the number of planets that actually develop life, that develop intelligent life, and that fraction that reveal their existence by releasing signals into space. One key variable in the Drake equation is the lifetime of advanced technological civilisations. Advanced civilisations are presumed to face both internal and external threats, such as self-annihilation after the development of nuclear weapons. However, given the short span of three generations since the development of nuclear weapons, there is no possible way to estimate the longevity of our own highly technological civilisation. The human track record of sustaining civilisations and complex societies over the last 12,000 years (Tainter 1988; Diamond 2005) does not incline one towards optimism.

There are also considerable external threats including nearby nova or supernova, comet impacts, or interstellar dust storms. A recent science fiction answer to the Fermi paradox, from Chinese science fiction superstar Liu Cixin (2008), is that the universe is actually a very dangerous place for intelligent life, because the exigencies of growth argue for species domination and suggest that young technological societies are likely to be extinguished by more advanced civilisations. The point is that we have spent relatively little time as a species as an industrial society, even less as a high technology society. It speaks to our vast ignorance of ourselves as well as the universe. Our scientific and research projects probing the solar system and the greater universe have provided compelling knowledge, but also reinforce how little we know, and how much we potentially have still to learn about coexisting not only with our kin (human and animal) on planet Earth, but with our solar system, galactic neighbourhood, the far-flung galaxies, and cosmos beyond.

Black Swans

Black swans are unexpected, outlier developments or innovations, unanticipated events that cause disruptive change. Coined by Taleb (2007), the neologism has been a staple of futures studies for decades, known by other names, such as *blue-sky events* and *outliers*. Popular black swan, low probability but high impact, events have been explored for the past few decades (Petersen 1999; Taleb 2007). A small set of examples of black swan events: collapse of the earth's magnetic field, the stalling of the deep ocean current, civil war in the USA, a nanotechnology disaster, the collapse of the banking and finance system, a massive solar flare, cyber/global war, a human mutation, or the emergence of super AI. The collapse of the Soviet Union was a black swan for people living during the Cold War, even though it had been explored as an alternative future. So, the extent to which black swan events are more or less improbable is open to debate. But they could trigger the shift to Unthought Futures, where our level of ignorance grows and depth of uncertainty deepens.

Risk analysis of the potential for catastrophic impacts of small asteroids or comets indicates that the probabilities of a major impact were previously underestimated. Similarly, Dunlop and Spratt (2018) argued that the International Panel on Climate Change has consistently underestimated the existential threat of global warming and sea level rise. Dunlop and Spratt's argument, that the peer-review and vetting processes produce conservative reports and scenarios is a cautionary warning about confirmation bias in establishment science. The production of knowledge is inherently cautious, and temporal challenges in the peer-reviewed process add delays that further confound more extreme and disturbing outcomes from research and modelling. This amply demonstrates the crisis facing establishment science in responding to postnormal science requirements.

Against the backdrop of a relatively benign climate (the present interglacial) for the last 10 to 12,000 years, which corresponded to the rise of agriculture, we have also experienced a few hundred years of moderate climate. The trends broadly are clear: human population growth, resource depletion, pollution, species destruction, desertification will disrupt this benign normality. It is incumbent on ethical and enlightened educators and scholars, to explore the ontology of black swans and what that says about underlying systems and structures of knowledge. We cannot predict what the black swans will be, or honestly assess the probabilities or likelihood, but we can better understand the contours of change which those black swans could create. In other words, we need to have dress rehearsals of some of those unknown unknowns, explore unexplored futures that can help us navigate the contradictions and reversals, the tipping points and quantum leaps in social, political, economic, and species change.

Some of the geophysical changes that were set in motion at the beginning of the Industrial Revolution from fossil fuel use will take millennia to reach homeostasis, even if we take immediate action to reverse the effects of greenhouse gas emission growth in the atmosphere. Uncertainty and indeterminacy will increasingly characterize decisions and planning. It is in this context that the production of knowledge, and probably new structures of knowledge,

will unfold. Black swan planning exercises and the development of futures studies literacy to address these issues coincides with an era of increasing climate weirding (Sweeney 2017; Jones 2019). Black swans will inevitably emerge in macro trend areas: demographics, technology, economics, and global politics. Some emerging issues and developments could become black swans, but as noted earlier, some may also continue to be black elephants, due to denial and the opposition of vested interests. Tens of millions of people are climate change deniers, locked in a worldview that is self-reinforcing. In the United States, Brazil, and Australia, and elsewhere, climate deniers are, or have been, in the seats of government, entrenched in corporate culture, and likely to resist fundamental change to the bitter end. However, increasingly, climate change becomes harder to ignore or deny, with more frequent flooding, shorter winters, more frequent violent hurricanes and cyclones, and rising sea levels. Black swans and black jellyfish events and phenomenon will hopefully illuminate the black elephants – particularly the assumptions beneath the current economic and social realities that currently define philosophy and epistemology. At some point, the continuous disruptions will foreclose any possibility of returning to the old normal.

There are a number of potential black swans that exist/are emergent in postnormal space and times. Many black swans could propagate from the roiling chaos of polarities in politics and culture, for example the continuing power of tribalism on one hand and of integration and globalism on the other. Individuals have increasingly found themselves torn between these two allegiances. The diabolical invention of suicide bombing was certainly an example of a black swan emerging from the dark side of human imagination to oppose the military power of industrialized nation states (Curtis 2016). The recent release of US National Security Agency malware tools will undoubtedly have ripple effects across the cybersphere as hackers use the tools against individuals and organizations large and small. The apparently benign Internet, with the dawn of social media barely a decade ago, has spawned proliferating hate and malignant behaviour.

In the cybersphere there is abundant need for better understanding and comprehension of the enormous forces of change, the disruptive nature of ‘innovative’ technological advance. Blockchain, sophisticated algorithms, artificial intelligence, and mind–machine integration all present potential emerging black swan disruptions and they are all already having dramatic, direct impacts on both the production of knowledge, its structure, and our understanding of reality itself. Indeed, much of this built-in virtual environment is a product of neoliberal philosophy and Western values, but at the same time contains the seeds of disruption, revolution, and evolution of our understanding of what it means to be human (or machine: see the updated television series *Westworld*). The blurring of what is ‘real’ and what is fake is increasingly a challenge for those who lean towards evidence-based belief and epistemology. Propaganda is hardly new, but it has become more insidious, more disturbing and its impact now aided by technology. A recent example is the growth of video deep fakes, especially using Photoshop techniques to morph real video into pornography or otherwise maliciously altered to create a false impression. Similarly, *catfishing* has emerged as an insidious set of techniques to create a false persona on social media, particularly dating sites, for a variety of reasons. Does our individual

epistemology unravel when what we thought we believed to be true is found to be false? Being in postmodern space can be surreal, but how much noise and dissonance can we abide before we succumb to our revealed religion, cable channel, or favourite social media channel?

It is sometimes difficult when we are so focused on the demands of our daily lives to perceive the revolutionary changes that surround us. The ubiquity of surveillance technologies in large cities, the constant bath of electromagnetic frequencies, the frenetic growth of the *Internet of Things* develop and grow in the background but set the stage for waves of unanticipated change in the foreground. Only the most visionary science fiction writers two generations ago imagined having the world's information at our fingertips. Social media has transformed communication and information channels for younger generations. Younger generations are more technologically-sophisticated, globalized, international, increasingly diverse in their identities and gender choices. On the other hand, as science-fiction writer William Gibson famously noted: 'the future is already here, it is just unevenly distributed.' Populations on the periphery, cultures on the margins, rural people generally, and the marginalized continue to suffer most from these quantum shifts in human development. Postnormal space is unevenly distributed. Different regions, urban areas, cultures, societies and industries all experience their unique flavors of postnormal lag, creep, and burst. The threat of *future shock*, Alvin Toffler's (1970) diagnosis of our culture shock due to innovation and change, now spreads everywhere, from the indigenous reaches of the Amazon rain forest, Papua New Guinea, and Borneo to world capitals.

Other recent examples of potential black swan events (although they also qualify as black elephants) are illustrated by research that points to a climate tipping point in the Amazon basin, where it is estimated that a 20% loss of trees will fundamentally change rainfall conditions (Lovejoy & Nobre 2018). Similarly, the melting of Antarctic ice sheets, such as the Thwaites glacier may soon accelerate both sea level rise and advance further instability of other Antarctic ice sheets. In one single day in August 2020, 12.5 billion tons of ice reportedly collectively melted from Greenland glaciers (Solly 2019). An ice-free North Pole has been a black elephant, but will it propagate more serious black swan phenomena? Scientific research continues to demonstrate that previous estimates of melting, in both Greenland and the Antarctic, have been far more conservative than observed trends. At the end of the day, what is most important to consider is that whether black elephants or black swans, emergent or existing driving forces need to be examined.

A good example of our scientific ignorance is the realization, in the 1970s, that there existed an entirely different domain of single celled organisms evolutionarily distinct from bacteria and eukaryotes, called archaea. That is significant because they make up a large proportion of the biota in the ocean. They could become black jellyfish if ocean warming caused their populations to explode. Archaeal life produces hydrogen sulphide (H_2S), which could potentially cause a mass extinction or at the very least cripple human civilisation, if their populations did explode. There is clear evidence that H_2S is associated with previous mass extinctions (Penn State 2003). The oceans and seas increasingly inform our quest for knowledge and understanding of our place in the universe. And yet, one of the areas of greatest scientific ignorance is about the Earth's

oceans, particularly the ocean depths. As a land-based species, we tend to overlook the importance of oceans and perhaps even how water and the ocean environment may play a critical role in our understanding of colonialism, power, and knowledge in the current global civilisation.

Some of the epistemological lessons related to the ocean, climate change, and sea level rise are explored in recent science fiction and scholarly studies. In particular, the works of Kim Stanley Robinson (2017), Karin Ingersoll (2016), and Paul Werbos (2019) are worth noting. Robinson describes in lavish detail the daily life and struggles, state of the planet, and evolution of post-diluvian New York City in 2140 AD. The rhythms of a partially drowned city are reflected in the waves, currents, winds, and weather. The lived environment is the intertidal zone, and the intertidal zone is more than geography, it is living, thriving, surviving, and contested space. It becomes both metaphor and ontology of collapsing capitalism in the centre of economic power. Ingersoll (2016) makes a case for an oceanic epistemology, a way of gaining understanding of the world and self through what she calls 'seascape epistemology.' Her idea is that surfing and related activities in Hawaii require a holistic understanding of the open ocean, currents, waves, seasonal patterns, wind, and see life as they interact in relation to the other. In contrast to the Cartesian project, she argued that oceans and waves are not things, and that these elements provide a nonlinear approach and context for understanding, and they encourage adaptation and acceptance of change. What is most striking about Robinson and Ingersoll is how similar they are in extending the quest for knowledge into oceanic space. Given the importance of the ocean, even for landlocked communities, we need to understand mother ocean better. Ingersoll reminded us that secular worldviews are limited, and we need to 'engage ancestors, gods, oceans, rivers, valleys, winds, rains, and stars, which are a part of our community' (2016, p.35). Indigenous epistemology such as hers will be a critical part of the healing and regeneration of knowledge that may be required to survive in the rising intertidal zones.

Iconoclast futurist Werbos (2019) warns of the possible threats to the ocean, H_2S releases both intentional and accidental, and deep ocean circulation issues. He argued that H_2S poisoning is a potential existential threat, because of ocean warming and polar ice melting that could both stall the deep ocean currents therefore de-oxygenating the oceans encouraging Archaeal blooms, a black jellyfish that could become a black swan event. Ocean stratification and extinction events have been tied together in the fossil record. Werbos asserted that we do not know what is going on in the oceans now, and how the basic chemistry of stratification and fouling occur. He argued we need to understand far more about what the impacts of increased CO_2 and warming will be in terms of the archaeon world. While we have devoted libraries worth of propositions about the knower and what can be known, about our justification of our knowledge, its reliability, and the connection of our mind/brain to reality, we are very ignorant of one of the most essential parts of our planet, the oceans. Werbos reminds us of how little we know, and potentially some of the areas of Earth science that we could stand to fathom better. We know some of the chemical scenarios that Werbos presents are possible, and he asks: what do we need to know to prevent extinction outcomes due to our ignorance and partial understanding of how the world works?

Unthought Epistemologies

Postnormal times theory literature has expanded and deepened during the last few years. Furthermore, the COVID-19 pandemic has become a model case study in postnormal phenomenon and behaviour (CPPFS 2020): it has provided illustrations of our deepening ignorance and growing uncertainty, and opportunity to navigate the smog of our expanding ignorance, and explore unthought futures. Ignorance has now moved from the periphery to become the central concern of epistemology. Up to now, the production of knowledge and basic science has largely taken place in universities, corporations and public organizations. That has been the dominant model in the industrial era but higher education today is in crisis, and transformations in the peer-review process and academic publication industry are likely (see chapter six). The impact of the internet, the creative commons, and developments such as Wikipedia are already hugely disruptive. There are positive signs, such as community-based research projects that reflect a democratization of knowledge creation. As a species we will undoubtedly learn a lot from the current turbulent times, or we will extinguish ourselves trying. I also believe that the search for meaning, for hope, and for wisdom should inform our actions as we become a mature planetary civilisation. There is hope for a more transcendent epistemology and systems of applying knowledge wisely. Postnormal times analysis, epistemology, and futures studies may be an antidote to help reduce ignorance and uncertainty about our futures. It would seem that consciousness, and wisdom, above all, are not just about what the mind knows and how it knows, but a more integral awareness of our own consciousness, our relationships with others, and the environment. Hopefully emerging epistemologies are big enough to embrace pluralism, foresight, and human agency to accommodate beliefs and wisdom that we may not share in a chaotic period of human history.

We are near the end of the dominant Western epistemology. Esoteric philosophical discourse will not totally disappear but other postnormal forces will make it increasingly irrelevant. What appears to be the most significant challenge to traditional epistemology is shifting global demography and the decline of the West. The Pacific shift in culture, economic power, and population are key factors in this transition, and are perhaps inevitable in the extended present. Furthermore, as Sardar explains in his companion paper, the increase production of knowledge correlates with even greater ignorance. It does not devalue epistemology but it does dilute it. Climate change may also have a significant impact on both the production of knowledge and the importance placed on ontology and epistemology. For example, Morton's (2013) object-oriented ontology and concept of *hyperobjects* are the sorts of critical memes that have power to reframe our thinking, shift our nature paradigms. The emergence of artificial intelligence, particularly machine super intelligence, also has potentially profound implications for the use, function, and application of human intelligence. We may begin asking ourselves who and what epistemology serves: the dominant paradigm or an emerging consciousness that privileges reductive thinking less and wisdom more?

It turns out that in postnormal times, knowledge is a funny thing. It keeps growing, but has its limits and tends to generate contradictions, and is beset with uncertainty and ignorance.

Our knowledge is selective, shallow, tentative, and increasingly toxic. Emergent postnormal phenomena are likely to make it very clear that in order to survive as a species, we need to explore some of those social and policy paths not taken. Hopefully our species will remain wise enough to remain open to unthought futures and epistemologies.

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CHAPTER THREE

MANUFACTURED WORLDVIEWS AND THE SHIFTING LANDSCAPE OF DIGITAL KNOWLEDGE

Liam Mayo

‘Whoever speaks of crisis today,’ notes critical theorist Nancy Fraser, risks ‘being dismissed as a bloviator, given the term’s banalization through endless loose talk’ (Fraser, 2019, p.1). However, the perception today that humanity faces crisis after crisis is a very real one—one can sense, without being pompous or boastful, that change of a grand scale is upon us. And whilst globalisation, urbanisation, genomics and climate change foreground this transformation, it is the fledgling nature of digital culture that is incendiary to the change of our epoch. Today, thanks to digital culture, our fundamental understandings of reality are being challenged and expanded (Rosenfeld, 2015). In the era of ‘fake news’ the erosion of trust in traditional forms of knowledge making is normalised; exacerbated as both fake and legitimate news stories are shared through social media networks (Torres, Gerhart, and Negahban, 2018). These platforms, whose business models hinge on driving high volumes of traffic and social engagement, propagate and promote content that is likely to go viral over content that is factually accurate (Silverman, 2015). This content is underpinned by big data, the ‘dynamic, instantaneous, global and complex’ field that captures both conventional varieties of data, ‘facts, signals, symbols’ as well as ‘behaviours, emotions, actions and attitudes’; as a result, Sardar asserts, big data ‘incorporates the essence of individuals, groups and communities’ (Sardar, 2020, p.5).

While the value proposition of the internet continues to be a convenient site for collaboration and the dispersion of ideas, its accessibility and coordination abilities has forever altered the terms by which authority, knowledge, selfhood, reality and time are conceived (Torres et al., 2018; Kirby, 2006). Put another way, digital culture has advanced an attrition of worldviews and expedited the erosion of traditional forms of knowledge making.

This chapter introduces the notion of postnormal condition, distinguishes between postnormal and postmodern, and examines digital developments through four key concepts of postnormal times theory: *lag*, *creep*, *tilt* and *burst*. It is proposed that the current epistemological crisis—symptomatic of the postnormal condition—is a *cultural* crisis, owing to humanity’s inability to move beyond a manufactured normalcy that perpetuates a familiar sense of present. It will be argued that our desire to de-emphasise change, and make all things normal, fundamentally perpetuates a perception of crisis, individually and collectively. Moreover, our cultural propensity to downplay change in spite of change nurtures ignorance and fosters uncertainty; the distinguishing characteristics of the postnormal condition. Here, postnormal times theory is posited as a theory of change, that provides utility both as a diagnostic tool at the surface level and a conceptual framework to interrogate the fracturing worldviews experienced during significant change.

Postnormal Epistemes

Epistemology, as a way of building knowledge, has foregrounded the Western philosophy that has dominated the modern period. This is celebrated through the esteem and extension of Descartes, ‘I think therefore I am’: How can I know that there are (or are not) real things? What gives me (or denies me) access to the real? What defines the possibility of access? The possibility of possibility? (Morton, 2013). Indeed, thanks to Foucault, we may now read human history through the different ways cultures have developed knowledge about themselves: via economics, biology, psychiatry, medicine, and penology (Foucault, 2003).

In *The Formation of the Scientific Mind* (1938), historian of science Gaston Bachelard argued that the rupture of epistemology is a sporadic moment where accepted norms are distinctively broken away from. The academic A.T Kingsmith (2017) elaborates: the rupture is evasive, fleeting and interruptive, and makes problematic the established epistemological systems of truth, reason, justice, and morality. A rupture is a re-inscription of knowledge that branches off into different ways of being and thinking, theorizing and living. 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, with each rupture.

Certainly, this approach exposes the very nature of power and the role of academic disciplines, as purveyors of their field in suppressing social mutations, displacements and transformations,

in favour of the continuity of long-range historical concatenations. The prototypical example of this form of continuity is the manner in which western knowledge is constructed; giving us the neat, dotted line from Plato, to Descartes to Modernity (Vervaeke et al., 2017). Conversely, Galileo, Newton, Lavoisier, Einstein and Mendeleev, exemplify the discontinuity between epistemic configuration from one epoch and the next.

This illustrates the nuance between 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' (2017, p.596). 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* (2012), epistemologies can never be natural or complete: there is no equilibrium waiting to be discovered, no totality that negates the processes of change. Rather, what we have is Kingsmith's sea of anomalies; the tide that rises and falls, the river that ebbs and flows:

...from situationism's imagining of a world of random movements and structures, to deconstructionism's realizing 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. (Kingsmith 2017, p.596)

Postnormal times, as articulated by Sardar (2010), is a period of rapid and significant epistemological rupturing. It is not a single event, or a single moment in history. Rather, it is a period of transformation, where old ways of knowing are eroding and new are yet to emerge. This transformation means that change is not simply happening on the surface, but at the level of the basic tenets of our age's worldview (Montuori & Donnelly, 2017). Within postnormal times, we witness vast shifts away from that which we have understood to be normal – 'that which is frequently encountered: what is accepted as the dominant way of being, doing and knowing, conventionally seen as the standard, dictated by convention and tradition, backed by disciplinary structures and scholarship and what we are able to predict and control' (Sardar, 2015, p.27). These vast shifts are postnormal change. How we experience and respond to post-normal change is the postnormal condition. Thus, whilst our postnormal times are unique to our context, they are not an anomaly. Postnormal times have occurred before and will occur again. Consequently, postnormal times theory (Sardar & Sweeney, 2016) with its foundations in complex systems theory and post-normal science, is a theory of change; it tells the story of complex, chaotic and contradictory change of the contemporary epoch.

Our postnormal times are concomitant to digital culture; the omnipresent technologies, hyper-connectivity and vast societal structures that maintain, progress and celebrate its place in

our lives. With the emergence of digital culture, the reification of dominant forms of knowledge has become inadequate. Big data, the saturation of information, and heterogeneous claims to knowledge present a divergence from tradition. In our postnormal times we do not reject all truth claims. Rather, all truths have a claim: facts and values are equal elements in the process of constructing knowledge. In our context, digital culture is a paradox of normality because of its epistemological intrusiveness. We cannot disconfirm that which is online; it is truth to someone somewhere and spreading.

Indeed, our flexible relationship with the truth (and insatiable appetite for titillation) both recognises and undermines the authority of the traditional truth-teller: the scientist; the scholar; the expert (Wakeham, 2017). Online, campaigns against established knowledge can be led by anyone, anywhere; all that is required are the readily available tools to transmit an agenda. At times, these campaigns represent a wry wink at truth conventions. At other times, they are erroneous and provoke malicious manifestations with a view to diverging communities and fostering mistrust. For Nichols, this is 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 at all’ (Nichols, 2017, p.124). Long held worldviews—our normal bastions of wisdom—are now regarded with pessimism and contempt. As such, we no longer share a uniform worldview that guarantees divinity or prescribed standards of behaviour (Vervaeke et al., 2017).

This has empirical and cognitive implications. We see the shift of power from nation states and regional groupings to non-state commercial actors like Google, Amazon and Facebook. The hyper-connectivity and ubiquity of internet technologies, more than streamlining and expanding our access to realities, has shifted the dominion of the cultural agent to the user. With this, we move through the virtual realm in a manner that cannot be duplicated, inventing a pathway through cultural products which has never existed before and never will again. This is a far more intense engagement with the cultural process than anything offered before in history and gives the undeniable sense (or illusion) that we are controlling, managing, running and making up our involvement with the cultural product (Kirby, 2006).

For the user, this means that instead of a newspaper feeding us daily doses of shared knowledge, we

get a nauseating mix of news from forgotten classmates, slogan-placards about issues trivial and grave, revisionist histories coming at us via a million political voices, the future as a patchwork quilt of incoherent glimpses, all mixed in with the pictures of cats doing improbable things (Rao, 2012).

This experience is compounded, as one incident folds into another, then another; each intersecting with one another; each incrementally affecting the other, seeming to accelerate and

amplify with every moment. This barrage weakens our aptitude for discernment (Vervaeke et al., 2017). As such, we are yet to develop the wherewithal to effectively solve the perennial problems of life, largely because we are plagued by ignorance and uncertainty.

Ignorance, in postnormal times, is a manifestation of the realisation that the current dominant ways of thinking and knowing are insufficient to navigate the complexities of today. We are not equipped to think the unthinkable. We are ignorant to how the solutions to the problems of today will affect us tomorrow. We are ignorant to decipher the validity of information that is factual against the flood of data delivered to us daily (Sardar, 2015, 2010). This level of ignorance is unnerving to a society whose principle organising confidence has been bound to risk-mitigation and certainty (Healy, 1999; Beck, 1992). Our worldviews are shifting to be more akin to Donald Rumsfeld's notion of *unknown unknowns*, where there are an apparently increasing number of things that we don't know we don't know (Rumsfeld, 2002). Indeed, ignorance nurtures uncertainty. Uncertainty speaks to the problem of 'objectivity' that our experts (scientists, academics, economists, journalists, corporate executives) now find themselves experiencing. That is to say that whilst we have access to a gargantuan amount of information, this information is continuously evolving from interconnected local and global networks, meaning that its sheer complexity, rather than reducing uncertainty, in fact increases uncertainty exponentially (Sardar, 2020). These, I argue, are the embodiment of the postnormal condition.

Our Postnormal Condition

Let us exhibit our postnormal condition and its relationship to digital culture. We may begin by acknowledging that there is a vast complexity of physical infrastructure designed, built and maintained to enable the transmission of the internet across the globe. Satellites, submarine cables, antennas, poles, cables, nodes, routers and modems are deployed by a convoy of commercial and service providers, government agencies and marketeers who operate within complex, thatched economic, industrial and regulatory systems. The consumer—the user—via their computer and mobile device, may enter and explore an ever-increasing array of digital networks. Through these networks we expand our sense of self, expand our sense of reality and simultaneously expand our avenues to access new knowledge. Within these digital networks exist spaces for commerce, leisure, socialising, education and politics. With little to no learning curve, users accept that they are stepping from a physical world, rooted in well-defined and predictable boundaries, into a realm of pure communication, devoid of clear boundaries, where rules are continuing to evolve (Rosenfeld, 2015). So, our postnormal condition is primarily the texture between this myriad of sophisticated objects, with their unique affordances that connect us to the complex networks of the virtual realm.

Through these connections, users themselves have evolved the ability to multitask, becoming cognitively enhanced sifters of universal information. Space is no longer binary: 'where I am'

and ‘where I am not’; ‘physical’ and ‘virtual’; ‘adjunct and parallel.’ Rather, space is an infinity of data abstractions from the banks of every computer in the human system (Gibson, 2004). The further we are detached from references to real life, the more undefined things become and the more we function in the psychological state of the virtual (Gibson, 2004). This is at odds with traditional constructs of subjectivity: normal governmental and regulatory structures work to increase definitive ‘whereness’ of the subject (Stone, 1994). The complexity of the networks that link these spaces is unfathomable, and the movement between and within these spaces is outside the constructs of lineal time. Now, the inadequacy of Newtonian absolute time is not just that the hyper-connectivity of networked spaces has accelerated traditional temporalities, rather, the abstraction of self across each of these spaces is so severe that time, as an experiential part of the human condition, has altered. Thus, secondly, as digital culture sets the pace and space for life, our postnormal condition cultivates abstractions of selves across a multiplicity of spaces.

Because of this, adeptness at perpetual and rapid multitasking has now become necessity for navigating the imbroglio of modern life. Decisions are made on the fly, with five-star reviews and online opinions garnering the richest influence over our choices. So too, the need to record and share (as widely as possible) experiences and ideas is customary practise. Through this, our plurality of selves, takes form, abstracted across multiple spaces. This fractures the tie between what society has normally defined as a single physical body and a single awareness of self, moving us into a new realm of disembodied subjectivity (Stone, 1994). Indeed, whilst social networking may be a reason for participation in contemporary society, self-representation is the condition of participation (Thumim, 2012). Through the creation of virtual selves, we compose something tangible, yet still simulated, and through this construction we build who we are and create who we want to be (Rosenfeld, 2015). The ubiquity of digital technologies and the ensuing hyper-connectivity are normalised so that our identities, individually and collectively, are intimately linked to our online accounts. We present images of who we are, or want to be, to online communities that, in turn, either confirm or deny these identities. In this realm, we can be whoever we want to be; abstracted from physical reality. Existence can, for the first time in history, imagine itself immaterially socialised in virtual reality. This is life in pastiche, where new identities are explored and tried on (Montuori & Donnelly, 2017; Bauman, 2004; Maruyama, 1979). As such, digital culture creates the subject who is partly possessed by, and yet distinct from, the technologies that facilitate entry into the virtual realm. With this third distinguishing feature, we see that in our postnormal condition, the self-assertion of the individual now reigns supreme.

Finally, software algorithmic systems implemented by the corporate owners of websites, search engines and networking platforms, perpetually monitor online behaviour. Algorithmic rankings determine who and what gains visibility online (Cotter, 2019). They seek to understand what we do online so they can give us more of what we want—quicker—and sell that big data to other corporates who are also eager to do the same (Wheeler, 2017). In this regard, the users are consistently delivered information that not only reaffirms their already held beliefs and

speaks to their biases but is often information that is not curated or verified. Our access to new information and new realities narrows, rather than widens, in the virtual realm. So instead of an infinite savannah ripe for exploration, the virtual realm has become an increasingly narrow system of feedback loops that pander to our preconceived ideas and appetite for instant gratification (Silverman, 2015). As such, our postnormal condition should be understood by one final decisive nuance: that we are the victims of our own entrapment.

Manufacturing Worldviews

Of course, none of this is entirely new. Cultural and societal structures that emphasise self-assertion and perpetuate closed feedback loops for the reaffirmation of formerly held beliefs have long been established as part of modernity. As new ways of knowing and understanding present themselves, these structures shift and move to reify disruption into normalisation. This is further convoluted as significant and disruptive shifts occur alongside and amongst normal change. As a result, postnormal change and normal change overlap and exist alongside one another. Thus, it is often difficult to see the forest for the trees and sift through the processes of change to establish that which is postnormal, especially when our ways of knowing are so heavily prejudiced by the very change we are trying to interpret and understand.

This process of normalisation becomes problematic in postnormal times. Normalisation camouflages epistemological rupturing of established epistemological constructions, making change difficult to map. We create metaphors that relate new experiences to something we already comprehend and know, adjusting our behaviours in an attempt to overlook or ignore the changes happening before our eyes (Sardar & Sweeney, 2016). This is a decidedly cultural phenomenon that favours a ‘business as usual’ approach over the drive to address the uncertainties prevalent in the core assumptions that have governed our way of knowing. This approach preferences the attribution of fundamental changes to the foregone conclusions of existing orthodoxies, rather than pointing out the unnerving shifts away from traditionally held notions of ‘normal.’ The public discussion on global warming is exemplary of this. Those who deny the science that implicates humans as the dominate force driving global warming, point to the millennia of climate change before human existence. This argument rationalises change and normalises empirical consequences, absolving accountability and eradicating agency. Similar arguments are made across doctrines and ideologies to explain away the array of uncertainties that plague our existence: economic instability and social and cultural divisions, just to name a few.

Culturally then, the future—where the real change exists—remains a fixed point on the horizon; far from the present and yet to be attained. 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 happening. Rao argues that this is the manufactured normalcy field at play: the incorporation and normalisation

of change into larger conceptual metaphors built out of familiar experiences (Rao, 2012). ‘Manufactured,’ in this sense, is as articulated by Herman and Chomsky: norms that have been developed by powerful global institutions, including media and technology companies, that operate by relying on market forces, internal, unquestioned assumptions, and subtle manipulation to generate ideological and consumer driven desires and dreams (Sardar & Sweeney, 2016; Herman & Chomsky, 2010). By using the manufactured normalcy field, individual or communal consciousness perpetuates a continuous present through a familiar sense of a static.

Consider the mobile phone, which is far closer to a high-powered piece of computing technology than a telephone, as an example of this. The ‘smart phone’ is the metaphor for a device that is our personalised computer, offering access to our bank accounts, our social networks, our information hub, camera, photo album, entertainment system and so much more. With each iteration, as new technologies emerge, our manufactured normalcy field stretches incrementally to incorporate it as part of our culture. Thus, the mobile phone, with more power than we ever conceived possible, has become normalised. As such, it is now a necessity of modern life.

Indeed, modern life, or what Habermas called ‘the project of modernity,’ is very much what our sense of normal is predicated upon. As such, in presenting the postnormal condition it is important to distinguish between postmodernism and postnormal times theory. This is not only because postmodernism presented itself as the most radical challenge to the epistemological foundations of reason, objectivity and knowledge since the Enlightenment (Potter & López, 2005), but because postmodernity is deeply rooted in the culture of modernity (Delanty, 2000). As a consequence, rather than leading us out of modernity, postmodernity has led us toward, and remain with us, in our postnormal times.

Postnormal, Not Postmodern

To begin with postmodernism is an ‘ism,’ which, a quick Google search (as a Google search is now a source of knowledge) reveals, is defined as ‘a distinctive practice, system, or philosophy, typically a political ideology or an artistic movement.’ Postmodernism was a philosophical project championed by French philosophers like Jacques Derrida and Jean Baudrillard and American philosophers such as Richard Rorty and Fredric Jameson, who argued that there was no ‘truth’ out there waiting to be discovered. It was a political ideology with liberal secularism as its foundation. In contrast, postnormal times, as a concept, is concerned with change and aims to understand and describe the changing nature of change, and develop ways and means to navigate our contradictory, complex and chaotic times.

The overriding concern of postmodernism was with the demolition of the ‘Grand Narratives’ – Enlightenment Reason, Science, Religion, Marxism, Modernity, Tradition – anything that gives meaning and direction to our lives (Potter & López, 2005; Myerson, 2001; Sardar,

1998). Postnormal times suggests that grand narratives cannot be ignored: far from disappearing they are deeply entrenched, and the countless contradictions we see around us are products of the clashes, conflicts and differences that grand narratives throw up. Once you have deconstructed the postmodern onion, as Umberto Eco demonstrates in Foucault's *Pendulum* (cited Eco, 2007), there is nothing at the core: all is meaningless. Yet, in post-normal times, meaning is sought by everyone, everywhere—even at the extreme fringes of political left and right.

Postmodernism argued that the distinction between image and reality, reality and image, had evaporated, as demonstrated by Baudrillard in *The Gulf War Did Not Take Place* (Baudrillard, 1995). All was simulacrum. Postnormal times, on the other hand, takes the approach of critical realism, making specific distinction between the self, the manufactured normalcy field and reality; between perceptive and real change. Postmodernism aimed at dislocation and erasure of history; postnormal times recognises the value of history and tradition both as a source of injustice and grievance, and as a source of meaning essential for analysing and understanding contradictions. Postmodernism sought to give voice and representations to the 'Other' in history, anthropology and politics, but this access was conditional: it was granted on postmodernism's own terms, that is, the history, tradition, religions and worldviews of the Other had been already dismissed as meaningless (Sardar, 1998).

Postmodernism was infatuated with irony, ridicule and cynicism, exemplified by the 'magical realism' school of fiction, of which Salman Rushdie's *The Satanic Verses* (1988) is a prime example. Postmodernism promoted perpetual, all-round doubt. Cynicism and unbridled doubt become corrosive when they saturate a society or a worldview. So, postmodernism became a nihilist philosophy as confirmed by Gianni Vattimo in his *The End of Modernity: Nihilism and Hermeneutics in Post-modern Culture*. In the final analysis, postmodernism became a hegemonic discourse. Or, as Sardar (1998) suggests, 'the new imperialism of western culture' that sought to subsume and consume all non-Western people.

Thus, postmodernism and postnormal times theory must be distinguished from one another. Modernity and postmodernity were two epochs posited in a quite common—although by no means universal—philosophy of history. Unlike modernity and postmodernism, which were seen as the final goals of humanity, postnormal times is consciously perceived as a transitional period, between the 'no longer' and the 'not yet.'

While postmodernism and postnormal times are distinct periods, many contemporary problems and issues are a direct or indirect result of postmodernism. Through our transition, postmodernism perpetuated certain outlooks, desires and trends. Postmodernism has preserved—indeed enhanced—all the classical and modern structures of oppression and domination (Sardar, 1998), when 'anything goes,' everything stays, and expediency guides thought and action. All postmodern traits worked towards depriving individuals of their conscience, trapping them in a system where neither the ends nor the means need moral justification.

Ethics and morality are replaced with a perpetual and insatiable quest for consumption, an ever-present internal anxiety about choosing an identity wrapped in manufactured illusion, the inescapable bombardment of images and representations, and constant manipulation of/by all. Postnormal times theory has to address this legacy, as this continues to consume us in postnormal times. New practices emerge, with each epistemological rupture, and we creep toward postnormality. The distinctions between postmodern and postnormal practices are presented in the table below:

Postmodern and Postnormal Practices

Postmodern	Postnormal
The practice of taking and sharing selfies with the use of one's mobile phone.	Deep fakes are manufactured images or videos that make it appear that someone was somewhere, doing something that they were not.
The practice of liking posts on Facebook and re-tweeting tweets on Twitter.	Clicktivism expresses gestures online intended to convey socially approved attitudes for social or cultural causes. Slacktivism and virtue signalling are the common criticism of this action.
The success of television shows, where viewers at home use their phone to vote for their favourite participant and help in determining the winners of the competition.	Disney is researching the use of facial expression recognition technology and machine learning to assess audience reactions to films as a means to gather rich, moment-to-moment data (Saha, Navarathna, Helminger, and Weber, 2018).
The success of online dating services like Tinder, through which individuals make contact with physically nearby potential lovers, again with the use of their mobile phones.	Catfish are to be wary of when we are trawling online dating sites for new matches, as cyber-sex has become the normalised.
The tracking option for services, such as the ones offered by Amazon or Uber Eats, so that a customer can know exactly where their order is and when it will reach its destination.	Whilst we proportion our services via five-star rating systems embedded within mobile applications, in return we can also be rated as customers by vendors. More than this, our purchasing behaviour is tracked and monitored so intuitive software can recommend and promote products/services to us.
The diffusion of video recordings from personal mobile phones shown on television news (as evidence in cases of 'police brutality' for instance).	GPS systems within devices can track and locate people at all times and alert them to an incidence occurring within their close proximity in real time.

So, the manufactured normalcy field is distinct from reality, expanding and contracting, permeating and repelling as we re-orientate our perceptions of what is normal and is not normal. It is the cultural practises we employ to ensure minimal change, despite change. When we ask the question, 'is there a sustainable future?,' we are not really asking about fossil fuels, or feeding 9 billion people. We are asking 'can the manufactured normalcy field absorb such and such changes?' (Rao, 2012).

Postnormal Lags, Creeps and Bursts

The goal here is not to replace postmodernism with postnormal; rather to compare and contrast as a means to build the argument that postnormal times is, conceptually, a theory of change. As a theory of change, postnormal times provides a framework to begin to navigate change by articulating a unique set of characteristics that define postnormal change and underscore their impacts. Further, as a distinct period of change across a discrete cycle of time, it may also be transferred and translated across temporalities, cultures and contexts. For the British, colonising Australia in the 1700's was an entirely normal process. For the First Nations people of Australia, this invasion was entirely postnormal. There were some in the colony—missionaries usually—who sought to extend compassion to First Nations people through the teachings of Christianity. This was normal for the missionaries and postnormal for both the colonisers and the First Nations people. Thus, normal and postnormal systems have existed, side by side, in one form or another, for centuries. We can see similar examples in the Suffragettes movement, the animal rights and the climate movements.

Moreover, postnormal times theory provides a framework to make sense of the litany of surface level changes and a conceptual model to interrogate the fracturing worldviews experienced during significant change. This is not to say that everyone, everywhere, is affected by postnormal times in the same way, at the same time, or even to the same extent. Postnormalcy and normalcy overlap and exist side by side. Again, global warming exemplifies this: scientists insist that large scale industry contributes profoundly to intensifying the effects of climate change, whilst industry – grounded on capitalist interests – continues to pursue profits as primacy. Equally, as groups like Extinction Rebellion orchestrate large scale protests to raise awareness of what they call the climate crisis, politicians favour jobs growth and an agenda for economic progress to curry favour with constituents. Interests and values intersect with one another, and conflict ensues as established ways of knowing and understanding are tested and/or usurped; the potential for established epistemological systems to go postnormal expedites. Thus, the future does not arrive in a temporal sense, rather, it arrives chiefly through the impacts of social fragmentation.

This is evident in the apparent rise in popularity of the digital influencer, a type of micro-celebrity who are paid by companies to use their large online profiles to promote brands and products (Cotter, 2019; Abidin, 2015). Digital influencers, presenting themselves as ordinary individuals, can penetrate deep into social networks and are able to sell their message directly to the user through their shared connection. Through an impression of 'realness,' influencers foster a sense of intimacy, accessibility, and relatability, which forms the basis of affective relationships with their followers (Cotter, 2019; Marwick & Lewis, 2017). In selling their identities, they become proxy supporters of the manufactured normalcy field.

Far removed from traditional forms of advertising and marketing, the digital influencer goes to the heart of the concerns that many observers and commentators share regarding the now

seemingly fluid relationship between lived and virtual realities. Retail companies, interest groups and ideologues alike are able to acquire data to target vulnerable people, infiltrate social networks and use algorithmic software to create closed loop cycles of information to spread their messages (Marwick & Lewis, 2017). With digital culture, digital influencers are normalised; part of our culture having shifted our perception of truth, knowledge and expertise.

This is known as a *postnormal creep*; a process whereby positive feedback loops of highly interconnected and complex systems facilitate weird phenomena to penetrate the manufactured normalcy field. A great deal of research and development, design and marketing go into ensuring users seamlessly transition into new practises. Design choices are aimed at de-emphasising the strangeness of new technologies and reaffirming essentiality for modern life. What designers actually design are futures, not simply things that point at a certain future (Morton, 2019). Undeniably, the implicit power of technological change is that it arrives in ways that leave human behaviour minimally altered. The future is happening now: we have just become so accustomed to de-emphasising it that we cannot see it. Instead, weird phenomena cause us to creep toward our future. But just as normalcy and postnormalcy exist and overlap simultaneously, not everyone and everything is affected by postnormal creep in the same way at the same time.

Postnormal lag is the perceptual condition of denial; abnegation despite overwhelming evidence to the contrary (Sardar & Sweeney, 2016). The obvious example in the context of digital culture are the elements of the finance and banking sector that refuse to acknowledge and/or take seriously the emerging significance of crypto-currency. So, as the postnormal lag disavows change (despite change), and postnormal creep drives change while the manufactured normalcy field de-emphasises change, these processes occasionally converge, or indeed diverge, in different ways leading to a postnormal burst and systems go totally postnormal. What ensues is a perpetual bombardment of rapidly shifting agendas, legislations, messages and norms: chaotic, perceptual and actual.

We saw this play out at the end of October 2017. The *New York Times* published allegations of sexual harassment, assault and rape about Hollywood producer Harvey Weinstein. No one could have predicted the chaotic, and often weird, chain of events that followed. Weinstein was fired from the production company he co-founded. Criminal cases in New York and London began to build against him. More allegations from multiple women over several decades continued to surface in the media, as did stories of inappropriate conduct by others across the United States film and television industry. Amazon Studios director Roy Price resigned after it was revealed that, not only had he ignored claims by actor Rose McGowan that Weinstein had raped her but had himself inappropriately propositioned a female colleague. Morning television presenter Matt Lauer gave an on-air statement where he apologised and resigned from his role as presenter of *The Today Show* after allegations of sexual harassment mounted against him. Accusations against Kevin Spacey led to director Ridley Scott halting the production and the recasting and refilming of all the scenes Spacey was originally in, effectively

removing him from the film altogether. A postnormal creep that had been building for some time had gained momentum.

Within a month the list of powerful and high-profile men accused of sexual misconduct swelled to encase the broader United States community. Actress Heather Lind published a social media post accusing former US President George H.W. Bush of groping her from behind and telling her a joke of an overtly sexual nature. Olympic gold medallist McMayla Maroney accused the former USA Gymnastics team doctor Larry Nassar of molesting her. The writer, activist and Nobel Peace Prize Laureate Elie Wiesel was accused posthumously of groping Professor Jennifer Listman. Chefs, executives, union bosses, photographers and choreographers are amongst those named by capricious media outlets. As the postnormal creep accelerates, the postnormal lag—the misogynies of patriarchy—are revealed and challenged. As the complexity of systems—and the contradictions that lay within them—were exposed, a sense of chaos began to grip the movement; notions of consent, coercion and institutional complacency came to the fore; and we edged closed towards a postnormal burst.

By November, Theresa May's conservative government in Britain was embroiled in several allegations of sexual misconduct spanning decades and different political parties. This led to the resignations of Defence Secretary Michael Fallon and Welsh Minister Carl Sergeant – who took his own life four days after his dismissal. French President Emmanuel Macron expressed his horror over the allegations against Weinstein and announced that Weinstein would be stripped of the *Légion d'honneur*, the country's highest civilian honour, which he had received in 2012. In India, law student Raya Sarkar set up a Google Doc, accepting anonymous testimonials to sexual abuse taking place within universities in India. Up to 59 academics from 29 colleges were named, some of whom were prominent figures. Raya Sarkar's list sparked a debate on whether anonymous name-and-shame campaigns were just, and whether due process could be subverted. Several prominent academics, including Ayesha Kidwai and Nivedita Menon, issued a letter of response to Raya's list, and were criticised for defending due process. Another lag: Australian television presenter Don Burke, when accused of sexual misconduct by several women, denied these claiming, 'the Harvey Weinstein saga in Hollywood started a witch hunt.' Indeed, the image of a red-faced bloated Weinstein, the white rich man, became the archetype for the system that had suppressed victims and protected the powerful who perpetrated the abuse.

Amongst the chaos, actor Alyssa Milano tweets the message: 'If all the women who have been sexually harassed or assaulted wrote 'me too' as a status, we might give people a sense of the magnitude of the problem.' The #MeToo hashtag was tweeted nearly one million times in the 48 hours that followed Milano's Tweet, and in the months that followed, several millions more. Many of the tweets detailed individuals' experiences of assault and harassment. The term, 'the Weinstein Effect' has now etched itself into the zeitgeist of popular culture in a manner so dramatic it is befitting only to the exponent with which it shares its name. Litany that closes the loop and reinforces the new normalcy, the #MeToo movement demonstrates

the speed, scope, scale and simultaneity (4Ss) by which phenomena in postnormal times travel and impact systems.

It also demonstrates the complexity of mapping and navigating postnormal change. Creeps, lags and bursts exist and occur simultaneously at a diversity of levels. Within the #MeToo movement alone a diversity of creeps and lags impacted within and outside the phenomena. The justice system lagged against the creep of social media. Clicktivism crept against formal grievance processes. Heteronormative language was called into question as the creep of dissenting voices was amplified. Data, information and knowledge lagged against Big Data, the saturation of information and the plurality of claims to knowledge. The *burst* is a result of a number of influences acting against a number of systemic layers—creeping toward chaos—until the system is altered beyond return. The burst shifts the system at every level. In postnormal times, the nauseating rapidity with which these occur bombard our manufactured normalcy field; the experience that ultimately underlines the postnormal condition.

Postnormal Tilts and Vincible Ignorance

But was the #MeToo movement really a burst? Did the movement illicit change at every level? Has the creep overcome the lag? Has the system gone postnormal? From where we stand, the answer to this is unclear—and in fact may not be clear for some time. Postnormal times theory calls this *vincible ignorance*; when the answers can only be found sometime in the future, after a generation at least has experienced the impacts and effects of these developments (Sardar & Sweeney, 2016). Sardar (2016) contends that vincible ignorance ‘cannot be overcome in the present by learning as there is nothing to learn, but it creates an awareness of what we do not know and must seek to know in the future’ (p.123) .

This is juxtaposed against invincible ignorance (Sardar, 2015), the ‘unthought’ that lies beyond our imagination, which is ultimately limited to our language, frameworks and worldviews. This is the ignorance of our ignorance, an inherent ignorance of the potential risks of recent developments that requires radically new ways of anticipating and thinking (Sardar, 2015, 2010). One thing we do know from our current purview is that the #Me Too movement did not start with a tweet from Alyssa Milano. It was originally coined in 2006 by civil rights activist Tarana Burke, who began using the phrase ‘me too’ to raise awareness of sexual abuse and assault. It was only after a Hollywood celebrity used the term in her tweet that the movement gained widespread attention. This illustrates the influence of a creep over a long period of time; slowly gaining speed, scope, scale and simultaneity. It may also be illustrative of the strength of a lag—the long-held traditions, norms and orthodoxies, characterised by contradiction that exist in postnormal times and continue to influence systems significantly. In this sense, perhaps we can conclude that a burst is quite hard to come by.

What may be helpful is to be able to articulate the experiential shift in knowing and understanding that occurs at the torsion caused between a creep and a lag; before the burst. If the #MeToo movement gives birth to something different, then it was a burst. But if it resurfaces within the same parameters then it was a postnormal *tilt*. The *tilt* is a perceptual jolt; a wake-up call; a realisation that, despite our desire to maintain ‘business as usual,’ change is happening right now. The tilt disrupts our cultural propensities and forces us to reassess the fixed-point horizon thinking that has influenced our approach to futures thinking. The tilt leads us to assess the multidimensionality of change and comprehend our place and role as part of that change. In this regard, our epistemological crisis may simply be the tilt before the burst. Certainly, fake news, deep fakes and catfish, normalised with digital culture, are certainly illustrative of a postnormal creep. The maintenance of traditional truth telling institutions and lamenting for bygone eras of facts and certainty are illustrative of a postnormal lag. As we stand, in vincible ignorance, it is impossible to say. Only with time and greater perspective may we draw greater conclusions. What we do know, however, is that we cannot control postnormal times; we can only equip ourselves better to navigate them.

Conclusion

So, what makes *our* postnormal times any different to postnormal times that have come before? Further, what makes postnormal change more or less significant than normal modes of change? Certainly, these are the questions that go to the heart of the utility of postnormal times theory. The answer to both questions may very well be the same: nothing at all, and everything. Our postnormal times may very well be comparable to those that have come before; the uncertainty and ignorance characterising the postnormal condition may surely attest to the experience of those living through the very early stages commencing the end of World War II. I would even argue uncertainty and ignorance plague us at micro-moments throughout our lives; the death of a loved one, the start of a new job, moving to a new country: moments of postnormality through the experience of life.

However, and quite contrary, everything is different in our postnormal times. Never before in human history has one person been able to communicate with billions with readily available apparatus, like we do today. Never before in human history has the impact of human life been so detrimental to the life of the rest of the ecosystem, as it is today. Never before in human history have we acquired the wealth, know-how and connectivity to solve illness, poverty and inequality, like we do today. Yet in the face of significant change, dogged by uncertainty and ignorance, the postnormal condition is stifled to action. This conditioning, intimately entwined with digital culture, instigates a shift in the way we conceive of selfhood, authority, knowledge, reality and power. Yet the current epistemological crisis—symptomatic of the postnormal condition—is a cultural crisis owed to our inability to move beyond a manufactured normalcy that perpetuates a familiar sense of present. Our postnormal times, Foucault’s epistemological

rupturing, is a transitional period where old paradigms are dying, and new ones are not born. In postnormal times, the very nature of change is changing. Thus, we stand with no certainty of any return to a past we once knew and no true sense of a way forward. Digital knowledge is making conventional epistemologies increasingly irrelevant; we have to discover new ways of knowing that deal with ignorance and uncertainty. The challenge then, is to make weird those things considered normal, make problematic the normalisation process and commence a mapping of postnormal change. In doing so, postnormal times theory provides a framework to conceptualise, comprehend, make sense of and process complex change as a means to empower ourselves to navigate postnormal times.

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CHAPTER FOUR

ZOMBIE DISCIPLINES, ANTICIPATORY IMAGINATION AND MUTUALLY ASSURED DIVERSITY IN POSTNORMAL TIMES

Liam Mayo and Shamim Miah

In an interview with the *Journal of Consumer Culture*, the noted German sociologist Ulrich Beck reflected on the challenge of theorizing a society whose system of coordinates are changing significantly before its very eyes (Beck, 2002). Throughout his career Beck had repeatedly rejected, what he called, ‘zombie categories’ which he attributed to the sociological classics and claimed embodied aspects of experience were no longer relevant in the 21st century (Beck, 2002). Zombie categories, such as ‘social class’ or the ‘nation state,’ Beck contended, are merely kept alive today – artificially – by scholars (Gross, 2016). 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 (Beck, 2003). With these, 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?’ (Beck, 2002, p.263)

Indeed, these sentiments mirror those of futurist Ziauddin Sardar, who argues that postnormal times provides a lens through which we may interpret and understand the present period and 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 (Sardar & Sweeney, 2016). This is not the death nail for futures studies, rather, it is a redoubling of the importance of futures approaches and a signalling toward the importance of the imagination in navigating the changes of our age (Sardar, 2010; Montuori, 2011).

This chapter aims to do three things. First, to 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 Ziauddin Sardar's contention – that post-normal landscapes increasingly make irrelevant traditional approaches to dealing with perennial problems – and expand further on the notion of imagination as a means to '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' (Sardar, 2015, p.38). Anticipatory imagination (Bussey, Song, and Hsieh, 2017) is offered here as a useful process for questioning and formulating, and is linked to pedagogies of possibility (Bussey et al., 2012), and opening spaces for alternate forms of knowledge creation. Here, Sardar's notion of Mutually Assured Diversity (MAD) provides a holistic framework for operating across a whole range of cultural, social, political and discursive fields (Sardar, 2021). We make the case that, in light of zombie disciplines, fostering anticipatory imagination, within the operating framework of MAD, invites change and transformation at the personal and cognitive levels while fostering new values and new strategies that can creatively manage uncertainty and complexity. 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 metaphor provides a critique of knowledge in postnormal times; occupying the space of both the living and the dead, the personification of 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' (Vervaeke, Mastropietro, and Miscevic, 2017, p.27). The zombie has its origins in Haitian Vodou, via African spirituality; it represents the embodiment of the fear

of slavery, economic, political, or spiritual (Moreman, 2010). 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, transformed into the flesh-eating ghoul of modern cinema. To date over a thousand zombie movies have been made since 1920, over half of them produced in the last ten years. The zombie phenomena commercialized by George Romero's *Night of the Living Dead* (1968), considered to be the movie to popularize 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, 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' (Moreman, 2010, p.264), representative of the 'anxieties growing from the anomie resulting from a monolithic authority structure weakened by secularism, pluralism, and cultural relativity' (Moreman, 2010, p.265), quintessentially the slave without master, subject to their vilest desires and without hope of divine salvation (Moreman, 2010). As Deleuze and Guattari put it 'the only modern myth is the myth of the zombie' (Deleuze & Guattari, 1984, p.33).

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 (Webb & Byrnan, 2008). They shuffle from place to place, seemingly unattached; they don't 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 (Vervaeke et al., 2017). Indeed, zombies are us. Their premise is based on their self-reflected image of humanity. But zombies are ugly us. They lack dignity and in pursuit of their consumption they will destroy themselves (Webb & Byrnan, 2008). 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, in particular cultural studies. The idea of zombie as a metaphor has been developed by a range of academics, and the concept 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 notes:

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 (Quiggin, 2012, p.1).

An examination of zombie disciplines is crucial in postnormal times, especially given the entire *raison d'être* of higher education based upon critique, contestation and developing new knowledge has given rise to 'post-truth' (post-modernism), 'deep-fake' (not possible without computer algorithm) and 'fake-news' (made popular largely due to un-critical mass). 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, continues to exist and to teach next generation of students; thus, allowing the system to self-perpetuate (Apple, 2016).

A discipline, rooted in traditional forms of knowledge production and dissemination, in these postnormal times, rather than leading to wisdom, instead produce an epistemological veil, a 'smog of ignorance' (Sardar 2020); an obnoxious projection of the existence of knowledge that masks a lack of knowledge within a neo-liberal educational system which benefits only those within the power structure rather than the students (Apple, 2016, p.880). This diseased reasoning is helpful way of describing people's inability to provide authentic explanations to complex issues, because the capacity of organisations to make judgments have become infected with zombie ideas (Smyth, 2018).

Disciplines and Knowledge

The current disciplinary ordering and structuring of knowledge is largely a product of the enlightenment movement in general, and modernity in particular. During the pre-modern 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 fuelled 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, social sciences and humanities. Throughout the early twentieth century new disciplines were added to the growing list, such as psychology, and late twentieth century witnessed the growth of cultural studies, 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 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 (Skúlason, 2015). The French tradition, as seen with the l'Université 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 (d.1835) 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 rather than strong connections with ethics or wisdom. Foucault, in *Archaeology of Knowledge*, argued that academic disciplines are simply a set of ‘ideas’ that have been historically grounded in power structures and have actively re-produced existing power politics (Foucault, 1972). As such, modern knowledge production translates to power, control and exploitation. According to Guhin and Wyrzten, knowledge production is a political act, which they term as ‘violence of knowledge’ (Guhin & Wyrzten, 2013). They question the liberal assertion that ‘true’ knowledge is a-political, by locating the deeply political circumstances through which knowledge is produced. They draw upon postcolonial theorists to describe how the Other is subject to ‘violence of essentialization,’ grounded upon the principles of Orientalism, based largely on an academic pursuit for ‘dominating, restructuring and having the authority over the Orient’ (Said, 1979, p.3). Spivak is more granular in her analysis, referring to ‘epistemic violence’ as the process which Western forms of epistemology precludes or destroys local forms of knowledge (Spivak, 1988). As Sardar notes in chapter one, ‘wisdom integrates and unifies the knowledge and values of a person, it cannot be abused, and a wise person cannot be immoral.’ Thus, for the subaltern, knowledge, when linked to disciplines, is not the pursuit of the greater good, neither is it linked with wisdom, rather knowledge is the obliteration of the cultural coding that enable agency.

Today, we know that contemporary knowledge production is linked to neo-liberalism. 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 (Amin, 2014). 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’ (Amin, 2014, p.20) – what best suits those with power and influence in society (Husain & Osswald, 2016, p.1023). 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 (Polanyi, 1944). 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’ (Polanyi, 1944, p.24). More recently, most universities have developed a tradition, which embodies the market and the business model of neo-liberalism; as Sardar notes, ‘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’ (Sardar & Henzell-Thomas, 2017, p.5). 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 (Husain & Osswald, 2016). Additionally, the emphasis on creating a labour force, results in the student as the consumer rather than the learner (as Shamim Miah argues in chapter six). These

consumers become, what Matt Husain calls ‘zombie graduates,’ who are entitlement happy yet lack critical understanding and suffer acute philosophical poverty (Husain & Osswald, 2016).

Academic disciplines have played a critical role in shaping the way we think, perceive, and how we construct the ideas of reality. Indeed, contemporary modes of inquiry through social sciences, attempt to understand the human condition through a disciplinary mode. In short, we make sense of the world through specialized disciplines. Many disciplines within the social sciences, lead to zombification due to their epistemological contradictions – this is because of their inability to provide solutions to social problems as they play an integral part in creating the problem in the first place. For example, modern geography, which developed as an adjunct to Empire, has often been presented as providing solutions to poverty and underdevelopment within the ‘Third World’ while in reality it has contributed considerably to the poverty created by development and urbanisation.

Moreover, academic disciplines are not only bodies of knowledge or a way of thinking; it is also a tradition (Lummis, 2002). Most academic sciences only began to emerge in and through projects of capitalist-colonial world making. Thus, it is not surprising to see how many disciplines rooted within Eurocentric modes of thinking and practice are very reluctant in accepting non-Europeans into the canonical readings and theorists or taking up non-western subject questions. By using Western political theory, the master discipline of social science, as a case study, Lummis (2002) was able to show how ‘political theory is not simply a collection of the best books on the subject.’ Rather it is situated in discourse and as such it is a narrative; its key ideas take root and are given meaning in the context of that narrative. For example, ‘the Western-centric character of political theory is too obvious to require a lengthy demonstration. A single example should suffice: *The Cambridge Texts in the History of Political Theory* now numbers some ninety volumes, contains not one by a non-Western theorist’ (Lummis, 2002).

These issues are taken up by academics working within the field of postcolonial studies and Decolonialism. Decolonisation, as Bhabra (2018) notes, is a way of thinking about the world which takes colonialism, empire and racism as its empirical and discursive objects of study; it re-situates these phenomena as key shaping forces of the contemporary world. Lummis (2002) asks some critical questions relating to Eurocentric nature of disciplines in general and political theory in particular: Is it simply laziness or prejudice on the part of the theorists? Is it the old, arrogant inability of Westerners to believe that anyone other than themselves can have an original thought? Surely that’s a big part of it. But more interestingly, isn’t there something in the very nature of modernity, our cultural monolith, that systematically excludes non-Western knowledge?

Zombie Disciplines

So, disciplines disseminate ideas and concepts that are no longer representative of reality but continue to shape minds and imagination, education and policies, outlooks and futures (Husain

& Osswald, 2016). Zombie disciplines, we argue, are those disciplines that are products of modernity, diseased by neo-liberalism, unchanged and increasingly irrelevant in postnormal times. Drawing further on our zombie metaphor, zombie disciplines straddle the divide between living and dead, are unintelligible yet communal in their proximity to one another, seemingly unattached to one another, they are heedless, fierce and threatening but are not evil – rather scrabbling to satisfy a base instinct of their own craving. Indeed, zombie disciplines within the university lacks dignity – in pursuit of their consumption they will destroy themselves! And us!

These 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 perspective on biology, and many other ‘subjects’ in between. Appadurai has argued that anthropology, largely unchanged since the mid-twentieth century, must be rethought in a manner that transcends its rigid disciplinary basis. Rosa (2013) has argued the same for sociology; Nowotny (2015) and Giri (2017) similarly for science; whilst a long list of technological commentators speculate about the impacts of technologies and the inability of established disciplines to comprehend these (Brynjolfsson & McAfee, 2014; Srnicek & Williams, 2015; Tegmark, 2017).

Raworth (2017) and Streeck (2016) have similarly attempted to rethink the zombie discipline that is economics. It has been a widely held position that poverty is an outcome of economic under-development of nations, particularly in matters of production and maximisation of land, capital and innovation. The extension of this premise sees investment, modernisation, infrastructural development to be the solution to alleviate poverty. Contrary to that widely held position, Yapa (2002, p.33) has argued that conditions of social and economic deprivation experienced by people in poverty is a product of socially constructed ‘scarcity induced by the very process of economic development.’ Moreover, the ‘claim that poverty is an economic problem caused by lack of income is not a self-evident truth; it is simply a way in which we have been academically socialized to think about the difficulties that certain households experience in satisfying basic material needs.’ As Yapa (2002) reminds us, the materiality of the ‘poverty problem does not exist independent of discourses we have constructed to understand it. By concealing how development induces scarcity, social science discourse is implicated as a causative agent of poverty’ (Yapa, 2002). The mechanisms within social sciences are partly responsible for creating poverty through its epistemological structures. It is the construction of the binary distinctions around ‘developed vs. underdeveloped,’ ‘poor vs. rich,’ ‘industrialised vs. unindustrialised,’ ‘modern vs. traditional’ and so on, that is implicated in constructing ideas of scarcity. In short, social problems are not resolved by social science but rather constructed through discourse, which acts ‘as a causative agent of the very problem it is designed to address. This happens at least at three levels: first, when the problem is named and defined; next, when root causes are assigned; and finally, when prescriptions are suggested’ (Yapa, 2000, p.45).

Streeck argues that the end of capitalism is imminent, the result of a self-destructive process that began long ago, which will be followed by a sort of lapse before a new economic system is

installed. Streeck observes that it is at the exact moment in time that economics and sociology are so far out of sync (both zombie disciplines no less!), that they are needed most. Neither has provided a framework to bring people together toward a collective future, and instead further expedited the death of capitalism by promoting new divisions through convincing people that their liberation is achievable through a hyper-materialist existence. He attacks the fundamental mythology of neoliberalism, proposing that the financial crisis has exposed an ill-concealed tension between free-markets and democracy, suggesting that these ideals were best suited for the defence of the West against the Soviet-bloc immediately after the Second World War, but have now well and truly expired in currency.

Raworth, whose argument is the most advanced in this area, states that economics as the ‘mother tongue of public policy’ is fundamentally underpinned by ideas that we now know are out of date (Raworth, 2017, p.218). Her claim is that economics students of today will soon become some of the most influential citizens and policymakers that shape societies in 2050. Yet the discipline by which they are educated remains fixated on gross domestic product (GDP) as the principal measurement of economic progress. The shift that is required now, Raworth states, is to create an economic future that is ‘wildly unlike the past’ (2017, p.219). This requires moving: from GDP growth to a ‘doughnut economy’ that safeguards Earth’s life-giving systems; from self-contained markets to an embedded economy; from ‘rational economic men’ to social adaptable humans; from mechanical equilibrium to dynamic complexity; from ‘growth will even it up again’ to distribution by design; and from ‘growth will clean it up again’ to growth-agnostic. With these, Raworth is convinced we are equipped with a new economic compass to navigate the emergent postnormalities of our transitional epoch.

But where do zombie disciplines come from? Why are they allowed to lumber through our society and continue to infect us? To explore these questions, we take a closer look at sociology.

Sociology: The Birth of a Zombie Discipline

It is clear that sociology is a product of modernity whilst concurrently maintaining the objective to make sense of modernity. While modernity fundamentally transformed western societies through industrialisation, urbanisation, decline of religion, the introduction of sociology made it possible to reflect upon the nature of these socio-cultural transformations. In short, ‘sociological conceptualisations 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’ (Boatcă, 2013, p.56). However, within the discipline of sociology, it became important to challenge some of the many claims underpinned by the literature relating to ideas of modernity and liberalism, especially relating to the socio-political transformation of France and advances of liberty, equality and fraternity. In fact, as CLR James has pointed out, it was the slave resistance in Haiti that was instrumental in shaping these

ideas of universal rights into the minds of French thinkers (James, 2001). 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 (d.1857), the author of *Plan of the Scientific Works Necessary for the Re-organisation of Society* (1822), 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 a theological stage, through a metaphysical phase and gradually leading to a positive or scientific stage.

Whilst the origins of sociology can be traced back to Plato's *Republic* (375BC), Ibn Khaldun's *Muqaddimah* (1377) or even Baron Montesquieu's work *The Spirit of the Law* (1748), it was the fourth volume of Comte's *Cours de Philosophie Positive* (1838) that the actual term 'sociology' was first used. As a result, he is considered to be the father of modern sociology and his ideas enjoy the same legitimacy as the natural sciences. The second key figure within sociology was Herbert Spencer (1903) who combined scientific metaphors with sociological theories. Spencer's *The Study of Sociobiology* (1873) 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; whilst, justifying the status quo of the ruling classes in England by resisting social reforms made by the oppressed working classes. Whilst socio-biology has had a complex and controversial history, nevertheless, some of the ideas of race-science continue to shape popular and scientific debates (Sani 2020).

Given this historical context, we can see that the rise of sociology (and anthropology as a consequence) was materially connected with its Eurocentric formations. As Alatas has noted, the 'vigorous outburst of colonialism in the 19th century was accompanied by intellectual trends which sought to justify the phenomenon [of colonialism]' (Alatas, 1977, p.13). In light of the current questioning of sociology's heteronormative standpoint by feminism, critical race theory and others, Go has pointed out that sociology, and by extension any discipline, needs to take stock of issues relating to knowledge, power and standpoint. So, whilst the discipline is the product of history – it is the product of only one history (Go, 2013) – the history of the victor.

Not only do zombie disciplines have their foundations firmly anchored in imperialist and racist histories, they also have 'Great Men' associated with them who are required to be cited within the literature. Sociology revolves around three thinkers: Marx, Durkheim and Weber. Karl Marx's ideas have been well documented, especially relating to capitalism, economy, class struggle and ideology. Perhaps what is less frequently debated is his idea relating to non-European societies. In his analysis of the empires that existed before industrialisation, Marx viewed pre-capitalist 'Asiatic Empires,' such as Ottoman, Chinese, Indian and Persian empires, as subordinate to the West for, he argued, they had gone 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 (Marx, Engels, and Adoratskiĭ, 1942, p.439).

Max Weber's writings and interest 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 the world, 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 (Kalberg, 2008). Emile Durkheim's views on imperialism were slightly different to Marx and Weber, especially given that he did not publicly advocate nor hold a critical position on French Imperialism (Seidman, 2013, p.41). Nevertheless, these three classical sociologists failed to 'incorporate the dynamics of Empire into their historical sociology of contemporary society' (Seidman, 2013, p.39).

To spread ideas and concepts, zombie disciplines use canonical texts and, in the case of sociology, canonical sociological classics. As McLennan pointed out, these texts 'were largely couched as grand ethnographies of social progress, however complicated, featuring a common scenario in which non-Western societies are positioned as backward and modern capitalist ones as advanced' (McLennan, 2013, p.122). There are many epistemic shortcomings that give rise to sociology as zombie discipline, perhaps one of the most important of these is based upon the claims of metrocentrism; that is to say epistemological ideas underpinned within sociology, rooted within a specific understanding of Europe and rest of the world, is made universal through the writings of Weber, Marx and Durkheim (Go, 2013, p.19).

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 epistemological and ontological standpoints, its limitations and its ability (or more pointedly, inability) to navigate postnormal times. In postnormal times the mask slips from sociology and its related disciples, to expose its zombie nature, and in doing so it demonstrates how it leads to the logical conclusion of post-modernism – 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. The death of sociology may be correlated to the postmodern rejection of any grand theory or set of theories to explain the nature of society. There is also a broad ontological question which is raised not only by politicians, (such as the former Prime minister of Britain Margret Thatcher who declared 'there is no such thing as society, there are only individual men and women and families'), but also by cultural theorist and philosopher Jean Baudrillard (d.2007). In a number of transformative articles, especially *Simulcra and Simulation* (Baudrillard, 1994) and *The Gulf War Did Not Take Place* (Baudrillard, 1995) 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. Indeed, post-modernists argue that reality is washed away, replaced by relativism, perspectives and contexts.

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 on theorising significant societal change: ‘if the fundamental distinction and criteria that we have always identified with modern society no longer apply, where can one begin?’ (Beck, 2002, p.203).

We argue that contemporary society – which experiences change that both occurs rapidly and simultaneously, with on a grand scale and diverse scope – has become too complex, chaotic and contradictory for any discipline, sociology included, to comprehend with any rigour. Thus, disciplines are no longer the foundations of society, society is the foundations of disciplines. This is the tail wagging the dog. Moreover, the desire to play down this change in spite of it, is symptomatic of a humanity attempting to navigate postnormal times without the adequate know how to do so (Mayo, 2020c); zombie disciplines, create zombie people, who continue to make decisions that are informed by toxic knowledge (Sardar, 2020), and these further exacerbate the impacts of postnormal change (Serra, 2014). As such, our postnormal times may be understood as an epistemological crisis (Mayo, 2020b).

Culture and Imagination

The root of this epistemological crisis, assert Vervaeke et al. (2017) is Western culture itself – a result of the collapse of the worldviews of modernity which results has left society bereft of intellectual, social, and other resources to respond to emergent challenges. They take 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 tradition to compel action. As Vervaeke et al. 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 death epitomize’ (Vervaeke et al., 2017, p.42).

Indeed, ours is a cultural crisis owed to humanity’s inability to move beyond a manufactured normalcy that perpetuates a familiar sense of present (Mayo, 2020b). The British-Polish sociologist, Zygmunt Bauman, argued that the outcome of modernity was the Holocaust (Bauman, 2000). Clammer asserts that if Bauman is correct, ‘then it is indeed our very civilisation that has brought us to the brink of catastrophe, but perhaps this time to an ecological Holocaust. If this is the case than... it is our very culture and the values that constitute it that is the root of our problems’ (Clammer, 2014, p.41). Overcoming this crisis, then, will require having to rethink the domain of culture in our search of solutions.

Culture, as Clammer reminds us, produces knowledge through a constellation of values, assumptions and drivers that are constantly in flux (Clammer, 2014, pp.12-13). 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’ (Sardar, 2010, p.443). With imagination, the construction of myths and stories become the vehicle for communicating and negotiating meaning about our world (Brockmeier, 2009). These acts of meaning making link us to culture (Bruner, 1990). 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’ (Sardar, 2010, p.443).

Thinking about the future has 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 potentialities concerning possible, plausible and preferred futures (Bussey et al., 2017; Glenn & Gordon, 2003; Slaughter, 1996). The primary focus of futurists are images of the future (Dator, 2019; Polak, 1973), and as it is culture that provides us with such images, imagination is the realm of the futurist. In this way, Michael McCallum has argued that the futurists add value to the conversation about the future by instigating or mediating framings and ways of understanding to those that are not normally accessible to others (McCallum, 2017). Thus ‘the business of the future no longer has a “futurist” locus (if it ever did),’ rather it is the business of all disciplines to think about the future in a way that, as McCallum puts it, explore ‘how narratives may be created’ (McCallum, 2017, p.10). We also argue that futures thinking mitigates against the zombieism that threatens to infect disciplines. However, new thinking, in this way, requires new forms (Bussey, 2017).

This new form may be found in Transmodernity, Sardar’s concept that is ‘designed to address the positive element of self-renewal and self-reorganisation in diverse world cultures’ (Sardar, 2021). (Sardar’s notion of transmodernity should be distinguished from Latin American philosopher Enrique Dussel’s formulation of transmodernism, which is rooted in his Marxist philosophy of liberation and focussed on how communities of victims can speak for themselves (Dussel 1995) as well as other versions). For Sardar, transmodernity is rooted in the notion that cultures do not, and have never, existed in isolation, and that all cultures interact and all future actions are located in the intersections of cultures (Sardar 2006, 2012). In this way, Sardar proposes, transmodernity produces 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, 2021). Thus, transmodernity calls upon our imagination as our moral conscience to perceive and shape better futures that are inclusive of all forms of episteme.

However, the imagination is contextual; we cannot imagine beyond our experiential, spatial or temporal contexts. Indeed, contexts often seem hegemonic and diminish agency (Bussey, 2014), and as a result our futures are colonised (Sardar, 1998). 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. As Bussey suggests, this requires us, in thinking about the future, to ‘claim – or reclaim – our right to cultural agency... to offer alternative narratives, images and visions ... to hack into the cultural coding that [determine] how we think, relate, remember, act, love, fear and hope’ (Bussey, 2017b, p.89).

Thus, in moving toward transmodernity, futures thinking may be responsible for generating new possibilities within the cultural genome, exploring new pathways by reconfiguring old elements, inserting new code, and bring out creative work generating alternative futures (Bussey, 2017b, p.89). To achieve this, two things are required to be incorporated into the way we generate and disseminate knowledge. First, 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 (Bussey, 2014, 2016; Bussey et al., 2017; Bussey, 2017b). Second, an appreciation of the fact that our own happiness and enrichment depends on the happiness and enrichment of others, that we are not just different, but our difference depends on and is connected to all other different cultures and communities (Sardar, 2020). Thus, transmodernity may be achieved if we use the future as a way to unlock anticipatory imagination (Bussey, 2017) within the epistemological framework of mutually assured diversity (MAD) (Sardar, 2006). Let us explore these two concepts, and their interrelationship, in more depth.

Anticipatory Imagination and Mutually Assured Diversity (MAD)

As a pedagogical device, anticipatory action learning is a well-established approach to researching the future. Effective anticipatory action learning processes link individuals to social transformation, integrates different kinds and levels of appreciation of futures, creates open-ended and continually evolving conditions and contributes to intelligent action rather than formal knowledge (Sardar, 2013). Felder and Brent suggest that by working in the space between knowledge and problem is where learning is truly fostered (Felder & Brent, 2003). Within this framework ‘socially robust knowledge... capable of dealing with unknown and unforeseeable contexts’ is fostered and tested (Nowotny, Scott, and Gibbons, 2013, p.167).

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? (Bussey et al., 2017; Inayatullah, 2006;

Stevenson, 2002). 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 curriculum for the development of student anticipatory reasoning and questioning as well as into community engagement projects deployed by city planners to bolster participatory decision-making processes (Gould, 2008). Conceptually this future orientated attention essentially draws an awareness of and yearning for alternatives already embedded in the present data base of images and practises.

However, positive action, nested in constructive optimism (Stevenson, 2008, p.917), requires a healthy imagination that is ‘critically aware of the diminished futures that appear hegemonic in the dominant culture’ (Bussey et al., 2017). Bussey, working with his colleagues, has 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’ (Bussey et al., 2017). 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. Thus, personal imagination is dependent on an individual’s social and cultural capital and makes sense of deep existential questions of identity, potentiality and taboos; social imagination speaks to the assumptions, values, rationalities, and institutional conditions that set contexts; and cultural imagination exposes the historical and epistemological roots of context. Anticipatory imagination traverses all three plains of imagination to, in the case of Bussey et.al, 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. As such, an epistemological framework that creates space that synthesises the best of the diversity of cultures, without privilege, with a view toward transformational action. Sardar’s mutually assured diversity (MAD) offers us such a framework.

MAD premises that there is no such thing as a distinct culture, and that culture is diverse, complex, dynamic and adoptive. Moreover, Sardar tells us, ‘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’ (Sardar, 2020). As such, cultural relations, within the epistemological framework of MAD, are all about maintaining the external and internal diversity of cultures and ensuring that every voice is heard and acknowledged. This is fundamentally about mutual respect and that culture is an essentially a relational attribute that enables ways of knowing, being and doing.

Expounding on this, Sardar provides us with twelve varieties of mutually assured diversities – an ensemble we argue should be considered in framing our pedagogical approach to anticipatory imagination: definitions, dissent, discourse, demarcations, democracy, degrowth, dematerialisation, defence, dependence, desires, dignity and destinies. We propose that this pedagogical model for building anticipatory imagination, within the epistemological framework of MAD,

should be deployed and embraced across disciplines. We suggest that this model builds confidence around one's capacity to actively reframe contexts, deploy skills and materials in the quest to solve problems, whilst simultaneously enhance our collective endeavours toward thinking about the future. As such, we offer a thirteenth variety: mutually assured disciplines, to Sardar's MAD framework. Mutually assured disciplines would overcome zombie disciplines by harnessing pluralistic and diverse creative energies in a way that exercises individual and collective agency in the service of social, cultural and ecological processes that risk gridlocking transformational action, in a state of postnormal paralysis.

Postnormal Agency

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 (Evans & Strauss, 2010). In particular, agency refers to the agentive dimension of human subjectivity; the human specific capacity to actively influence and change their living conditions (Brockmeier, 2009). This capacity for action, Jens Brockmeier tells us, is mediated through the particular social character of human life (Brockmeier, 2009). 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 (Brockmeier, 2009). Indeed, we are reminded of Karl Marx who reflected, in his *Theses on Feuerbach* (1888/1969), that the 'human essence is no abstraction inherent in each single individual ... but the ensemble of the social relations' (Marx & Engels, 1968, p.14). The basic insight here is that agency, however constrained by the forces of culture, always lies with one's perspective and, in the context which they determine.

Postnormal times is a transitional period. What comes after postnormal time, Sardar tells us, 'can be consciously shaped to be better, saner, more globally and ecologically relevant, more pluralistic, more humane and more peaceful alternative' (Sardar, 2015, p.27). 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 intellectual and cultural space for the non-west by encouraging non-western cultures and societies to describe themselves with their own categories and concepts and anticipate their own futures (Boxwell, 2002). Further, agency is not an exclusive property of humans or even the biosphere (Smith, 2013). 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 (Braidotti, 2013)?

Indeed, the philosopher and feminist Rosi Braidotti advocates for a post-anthropocentric configuration for knowledge that grants the Earth the same agency as the human subjects

that inhabit it (Braidotti, 2013). This will require a reimagining of what is meant by agency. For Braidotti, these reimaginings 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’ (Braidotti, 2013, p.191).

Untapped visions may be explored through anticipatory imagination, within the framework of MAD. 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 Bockheimer 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’ (Brockmeier, 2009, p.227).

Agency, then, in postnormal times, exists everywhere, is open and fluid, is not linked to a dominant world view, and rather invites us to reimagine everything we thought we already knew. We can illustrate the differences in agency in normal and postnormal times as a table:

Layers	Agency in normal times	Agency in postnormal times
Personal	Individualism	Abstracted (through media)
Litany	I have the ability to influence the direction of my life	Everything has agency
Social	Systems	Networks
Systems	Set and rigid, institutional and paternalistic	Open, fluid and dynamic
Communal	The whole is greater than the sum of its parts	The whole is always less than the sum of its parts
Worldviews	Grand narratives	Eroding, new yet to emerge
Imagination	If you imagine it, you can make it so	Reimagine everything that you thought you knew
Epistemology	Transdisciplinary	Anticipatory
Ontology	Static	Process

Thus, a change in the ways in which we enact agency in postnormal times, a reimagining of how we are in the world, whilst enabled by the imagination and facilitated through the epistemological realm, also has implicate effects on the ontological realm. Let us address this in a return to our zombie metaphor.

Toward Transmodernity

Our relationship to the zombie has been one based on fear: fear of the Other, fear of the imminent existential threat, 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 artefacts of today. Others, like Deleuze and Guattari (Deleuze & Guattari, 1984) view the zombie from a Freudian-Marxist view, in which capitalism is the root of the so-called death drive; as people become de-humanised by commodification, they can increasingly look forward only to death (Moreman, 2010). Again, 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.

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' (Morton, 2010). 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 (Bussey, 2017 & Bussey, 2017a). 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 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' (Coole, 2013, p.453). This approach seeks 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 (Mayo, 2020c).

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' (Giri, 2013, p.102). This is resonant with object orientated ontology, an anti-anthropocentric philosophy that removes humans as the centre of the cosmos and asserts the agency of nonliving forms. With object orientated ontology, Morton postures 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 (Morton, 2010). In doing so, Morton keeps open a space for the uncanniness of our intimacy with the world and with other beings (Mayo, 2020c). 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 (Morton, 2010).

New disciplines that attempt to synthesise anticipatory epistemologies and process ontologies are emerging. A good example is posthumanism that has emerged as a discipline in reaction to anthropocentrism, situating itself as a group of ‘feminist minded, anti-racist, post- and decolonial thinkers and practitioners, who are trying to come to terms with the challenges of posthuman convergence, while avoiding universal posture or undue generalization’ (Braidotti, 2019, pp.86-97). Centres of research for posthuman studies have emerged in countries such as the UK, Denmark, Canada, Sweden, the USA, and South Korea and there are varieties such as theoretical, insurgent, speculative, cultural, literary, trans-humanist, meta-humanist and a-humanist (Koole, 2020). The emphasis in posthumanism is to respond to the perceived acceleration of social issues, the erosion of democracy, and increased disparity between rich and poor, by reconceptualizing our existence and, thereby, enhancing our capacity to move forward in a positive manner (Koole, 2020; Braidotti, 2019).

Yet emergent disciplines nested within the cultural ways of knowing and being of modernity are fated to zombification. Transmodernity, according to Sardar, has to be new ways of looking at ‘culture and shaping the world that goes beyond all our conceptions and perceptions of normal’ (Sardar, 2021); in other words, beyond modernity. Transmodernity is dimensionally geared toward ‘the constant transformation of all cultures; the transmission of cultures between cultures; transitions within cultures; transitive relations within cultures; translation of cultures between cultures; translocation of cultures in geographical spaces; transparency of power relations between and within cultures; transference of cultural desires to new cultural goals; transdisciplinary modes of study and inquiry and understanding of cultures; and, transcendence of the given future of modernity’ (Sardar, 2021). Transmodernity is not postcolonialism (another zombie discipline). It moves beyond – transcends – alterity, insisting that it is the diversity of communities and cultures, of things and the world around them, that truly makes the difference between survival and destruction. Thus, transmodernity, ignited by anticipatory imagination and framed by MAD, is all about power; it undermines ‘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’ (Sardar, 2021). With this, the zombie discipline, no longer a threat to our very survival, becomes a valuable part of our ecology, something to be engaged with and learned from, something from which we may begin to build a thoughtful future as a means to transform our world.

Conclusion

Should we reimagine our relationship with the zombie? The zombie as a symbol, as an abstract concept, fills us with fear as it reminds us of our fundamental deficits as a humanity. The zombie disciplines, as the forces 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, engage and learn from zombie disciplines and seek to navigate the future together. By examining images of the future, 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' (Sardar, 2015, p.27). In particular, anticipatory imagination, framed by MAD, nested within visions for a transmodern existence, provide a process that brings in the personal and transformational as domains of knowledge creation. As we have postured here, anticipatory imagination and MAD, when injected into the curricular that buoys zombie disciplines, unlocks agency, and fosters confidence around one's capacity to actively reframe contexts, deploy skills and materials in the quest to solve problems. The aspiration here is transformation from the inside out. Zombie disciplines, like the zombie itself, are not the enemy, rather relics from a modernity (Mayo, 2020a) that require excavation, a revamping and reframing, to help us transition toward that which is to come after postnormal times. Afterall, the zombie is fundamentally metaphorically transformational.

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CHAPTER FIVE

RETURN TO METAPHYSICS: KNOWLEDGE, SCIENCE AND THE ‘ART OF THE INSOLUBLE’

Colin Tudge

In the end, ultimately, life and the universe are beyond our ken. Most of what ought to be knowable remains unknown – and it is logically impossible to know how much is unknown since we would be able to gauge the extent of our own ignorance only if we were already omniscient, and so could compare what we know with all there is to know. All the really big questions – what is mind? What is life? Does God exist? – are unanswerable. Indeed, a great deal of what we would like to know is unknowable. There are no royal roads to truth. We may think we know this, that, or the other – but how can we be sure? Of course, we may *feel* sure, but how can we tell whether our certainty is justified? After all, the history of world – and, doubtless, our own personal history – is riddled with brilliant ideas and beliefs that turn out to be false.

What is truth, anyway? An idea is taken to be true if it corresponds to some reality. But that assumes that there *is* a reality. Is that really the case, or is everything illusory – or simply a creation of our own minds? Is truth merely what we perceive to be the case? To be sure, we can't make any intellectual progress at all unless we make at least *some* assumptions, and it is at least reasonable to assume that there really is a real universe, and that we – all and each of us – are in

it, and are part of its overall fabric. But reality is infinitely complex and the philosophies of the East tend to emphasize that this complexity is full of paradoxes and contradictions – opposite things seem to be true at the same time. In any case, what we call ‘truth’ is not and cannot be the thing itself. It is an *account* of the thing itself – a narrative, a story. What we call truth at any one time is a story that we happen to find convincing (but it may not seem so convincing tomorrow). Can ‘truth’ ever be more than that?

In short, it is at least reasonable to assume that there is something out there, and within us, called ‘reality’ and that some stories that attempt to describe that reality come closer than others – and hence are truer than others. But that, I reckon, is the best we can do, or can hope to do. The idea that we really can understand, and do understand, and hence by definition may become omniscient, like God or the gods, and ultimately omnipotent, so will have the freedom and the right to behave like gods, is at best what the old Greeks called *hubris*, which they saw as the greatest sin and folly of all. They were surely right.

But why don’t we understand our universe better than we do? We may offer all kinds of answers to this – including the religious idea that God allows us to know only what He wants us to know. More down-to-earth is the biological answer. For the fossil record and our knowledge of modern ecology tell us (or at least strongly suggest) that our brains evolved from the ganglia of ancient beasts and were shaped into their modern form by natural selection on the plains and woodland edges of Africa in the Pliocene and Pleistocene (beginning about five million years ago) as our physically somewhat feeble ancestors struggled to find food and mates and avoid hyaenas. Why should organs that arose in response to the everyday needs of the flesh give us insight into the arcane workings of the universe? How could we ever have evolved the ability to understand (or think we understand) more than is needed to keep ourselves alive? It is hardly surprising that the big things in life are beyond our ken. How could it be otherwise? Indeed, as Albert Einstein commented: ‘the most incomprehensible thing about the universe is that it is comprehensible’ (Quoted in Russell 2003).

The whole history of thought, including philosophy of all kinds, and science and theology, metaphysics and the arts, is humanity’s attempt to *understand*. Yet we must make this attempt with senses and brains and sensibilities that biologists at least would tell us were not built for the task. Our attempts to understand are heroic, yet always hampered by our own inappropriateness to the task. And there can be no end point. Omniscience must always be beyond our reach – and it is a huge mistake, which alas humanity has often made, to assume otherwise. The best we can hope for is some semblance of wisdom; and part of wisdom – Socrates suggested it is the main part – is the realization that all our explanations of life and the universe must fall far short; they are but narrow pathways through the thickets of uncertainty and unknowability. Omniscience is way beyond us.

But then what really matters – and this is humanity’s great motivator – is the *desire* to understand. As Karl Jung (1875-1961), put the matter in *The Stages of Life* (1931):

The serious problems in life ... are never fully solved. If ever they should appear to be so it is a sure sign that something has been lost... The meaning and purpose of a problem lies not in its solution but in our working at it. This alone preserves us from stultification and petrification.

Or as Robert Louis Stevenson (1850-1894) commented in his essay, *El Dorado* (1878): ‘to travel hopefully is a better thing than to arrive.’

So how in practice have human beings sought to achieve understanding?

Apollo and Dionysius

In 1998, in the 20th year of his Pontificate, Pope John Paul II delivered his encyclical, *Fides et Ratio*. It begins:

Faith and reason are like two wings on which the human spirit rises to the contemplation of truth; and God has placed in the human heart a desire to know the truth—in a word, to know himself—so that, by knowing and loving God, men and women may also come to the fullness of truth about themselves.

I think that says it in a nutshell. In the thirteenth century the Dominican friar Thomas Aquinas (1225-1274) said much the same (and the Catholic Church now acknowledges Aquinas as one of its greatest thinkers). So too in our own time does the Dalai Lama, who is the most spiritual of beings but is also a serious fan of science (I will discuss the meaning of ‘spiritual’ later). You don’t have to be a Christian or a religious person of any kind to see the wisdom in this. Faith might be called ‘intuition’: the *feeling* that such-and-such a thing is the case. Reason by contrast is ‘hard-headed.’ It implies observation – which, once ratified, we take to be fact; and analysis of the facts, guided by logic, aided by mathematics -- but also with leaps of imagination – leads eventually to ‘robust’ theory.

The contrast – or the complementarity – of intuition and reason are recognized in many different cultures and expressed in many different ways. The old Greeks contrasted the rational Apollo with the non-rational, from-the gut Dionysius, who was the god of wine among much else. Art historians contrast ‘Classical’ artists and composers with ‘Romantic.’ Modern psychologists speak of left brain and right brain. The two must be in balance – as encapsulated by the Chinese concept of yin and yang. Rationality without feeling, and intuition without the guiding hand of reason, both lead to trouble – intellectual, moral, and practical.

Modern Europe, at least since the seventeenth century, has emphasized reason. The eighteenth century in particular is commonly known as ‘the Age of Enlightenment’ – although the Enlightenment

style of thinking was into its stride before the eighteenth century and, like the last Ice Age, has never completely gone away. Charles Dickens (1812-1870) parodied the ultra-rational Enlightenment approach in *Hard Times* (1842), via the appalling schoolmaster Thomas Gradgrind:

Now, what I want is, Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these children. Stick to Facts, sir! (Dickens 1842)

Both approaches taken to extremes – reason without feeling; feeling without reason – lead to trouble. Thus, reason based on the apparently ‘rational’ assumption that individuals and societies should seek above all to improve their own comfort and security, has all too often led to class war and xenophobia and racialism – all often ‘justified’ by arguments that many at least find perfectly ‘reasonable.’ On the other hand, feeling untampered by the cool head of reason leads to all kinds of religious zealotry and murderous political ideology as is all too clear throughout history and alas in the modern world; or indeed, at the mundane level, to fights in the car-park when the pubs close (‘Leave it Barry, he’s not worth it!’).

Thinking and feeling in the modern world are very much guided by science on the one hand, and religion on the other. Science is commonly seen as the stronghold and the apotheosis of rationality, while religions in their various forms are strongly underpinned by intuition – often made manifest in what is perceived to be revelation and/or mystical experience. Many perceive the two to be inveterately at odds. Atheists of the most hard-headed kind take rationality as the only reliable guide to truth, and write off religion as ‘irrational’ – which is taken in effect to mean ‘mad’; and see science as its noble and necessary antidote, riding to the rescue of humankind like the American Fifth Cavalry. Many modern thinkers concede, however, at least up to a point, that science and religion are complementary. The American evolutionary biologist Stephen Jay Gould (1941-2002) said they are ‘non-overlapping magisteria.’ They are indeed both magisteria – where magisterium means ‘an authoritative body of thought and understanding.’ But Gould missed the point nonetheless.

For in truth, science is not unalloyed rationality. If it was, it would not work. Many or most of the greatest scientists of all can properly be called Romantics. *Bona fide* religion, on the other hand, as Pope John Paul intimated, has and must have a very strong cerebral tradition. Furthermore, the two overlap very considerably – each, historically, feeding off the other, as the Oxford-Lancaster philosopher of science John Hedley Brooke (b 1944) described in his seminal *Science and Religion* (1992). Their region of overlap is in the realm of what can properly be called *metaphysics* which literally means ‘beyond physics.’ But I will come to that. First let’s look at science. Is it really as ‘rational’ as it is often taken to be? Is it really as reliable as it may seem? Is it really – as some still assume – the royal road to truth, or at least the only sure guide to reliable truth?

The Rise and Rise of Science

Science is revealing a world and a universe more wondrous than even the most imaginative of poets could ever have conceived. Indeed, science itself is wondrous, that it should show us such things. Some, including both scientists and non-scientists, have assumed in the light of this success that science must one day tell us all there is to be known. Many have supposed that because the methods of science are so rigorous, and its cogitations and assertions are underpinned by mathematics, and maths cannot be wrong if it is carried out accurately (can it?) that whatever science does tell us, however complete or incomplete, must be reliable. Science is commonly seen therefore as the only route to *certain* knowledge—the royal road to truth and indeed to ultimate and certain truth. One day, indeed, so some believe, science will make us omniscient and the ‘high’ – science-based – technologies that emerge from science must one day make us omnipotent. Science, then, so some have thought (and some still think) will make us gods – and many behave as if this was already the case. This exaggerated belief in the powers of science – the belief indeed that science is the only mode of investigation that is worth taking seriously – is known as ‘scientism.’ In the hands of power-hungry governments and corporates, scientism is threatening to kill us all.

Yet insights dating mainly from the twentieth century – the century that pushed the boundaries of science further than ever before – have shown that such confidence is ill-founded – and nothing is more dangerous than ill-founded confidence. For one thing, certainty is not the same as truth. Science itself has shown us many times that ideas that seem established beyond all possible doubt, tested this way and that and apparently fitting all the facts, may be wrong, or at least may expose only one small aspect of reality. The Quakers advise: ‘think it possible that you may be mistaken’; and this is sound advice in all contexts. It is clear, too, that all serious scientific inquiry leads us into territory that is unknown – or indeed is unknowable; asking questions that lie beyond the capabilities of science to answer not just for practical reasons (as in, we can’t afford the necessary experiments) but also for theoretical reasons (the issue in question may not be amenable to experiment – or not at least to experiment of a decisive kind). A hundred years ago philosophers of the kind known as logical positivists argued in effect that what science cannot tell us is not knowledge at all and is not worth taking seriously, and some scientists are *de facto* logical positivists even if they don’t call themselves that. But to me, and I think to most other people (including a great many philosophers and scientists) that attitude – that whatever science cannot tell us is therefore beneath consideration -- is just a duck-out; a way to avoid hard questions. And since metaphysics literally means ‘beyond science’ I suggest that the big and serious ideas that lie beyond science belong *ipso facto* in the realm of metaphysics.

Science, like all big ideas, has deep and multifarious roots. It has picked up its ideas from all human endeavours from all the practical arts and crafts – farming, pottery, building, metalwork, folk medicine; from astronomy and natural history; from the abstract musing of philosophers; and from magic and theology. Astrology and alchemy, on the borders of science and magic, have both played significant roles in its development. Most cogently, all of science is underpinned by mathematics – which still has an occult quality, for no-one can explain why it is that mathematics,

the ultimate exercise in abstraction, can provide insights into the ‘real,’ physical world, as it very definitely does. Science in short is an innately mysterious business. Its diverse roots have sprung from all cultures and from all ages, including, outstandingly, China, India, Babylon, Greece, and – of key importance -- mediaeval Islam, in the Middle East and in Spain, which in the Middle Ages was centuries ahead of the west and north, though its contribution to the modern West is commonly unacknowledged. Mediaeval Christian and Jewish thinkers contributed a great deal too. Mediaeval thinkers were primarily theologians but it is a huge mistake to suggest, as many modern philosophers and historians have suggested, that they therefore contributed nothing to science, or indeed that they held up its progress. Mediaeval Christian thinkers contributed both to essential technologies, including clockwork; to the mainstream ideas of science – including the forays of the Oxford philosopher, Roger Bacon (1220-1292) into the science of light; and to the philosophy of science – including Bacon’s emphasis on the need for real, empirical knowledge, and the famous adage of the Franciscan friar, William of Occam (1285-1347): ‘non sunt multiplicanda entis praeter necessitatem,’ which means, ‘Entities are not to be multiplied beyond necessity.’ That is, don’t try to explain things you don’t understand by inventing some new force or entity *ad hoc*; or, more generally, embrace the principle of *parsimony* – keep explanations as simple, or at least as uncluttered as possible. This parsimonious approach to knowledge is commonly called ‘Occam’s razor’ and has stood scientists in good stead ever since.

Occam’s razor has its dangers however. It should not be taken to mean – as has often been the case – that the simplest explanation is always the best or (still less) that the simplest explanation must be *true*. Nature is extremely complex and we should not be surprised if the explanations that describe it best are themselves complex.

Then again, the perceived need for parsimony has often, at least arguably, made scientists too conservative: too inclined to reject new approaches simply because they are novel. Notably, the principle of Occam’s razor has been used to defend behaviourism beyond what was sensible, and to resist the new thinking of biologists like Konrad Lorenz (1903-1989) and Jane Goodall (b 1934); and new ideas on the way we acquire language as proposed by Noam Chomsky (b 1928). In a nutshell, the behaviourists sought to explain everything that animals do – and indeed humans – in a purely mechanistic way: as stimulus-response, and the accumulation of conditioned reflexes. But a great many naturalists (and pet-owners and farmers) perceived that non-human animals really do have feelings, and that they do think, and cannot realistically be seen simply as responsive machines. Chomsky showed that the behaviourist model of language acquisition – that we simply learn new words through reward (when our use of words has the desired effect) and punishment (when we’re ignored or struck down because nobody understands what we are gibbering about) – simply does not fit the facts.

In fact, as Einstein said: ‘explanations should be as simple as possible *but no simpler*.’

Indeed, we should not pluck *ad hoc* explanations out of the air but neither should we seek to ram all observations into the straitjacket of what we think we know already.

But to return to the historical thread: for various historical reasons the many threads of thought and craft came together in western Europe in the sixteenth century – notably with the Polish mathematician, astronomer, and canon Nicolaus Copernicus (1473-1543) who developed and promoted the idea of the heliocentric universe – that the Sun, and not the Earth, is the centre of things. But the first recognizably modern science properly dates from the seventeenth century, prefaced and encouraged by the salutary though somewhat misleading thoughts of the philosopher and politician Francis Bacon (1561-1626), and taken forward by such luminaries as Galileo Galilei, Isaac Newton, Descartes, Gottfried Wilhelm Leibniz, Robert Boyle, Robert Hooke, and the biologist John Ray. In those early days thinkers who explored the workings of life and the universe were called ‘natural philosophers.’ The word ‘science’ was freely used but was generally taken simply to mean ‘knowledge.’ The term ‘scientist’ was introduced only in the 1830s, by the Cambridge polymath William Whewell (1794-1866). He coined the word to describe the Scottish physicist Mary Somerville (1790-1872) since, he felt, he could hardly refer to her, a woman, as otherwise was conventional, as ‘a man of science.’

The seventeenth century brought huge advances not only in knowledge but in approach and in the philosophy of science. There was increasing emphasis on experiment and on the idea of natural law – what we might call ‘scientific’ law. Probably most famous is Newton’s ‘law’ of gravity: the idea that objects that have mass attract each other, albeit in a way that seemed utterly mysterious and still seems very strange. This is one of the great unifying ideas of science: for it seemed that this same law could explain why apples fall to the ground when they part company with a tree, and do not simply float off into space; and it also explained, just as neatly, how and why the planets continue, perhaps forever, to orbit around the Sun; and indeed, why all the stars remain in position, aeon after aeon. Thus, everyday phenomena were seen to march to the same drum as the entire cosmos, subject to the same laws and forces. This is a wonderful thought and it is far from obvious.

The idea of scientific law is still with us, of course, but modern scientists, at least *qua* scientists, think of the laws simply as descriptions of the way things are. By contrast, all of the great seventeenth century natural philosophers were deeply devout. All of those mentioned above were Christians. Newton spent more time on theology than on science. They all took it for granted that there could be no ‘laws’ without a law-maker, and that the law-maker was God. In fact, they would not have arrived at the idea of natural ‘law’ at all unless they had already conceived that there is a law-maker, both Creator and chief executive. In fact, the very idea of scientific law – one of the most fundamental ideas of modern science – sprung from theology. Absolutely not, it seems, are the two magisteria ‘non-overlapping.’ They have been yoked from the outset.

To some extent the seventeenth century greats were pragmatists, setting out to solve practical problems. Newton for example sought to apply astronomy to navigation – for this was a great age of exploration and long-distance commerce. But also, for Newton and the rest – particularly perhaps for the biologist John Ray – science was a form of worship: the use of God-given intelligence to understand and hence more fully to appreciate the works and the thoughts of

God. Indeed, they pursued science in the same spirit as J S Bach, a few decades later, who wrote of music: ‘the aim and final end ... should be none other than the glory of God and the refreshment of the soul.’

I have heard it said – often – that science is an innately blasphemous pursuit because it nibbles at God’s mystery. But that idea is surely the height of blasphemy for it suggests that God is merely a conjuror, whose tricks seem tawdry once exposed. The truth, in science, is the precise opposite. The more that scientists know, the more they see how much there is to know – and the more the mystery deepens, just as Einstein said. Indeed, the ever-growing sense of mystery is one of the great drivers of science, or at least of great scientists. This, as Hamlet said in another context, ‘is the appetite that grows from what it feeds on.’

Nowadays science is commonly taught primarily as a practical pursuit – specifically to provide high technologies. Most people surely agree that some of these high technologies are almost unequivocally good, including the vaccines that at the time of writing are our best hope against Covid-19 and its variants. Other high technologies, though, including super-crops and super-fast airliners and minute-by-minute surveillance and weapons that provide more bang to the dollar, raise very considerable doubts – at least among those who are seriously interested in the wellbeing and the long-term future of humanity and the natural world and not simply in money and power. Many technologies that should be almost unequivocally good are horribly misused, like modern IT. There seems to be no great idea that human beings cannot corrupt and mess up. Scientists and policy-makers in high-fallutin vein are wont to tell us that their goal is to ‘control’ nature or sometimes (somewhat chillingly) to ‘conquer’ nature or to ‘conquer’ space. They even tell us with truly Parnassian rhetoric that the ‘conquest’ of nature is ‘Man’s destiny.’ I much prefer the seventeenth century idea that the prime function of science is to help us to *appreciate* and hence to cherish nature, whether or not we care to see nature as the work of God.

Many modern scientists share this view. Many are still very religious and many of the greatest are at least deeply spiritual (the difference is discussed later) but nowadays, at least in the professional prints, they tend to keep quiet about it. Until deep into the nineteenth century, however, many scientists of spiritual bent were far more outgoing, and were happy to float questions of a metaphysical kind in public. Thus, in his *Theory of the Earth with Proofs and Illustrations* (Edinburgh 1795), the Scottish geologist James Hutton (1726-1797), often called ‘the father of the Earth sciences,’ very ably describes how volcanoes work. But then he asks, as a modern scientist would not, at least in their professional capacity, what God had made volcanoes *for*. How do they fit in with the grand plan, which Hutton assumed God must have? He wrote:

When we trace the parts of which this terrestrial system is composed, and when we view the general connection of those several parts, the whole presents a machine of a peculiar construction by which it is adapted to a certain end. We perceive a fabric, *erected in wisdom*, to obtain a purpose worthy of the power that is apparent in the production of it (my italics), (Hutton 1795).

Obviously, Hutton thought, since God is all wise, volcanoes were not designed simply to be destructive – so what positive purpose did they serve? The answer, he thought, was and is that they create new land – by throwing up lava which cools to become solid rock which is then eroded to form soil, the substrate for plants and hence for all terrestrial life. The question of God’s purpose lies very much in the realms of metaphysics and although many would say that it’s a stupid question, many serious thinkers – including many scientists – still think it is well worth asking anyway, even if not in the pages of learned journals. In practice it can be harder than it looks to differentiate between the ‘how’ questions of science and the ‘why’ questions of metaphysics or indeed of theology, and that is what modern scientists *qua* scientists do – if only to help them keep their ideas straight.

Even so, beginning in earnest in the eighteenth century and continuing through the nineteenth and twentieth centuries to the present day, science has become more and more hard-headed and has veered further and further away from such religious/ metaphysical musing. Indeed, the idea has grown up (helped on in recent years most conspicuously by Richard Dawkins) that science is innately atheistic and indeed that religion (and so, by default, metaphysics) is passé, anachronistic, a relic from more primitive times. This is a dreadful, misleading and destructive shift. It has come about, I suggest, for three main reasons.

First, scientists in the interests of clarity needed and need to keep their thoughts tidy. *How* volcanoes work is one kind of question. *Why* God made them or indeed whether there is a Creator God at all is a quite different kind of question and whatever their private musings, scientists in their professional capacity are at pains not to mix up the two.

Secondly, many discoveries of science seem at odds with various religious texts, and some people at least felt and feel that the ideas of science are more robust than the pronouncements of religious texts and therefore must undermine religion itself. Notably, in the seventeenth century the Irish Archbishop James Ussher (1581-1656) estimated from the chronology of the Old Testament, starting with *Genesis*, that the Earth is a mere 6000 years old – that it was created in October, 4004 BCE; and *Genesis* tells us that ‘in the beginning’ God created the heavens and the Earth and all its creatures in seven days. Yet geologists such as Hutton and his fellow Scot Charles Lyell (1797-1875) showed that the Earth must be millions of years old (at least) and so too did the rapidly expanding science of palaeontology, the study of fossils. The mechanism of evolution by means of natural selection which Charles Darwin (1809-1882) and Alfred Russell Wallace (1823-1913) outlined in a joint paper in 1858, and Darwin expanded in *Origin of Species* in 1859, clearly must have needed millions of years to produce life’s present and past variety. To be sure, many scientists of religious bent – including Hutton and Lyell – were not at all fazed by such discrepancies. Neither, as outlined later – and contrary to what is commonly taught – were many or most clerics. The clerics and the devout lay scientists simply acknowledged that *Genesis* is not meant to be literal. Its text is essentially poetical or metaphorical and its intention is prophetic. Lyell incidentally was a good friend of Darwin – yet he rejected the idea of natural selection not on theological but on scientific grounds. He

did not think natural selection would work. From all this (and a great deal more besides) we can see that the perceived divide between science and religion is nothing like as sharp as many apparently suppose (as admirably outlined by John Hedley Brooke.) But the rise and rise of science helped to weaken the grip of religious orthodoxies nonetheless.

Thirdly, theological explanations had been taken to be literal, largely because, often, no-one could think of alternatives. Thus, it was clear to anyone who cared to look that Earthly creatures on the whole are beautifully adapted to the places where they live – smooth-haired beasts in warm countries, shaggy beasts in cold countries, and so on. Until Darwin and Wallace came along with natural selection, the benign hand of God seemed to provide the only explanation. But once the idea of natural selection was spelled out it began to seem, to many, that the idea of God was superfluous, and indeed obsolete. Indeed, as the present-day Oxford chemist Peter Atkins (b 1940) observed:

There is no reason to suppose that science cannot deal with every aspect of existence.... and the only grounds for supposing that reductionism will fail are pessimism on the part of scientists and fear in the minds of the religious (Atkins 1995, p.125).

To be sure, others before Darwin had suggested that Earth's creatures must have evolved over time, and could not have appeared ready-made in their present form as *Genesis* suggests. Some had even outlined, at least in general terms, the idea of natural selection. But Darwin and Wallace – particularly Darwin, in *The Origin of Species* in 1859 – were the first to make the idea truly plausible; and scientists do like plausibility. To be sure, it has often been shown that plausibility is no guarantee of truth – and also that implausibility is no guarantee of untruth. The idea of continental drift, proposed in 1915 by Alfred Wegener (1880-1930), is a case in point. The hypothesis was neglected and even derided until the 1950s when plate tectonics provided an explanation – and now plate tectonics/continental drift is at the core of all the Earth sciences. Wegener's great idea was just as true in 1915 as it is in 2021 but few believed it until other scientists proposed a possible mechanism. There's a moral in this.

Overall, as science grew in scope and confidence through the eighteenth and nineteenth centuries it really did begin to seem to many, whether religiously inclined or not, that the physical sciences at least would soon provide a complete account of all the most fundamental mechanisms that drive the world. Thus in 1894 the eminent German-American physicist Albert Michelson (1852-1931) declared:

it seems probable that most of the grand underlying principles have been firmly established and that further advances are to be sought chiefly in the rigorous application of these principles to all the phenomena which come under our notice ... the future truths of physical science are to be looked for in the sixth place of decimals.

Michelson is best known for his work on the measurement of the *speed of light*, together with his colleague Edward Morley. In 1907 he was awarded the *Nobel Prize in Physics*, the first

American to receive the Nobel Prize in sciences. Whatever he said was taken very seriously. So, it should be – but even the greatest thinkers are sometimes wrong.

Curiouser and Curiouser

For within a few years of Michelson's ultra-confident declaration, a series of revelations turned the whole of physics on its head, as physics was then understood; and now, 120 years or so later, the re-think is still continuing, perhaps more rapidly and even more radically than ever. The re-think seems to be taking us deeper and deeper into the realms of the unknown – and of the unknowable – and is testing credulity to its limits. It is indeed taking us beyond physics and into metaphysics.

In truth, like all big ideas in science – and indeed like all big ideas of all kinds – it is impossible to say precisely when the new kind of physics began. Sometimes it seems as Plato suggested that we don't really discover new insights *de novo* but rather re-discover the knowledge that is already within us. Always, it seems, we can find pre-echoes of apparently new thoughts in some earlier age, and often in some quite different discipline – in a poem, perhaps – or some apparently remote culture. Perhaps most notably, as Fritjof Capra discussed in *The Tao of Physics* in 1975 (and others had intimated before him) many of the ideas of modern physics seem to be – or indeed *are* – present in essence in the Eastern religions of Hinduism and Buddhism. But in describing big ideas we have to begin somewhere and to get the show on the road I will pick out just a few figures from the nineteenth and early twentieth centuries who clearly did prepare the ground for the new physics. All of them were giants but all of them too, as Newton said of himself, stood on the shoulders of giants. All of them too – though Newton did not explicitly acknowledge this! – depended on the labours of more ordinary mortals, dozens or thousands of them, collecting data and providing lesser but significant insights of their own.

Probably the most famous of the few I have singled out here – indeed, perhaps the most famous scientist of all time – was Albert Einstein (1879-1955). In 1905 he published two papers that between them overturned the physics of Newton – or at least, more accurately, showed not that it was wrong but that it dealt only with aspects of reality. To be sure, Newton's science – not least his concept of gravity – went far beyond common sense. It required huge leaps of imagination and arcane maths, some of which he had to invent for himself. But Newton's physics dealt nonetheless only with the everyday world of medium-sized objects at middling speeds, and with the stars and planets whose peregrinations could be observed through telescopes, and measured. Einstein showed that on the larger scale, of huge objects and inconceivable speeds, different rules apply.

Thus, common sense – and Newton – tells us that space and time are absolutes: both are fixed entities from which everything else derives. That seems obvious. Undeniable. But Einstein's

paper of July 1905 showed that this just isn't so. The only absolute – the only measurement that can properly be considered constant – is the speed of light in a vacuum (as measured a few decades earlier by Michelson and Morley). When two objects move away from each other time moves more slowly for one than for the other. Furthermore, the speed of travel affects their physical dimensions: objects travelling at high speeds grow measurably longer. Both space and time are relative therefore; relative to each other, that is. Indeed we should not speak of space and time as if they were quite separate entities, but of space-time. Again, the general idea that time and motion are interconnected was intimated well before Einstein – not least by Christopher Marlowe (1564-1593). In *Dr Faustus*, Marlowe's eponymous hero had promised his soul to Mephistopheles, who was coming to claim his prize at midnight. As the midnight hour approaches the increasingly desperate Faustus pleads:

Stand still you ever-moving spheres of Heaven,
That time may cease and midnight never come!

But close observation and measurement and arcane maths are needed to turn such fancy into scientific theory and little of what is necessary was in place in Marlowe's day.

The second of Einstein's seminal papers, published in September 1905, showed that energy and matter are interchangeable – summarized by the equation that has graced a million tee-shirts: $E = mc^2$, where E = energy, m = mass, and c is a constant equal to the speed of light in vacuum. These insights have been shown many times to be empirically true and the thinking behind them is impeccable, but still they are hard to get the head around.

In 1917 Einstein elaborated his ideas still further in his theory of General Relativity, which incorporated the idea of gravity. Specifically, he showed that gravity is not an attractive *force*, like magnetism, as Newton has supposed. Instead, it results from the curvature of space-time. Thus, a heavy object, like a planet, does not attract other objects to it like a magnet attracting iron filings. Instead, it dents space-time so that other objects in effect roll downhill towards it. I once asked a very senior physics professor how he envisaged such a scenario and he replied 'I don't. I just do the maths.' Einstein's great strength was that he *could* envisage such weirdness, and did the maths afterwards (and sometimes needed others to help him with it). I don't even do the maths. I can only write down what the physicists say. My only point here is that the universe as revealed by modern physics is very different from what pre-twentieth century natural philosophers inferred, and from what common sense tells us must be the case. In fact, by our own day-to-day, common sense standards, the universe as now revealed is seriously weird.

Yet Einstein's relatively is only one of the revelatory threads that run through modern physics. The other main one is that of quantum physics which, once properly underpinned with maths, is called quantum mechanics. This is the science of the fundamental particles that are the stuff of which all matter is composed -- and of the energy and forces that cause material stuff to behave the way it does.

By the late nineteenth century it had long been established at least for practical purposes that all matter is composed of atoms – and atoms were still perceived, more or less as some ancient Greeks had conceived them to be, as irreducibly small units, like mini-billiard balls. Each element had its own kind of atoms. But in 1895, the New Zealand-born physicist Ernest Rutherford (1871-1927) showed that atoms are nothing like billiard balls. Instead, each atom has a central core – later called the ‘nucleus’ – that carries a positive electric charge, with negatively charged particles (electrons) orbiting around it. The general arrangement, as he saw it, was like the planets around the Sun – except that the planets are held in place by gravity, while the atom is held together by the forces of electromagnetism. But the electrons, relatively speaking, were a long way from the nucleus and in between was empty space. So atoms, the stuff of which all material objects are made, including very hard stuff like concrete, consist mostly of empty space. Weirder still and weirder.

The idea of electromagnetism was launched and adumbrated in the early nineteenth century by the Englishman Michael Faraday (1791-1867) and the Scotsman, James Clerk Maxwell (1831-1879). Maxwell, so many agree, deserves to be ranked alongside Newton and Einstein. Electromagnetic energy was shown to travel in waves, and its properties are related to the wavelength. Thus x-rays (discovered in 1895) have a very short wavelength; the wavelength of visible light is somewhat longer; microwaves are longer still; and radio waves can be very long indeed.

The warmth radiated from a radiator or any other hot object is in the form of infra-red – which is light energy with a relatively long wavelength that is not visible to our eyes (hence the ‘infra’). But in 1901, the German physicist Max Planck (1859-1947) showed that hot objects release infra-red energy not as a continuous spectrum of waves but in discrete packets – particles indeed – later known as quanta. This observation, together with the new appreciation of atomic structure as initiated by Rutherford, gave rise to the science of quantum physics which, once refined by maths, emerged as quantum mechanics.

The ideas that have emerged from quantum mechanics in the hundred-plus years since Planck are very weird indeed. In many respects they seem to defy the mechanical laws as laid down by Newton, which were the bedrock of science before the twentieth century – and they certainly defy common sense. Indeed, one of the founders of modern quantum physics and one of its greatest exponents, the Dane, Niels Bohr (1885-1962), said that if you think you understand the world of quanta then you haven’t understood the problems. Yet the ideas that have emerged from quantum mechanics in the hundred-plus years since Planck meet all the criteria of *bona fide* science – they stand up to the most rigorous experimental and observational scrutiny – even though they defy common sense and in the end are beyond comprehension. Indeed, those ideas have given rise to a range of high technologies including all the electronics that make modern computing possible, and television and lasers and IT, and the fact that those technologies work so well strongly suggests that the underlying theory must be correct, or at least that it captures a significant slice of what might be called reality. The ideas of relativity have been vindicated too, time and again. Yet – a kind of meta-weirdness: the mathematics

that describes relativity does not seem compatible with the maths that underpins quantum mechanics. Thus, there is a fault-line through the whole corpus of modern physics. Physicists and mathematicians are seeking a ‘theory of everything’ to embrace both but we can be sure that if and when *rapprochement* does come, only a few will understand it. At least, that select few will understand the maths, which does not mean that they understand the thing itself. It will just mean that they have a codified way of describing the idea, and so can refine the idea by manipulating the mathematics.

I won’t even pretend to describe the thinking behind modern quantum mechanics and its spin-offs but here are a few salient features from the past hundred years that are relevant to our theme:

First, there is the idea of ‘wave particle duality,’ already alluded to: the idea that fundamental particles of whatever kind may manifest either as waves, spreading through space, or as particles. Secondly: Bohr showed early in the twentieth century that the electrons around the nucleus as described by Rutherford weren’t just a cloud but moved in a series of discrete ‘shells,’ of greater or lesser energy. They can however shift from one shell to another and if they drop from a shell of higher to lower energy, they emit a quantum of energy in the form of a photon – a particle of light. Contrariwise, photons of suitable energy can push electrons from a lower energy shell to a higher one. Thirdly however, Bohr’s German friend and disciple Werner Heisenberg (1901-1976) showed that it is impossible to measure both the speed and the position of a particle at the same time – his so-called ‘uncertainty principle.’ It transpires too that we cannot for certain say that any one particle is in any one place at any one time, in the way that the positions of orbiting planets can be specified. We can only say that any particular particle is statistically more likely to be in one place rather than another. Fourth: it transpired later that quanta could move through atoms – that is, through apparently solid material; walls and human beings or what you will – as if the atoms were not there (for they are, after all, mostly ‘empty’ space). This is known as ‘quantum tunnelling.’ Then, fifth, and perhaps weirdest of all, there is the phenomenon of ‘quantum entanglement,’ which means that if two quanta are generated or emitted at the same time and then move in separate directions they remain in touch with each other however far apart they may be – even at opposite ends of the universe. If one of the two entangled quanta is interfered with and changes its behaviour then the other one, however far away, changes too, in the same way. It seems that there must be some communication between the two which seems to require some kind of signal – but the signal is sent and received in zero time. Thus the hypothetical signal that makes quantum entanglement possible seems to defy Einstein’s assertion that nothing can move faster than the speed of light.

All this sounds like nonsense (does it not?) and yet (although this is only the roughest description) this is how the world now seems to be. All the other sciences too have come on apace in the twentieth and early twenty-first centuries – and one way and another the weird ideas of the new physics are informing all of them: cosmology, chemistry, and even biology. For example: In the 1920s and 1930s the American astronomer Edwin Hubble (1889-1953) first showed that there are galaxies well beyond the Milky Way, which is our own galaxy; and he

also showed that all the galaxies are moving away from each other – which means the universe is expanding (perhaps forever, though perhaps in time it will collapse). This led to the idea that all the stuff in the present universe must emanate from some central point – a point of infinitely high density and extremely high temperature which then exploded, first into energy ('Let there be light!') which cooled to form atoms which coalesced to form dust and then stars. This is the theory which says that the universe began about 13.8 billion years ago with a Big Bang. Then in the 1940s Britain's Fred Hoyle (1915-2001) showed how all the chemical elements of the modern universe arose as the stars matured – although he also rejected the idea of the Big Bang in favour of a 'steady state' model. The energy of the stars – all that heat and light – is generated in their heart by nuclear fusion; crucially, the twentieth century brought the sciences of cosmology and quantum physics together, the very very large and the very very small. Newton would surely have revelled in it.

Twentieth century biology meanwhile fused the evolutionary ideas of Darwin with the genetics that arose out of the plant breeding experiments and theorising of Gregor Mendel (1822-1884) to create what was known as 'the modern synthesis.' Then from the 1950s onwards this grand fusion of notions was reinforced by molecular biology – the science of DNA, of which genes are made. The Englishman Francis Crick (1916-2004) and the American James Watson (b.1928) were clearly key figures in this, for in the early 1950s, at Cambridge, they worked out the three-dimensional structure of the DNA molecule (the famous double helix) and suggested how it might work. But they too, like all scientists, stood on the shoulders of giants and many others deserve credit too – notably Rosalind Franklin (1920-1958) of London University who provided the DNA crystals and the X-rays thereof that were Crick's and Watson's principal data.

The three-pillared theory – evolutionary biology with genetics with molecular biology – led many scientists to suppose that biology itself was sewn up, just as Michelson and others hundred-plus years earlier thought that physics was sewn up. But of course, this just isn't so, and never will be. In particular, it seemed for time that the 'language' of the DNA code must be digital, like a computer code, and that the DNA was a kind of dictator, determining the whole life of the organism. Now it is clear that the 'language of the genes' is syntactical, like verbal language, which makes it far richer but also more elusive; and that the genes as a whole are extremely sensitive and responsive to what goes on around them in the cell, and hence in the whole organism, and hence in the universe at large. DNA does not dictate, in short. It partakes in a universal dialogue. Dialogue indeed is the essence of all life.

It is now becoming clear, too – a huge departure from traditional thinking – that many of the known mechanisms of living creatures that seemed to be well understood cannot properly be explained without reference to quantum tunnelling and entanglement – including *some* forms of bird navigation, photosynthesis, and enzyme function in general. All this – 'quantum biology' – is excellently described in *Life on the Edge* by Jim Al-Khalili and Johnjoe McFadden (2014). The 'edge' in this case is the divide between the 'classical' physics of Newton and his successors, and quantum mechanics. Life, the hypothesis has it, partakes of both. The secret

of living organisms, it seems, is to provide conditions at everyday temperatures and pressures that allow quantum phenomena to come to the fore. Outside living systems, the behaviour of quanta can be properly observed and studied only under extreme conditions including temperatures that rival the Sun.

Overall, it seems that biology is being transformed before our eyes in the same kind of ways and to the same degree as physics has transformed since the start of the twentieth century. Truly modern scientists do not feel on the brink of omniscience. Rather they might echo Newton's declaration from the seventeenth century: 'to myself I am only a child playing on the beach, while vast oceans of truth lie undiscovered before me.'

How Do We Know What's True?

We don't, is the short answer. We can make what seem to be excellent guesses and we can gather plenty of reasons – collectively known as 'evidence' – to suggest that some of our guesses describe reality more accurately and completely than others. All in all we can be reasonably sure that we know a great deal more than nothing, and that some of what we think we know is pretty sound: that is, the stories that we tell ourselves do correspond pretty well to reality (assuming there is such a thing as reality). Yet our knowledge must always fall far short of what there is to know and it is extremely dangerous, for us and for the world at large, to assume that we know more than we do; or that an idea is true just because we think we have very good reasons for supposing it is; or that an idea is true just because we feel certain that it must be. Absolutely not should we despair or give up trying to understand ourselves and the world around us but we should always remain humble. As I discuss in my latest book, *The Great Re-Think* (2021), humility must be seen as a prime virtue in all contexts.

You might reasonably suppose that the revelations of physics in the early twentieth century would have shocked the whole scientific community, and philosophers of science, into a state of extreme and lasting humility. It had seemed after all that the whole of physics up until then, founded as it was on the insights of wondrous thinkers including Newton, tested experimentally and supported by mathematics, could not possibly be wrong, or fall short. But the new physics of Einstein and the quantum theorists was now suggesting that the whole mighty edifice of truth and certainty up until then was founded on quicksand – or perhaps, to be kinder, on a raft, floating on Newton's metaphorical ocean truth that is as yet unknown, and in many respects is unknowable. If all that could be wrong – or at least represent just a small slice of reality – then how could we ever be sure of anything?

Well, some scientists and philosophers of science did stress the need for humility. Far more influential, however, was the philosophy of *logical positivism*, which grew up in Vienna around the time of World War I. Its leader was Rudolf Carnap (1891-1970), who wrote: 'there is no

question whose answer is in principle unobtainable by science' (Quoted in Coats, 2002, p.21). The statement by Peter Atkins, as cited earlier, shows that this sentiment is still very much alive.

The confidence of the logical positivists and their successors seems to have two main sources. First, there was and is the growing body of scientific knowledge – the sheer volume and in many cases the astonishing detail of what is known already. It can become hard to imagine that there really could be much more. Secondly, and more profoundly, it began to seem at least to many that the *method* by which scientists arrive at their ideas was and is more or less fool-proof.

The method of modern science is somewhat different from that advocated by Francis Bacon but similar in spirit: a feeling that as long as we follow the rules, we can't go wrong, and must arrive eventually at truth that is both certain and complete. The modern method – dating from the twentieth century – was and is to collect as much data as possible, based on repeatable, reliable observation, which are then taken to be *facts*; to come up with various *hypotheses* to explain how all the (known) facts might fit together; and to *test* the various hypotheses by experiment and/or by making predictions about the way the world would be if a particular hypothesis was correct, and seeing if they are borne out by more observations. All the observations are *quantified* and the quantities are then subjected to the most rigorous *mathematical analysis* – for maths can't be wrong, provided we make no mistakes (can it?). Then the whole story is subject to *peer review* and if it gets past this it is published in a respectable journal for all the world to scrutinize and criticize forever and ever. Only those ideas that survive such battering are granted the status of *theories*. 'Theory' in science does not mean 'hunch' or 'wheeze' as it does in common parlance. A scientific theory is an idea that has been through the most rigorous intellectual mill that human beings can subject it to, and survived. Tried and tested theories are added to the grand ziggurat of irrefutable knowledge which, apparently, a great many people in positions of influence, and many others too, imagine science to be. How can we possibly go wrong?

The logical positivists, above all, stressed the importance of *verifiability*. The only ideas that were worth taking seriously, they declared, were those that could be verified. The only discipline that could verify its ideas beyond reasonable doubt, or even possible doubt, was science, with its sure-fire methods for finding things out and testing its ideas. Therefore science was the only reliable source of knowledge – and so it was and is the only truly worthwhile game in town. The suggestions or assertions of metaphysics or religion, or indeed of moral philosophy, were all just that – assertions. Say them loud and often enough and they become dogma. Noble souls may be prepared to die for the particular dogmas of their religion – but that doesn't make them true. A. J. (Freddie) Ayer (1910-1989), the most eminent and vehement of Britain's logical positivists, said that since nobody could say who or what God actually is, the very word 'God' was gibberish. His term. A lot of people were persuaded by such arguments and still are, even if they do not call themselves logical positivists.

And yet: even while logical positivism was still on the rise, and seen by many as the key to modernity and the gateway to the future, it was being eroded at the roots. First, modern science

and its methods rely very heavily on mathematics – which, it is assumed, must offer certainty. Yet, beginning in the 1920s, the Austro-Hungarian mathematician Kurt Godel (1906-1978) began to show that mathematics isn't quite as sure-fire as was generally taken to be the case. He showed, to paraphrase cruelly, that mathematical equations that aren't just tautologies (in effect, matters of definition) are bound to be incomplete or internally inconsistent or uncertain. That is, they are bound, always, to contain some assumption that, in effect, is arbitrary. Maths in short is not so 'objective' as is supposed. Mathematicians don't after all have a hotline to absolute, objective truth, whatever objective truth may be. This means that the theories of science, rooted in and 'verified' by maths, are not quite so secure as they seem.

Neither – to take a practical example – can we simply throw maths at problems and hope that it will tell us all we need to know. For example, modern taxonomists try to work out which creature (alive or dead) is related to which by assessing as many of their features as possible – especially, nowadays, the sequence of their DNA. But the resulting analyses typically produce many thousands of possible evolutionary trees. Statistics of a very fancy kind are then employed to work out which of the many possible trees are the most likely to be true. However, the data always lend themselves to several different forms of statistical analysis – different statistical *algorithms*. The taxonomist is left to decide which of the algorithms is the most appropriate for the task in hand – which he or she does on the basis of their own expertise, which in turn is based on their day-to-day work and their education and on their own predilections. In short, we can never escape the need for human judgement; and judgement that can properly be considered *wise* cannot be based simply on formulae.

In the 1930s came a serious challenge from the Austrian-British philosopher Karl Popper (1902-1994). He pointed out that in practice *no* big idea about the material world can be shown to be true beyond all possible doubt. We can show with absolute certainty only that certain ideas are *untrue*. Thus, he said, we cannot prove the proposition that 'all swans are white' because however many we find we can't be sure that there is a swan somewhere that is not white, that we have so far failed to find. This example is not actually very convincing but it will do. It tells us that the principle of verification – the centrepiece of logical positivism – is not appropriate because in practice *nothing* can be verified beyond all doubt. Ideas that qualify as scientific are not those that can be verified but those that could – at least in theory – be *falsified*. Scientific 'truths' are ideas that have survived rigorous testing and not been shown to be false. The canon of science as a whole, said Popper, is not founded on bedrock certainties because there are no bedrock certainties. Like the city of Venice (or indeed the pillars of New York's mighty Brooklyn Bridge) the edifice of scientific truth is built on mud: or, rather, on supports that are driven into the mud until they can be driven no further. Like Venice, science is indeed wonderful but is not as solid or secure as it looks.

A further caveat was provided in the 1960s by the Brazilian-born British zoologist and immunologist Peter Medawar, a Nobel Prize-winner and a friend and fan of Popper, who simply pointed out that 'science is the art of the soluble' – an artful adaptation of Bismarck's comment

that ‘Politics is the art of the possible.’ Scientists, in short, focus primarily – or in practice exclusively – on problems they feel reasonably sure they can solve in the time and with the resources available. This strategy has clearly been very fruitful. But is it likely – even remotely – that by exploring just what is within reach at any one time we can ever arrive at anything approaching omniscience? There are all kinds of reasons for thinking that this cannot be so.

The proposal of hypotheses to explain what are taken to be the facts is an essential step in the search for truth – but a hypothesis, as quantum physicist Richard Feynman (1918-1988) put the matter, is, in the end, just a ‘guess.’ Indeed, as Isaac Newton said nearly 300 years earlier: ‘no great discovery was ever made without a bold guess.’ Guesses in practice are leaps in the dark – albeit, in practice, informed leaps in the dark. Among the most spectacular leaps of the twentieth century was made by the American geneticist Barbara McClintock (1902-1992) who, from her studies of maize, concluded that genes must be able to move from one part of a genome to another – what she called ‘jumping genes.’ It was a wild idea but further studies suggest that she was right; jumping genes are now respectably dubbed ‘transposons.’ How did she arrive at such an insight? McClintock’s general approach was to cultivate a kind of empathy:

I start with the seedling, and I don’t want to leave it. I don’t feel I really know the story if I don’t watch the plant all the way along. So I know every plant in the field. I know them all intimately and I find it a real pleasure to know them. (*Quite* by McDaniel 1986).

More broadly, science is commonly supposed to be rational all the way through – the epitome of rationality – but guesses based on empathy is not what is normally meant by rationality. Fruitful inquiry requires something altogether more mysterious: intuition; imagination. In truth the geniuses of science are *not* mere rationalists. They are masters of rationality but what makes them special is what makes poets and prophets special: a vibration in the whiskers, a feeling in the bones, that such-and-such an idea *must* be true. Sometimes the crucial ideas come in dreams – and so it was, or so he told us, that the German organic chemist Friedrich August Kekule (1829-1896) dreamt of a snake that swallowed its own tail and so came up with the idea of the 6-carbon benzene ring. The critical experiments and the calculations come later. Dreams and vibrations in the whiskers are not what most people would call ‘rational.’ They are indeed non-rational. But it is a huge mistake, a sleight of language, to conflate ‘non-rational’ with ‘irrational.’ ‘Non-rational’ simply means not rational – and often in practice we need to rely on non-rational approaches – including guesswork and empathy. ‘Irrational,’ by contrast, simply means ‘mad.’ But if it is rational to search for truth, then sometimes it is more rational to be non-rational than to be what ultra-rational people would call rational.

Then again: although rational thinking aided by mathematics can tell us what is *likely*, it can never tell us what is actually *true*, or at least it can never give us the whole truth and if it does then we cannot know for certain that it is the whole truth. Neither should we suppose that scientists are themselves guided to what they perceive to be true simply by thinking rationally. In the end, what makes a scientist say ‘That’s it!’ – the grand eureka moment – is the feeling

in the bones that such-and-such an idea must be *right*. This feeling is in essence aesthetic. For as the great British theoretical physicist Paul Dirac (1902-1984) commented: ‘It is more important to have beauty in one’s equations than to have them fit experiment.’ Or as John Keats (1795-1821) wrote in ‘On a Grecian Urn’ in 1819:

Beauty is truth, truth beauty, —that is all
Ye know on earth, and all ye need to know.

Crucial too to the modern view of science was and is the ideas of the American philosopher Thomas Kuhn (1922-1996). Science is conventionally presented to us as a ziggurat of irrefutable truth. The stones of the ziggurat are the reliably observable facts. The mortar that holds the whole structure together is compounded from the tried and tested theories. I know from talking to them and from what they write (*vide* Professor Atkins) that many practicing scientists see things in this way. In reality, though, the canon of science at any one time is more like an unfinished landscape painting, worked at year on year by a thousand different hands. The whole is a palimpsest. Every now and again the additions and subtractions and refinements upset the balance of the whole creation and the scientists just have to abandon their creation, however long and painstakingly they have worked at it, and start again with a fresh canvass. Later, though, they will probably incorporate at least some of their ideas from their earlier effort.

Kuhn did not speak in these metaphorical terms. Instead, more formally, in *The Structure of Scientific Revolutions* (1962), he spoke of the accepted ideas of science at any one time as the ‘paradigm,’ which is often defined as ‘example’ but also as ‘worldview’ – compounded, like the metaphorical ziggurat, of accepted facts and theories. But as the facts and theories accumulate, inconsistencies appear. Some observations and ideas are at odds with others. Every now and again the whole structure breaks under the strain of contradictions – or, as he expressed the matter, the whole paradigm ‘shifts’ into a new phase, incorporating some of the old ideas, and abandoning others. Thus, in the mid-nineteenth century, Darwin’s idea of evolution by means of natural selection brought about a paradigm shift in biology. Newton’s idea of gravity was the outstanding paradigm shift of the seventeenth century – and relativity and quantum physics were the great paradigm shift of the early twentieth. In our own time, quantum biology promises to be another. Kuhn’s ‘paradigm shift’ is a powerful concept. It has of course broken the bounds of scientific discourse and is now in common parlance (much beloved of advertising executives).

In fact, when we put all the conditional clauses and caveats together, we see that what we think we know – even within the apparently robust body of science – is always provisional and uncertain; and outside science lies an endless ocean of what is unknown and, in the end, may be unknowable. In the early twentieth century the French playwright and philosopher Gabriel Marcel (1889-1973) proposed that there are three levels of unknowns: puzzles, problems, and mysteries. Puzzles, like jigsaws and Rubik’s cube, contain all the information needed to solve them. It’s just a question of rearranging what’s there. Problems too can be solved but require

some research – more information than is provided. Detectives are problem solvers. Their first task is to increase the body of facts so they have got something to work on. But mysteries are beyond final solution.

Science treats the worlds as a series of problems that can be solved, and some scientists, in the spirit of Michelson, still dream of final solutions. But in the end, as Einstein emphasized, the Venice-like islands of science are surrounded by mystery, in which there can be no final solutions. Science is indeed wonderful, and it is good to dream. But this is a dream that cannot be realized.

Finally, we may note one huge irony. Those scientists and logical positivists who assume that science can tell us everything there is to know that's worth knowing, and who dismiss what they perceive to be the arm-waving vagueness of metaphysics out of hand, apparently fail to realize that their big idea is itself metaphysical in nature. For science – the art of the soluble – is obliged more or less to focus on the material world, for the material world does indeed pose problems of the kind that Marcel identified – the kind that do indeed lend themselves to explanations that can be put to the test and pass the Popper test of falsifiability. But can all aspects of the material world be subject to the critical examinations of the scientific method? Can all the unknowns be reduced to problems that can be solved? And is the observable and quantifiable material world all there is? These are huge assumptions of a metaphysical kind – and are not themselves falsifiable.

All this is illustrated by a paradigm shift that is still very much in the making and promises (some would say threatens) to be the most profound of all.

Universal Intelligence

When we think it seems to us (does it not?) that our thinking emanates from our own selves, and in particular from our own brains. Too much thinking, after all, makes your head hurt. From this it seems to follow that thought and feeling, consciousness and 'mind' would not exist at all were it not that sentient creatures like us, brought it into being.

But there is an alternative notion: one that has long been embraced by some philosophers and theologians and also increasingly by scientists, and especially by some anthropologists, psychologists, and in particular by *avant garde* physicists. It is that *consciousness is a quality of the universe*, embedded in effect in the fabric of the universe. According to this idea, we do not generate consciousness inside our own heads, like a battery generating electricity. *We partake* to a greater or lesser degree of the universal consciousness that is around us all the time. Our senses and brains receive the universal consciousness like a radio receiving electromagnetic signals. Then – unlike a radio – our brains interpret and may refine those signals. Then – again roughly

like a radio – we transmit the (modified) signal to others (or can do so if we choose). Our brains and senses, then, are receivers and transmitters. But they are not merely relay stations. They are creative too. I stress, though, that this analogy with radio is just that; an analogy. Radios receive and may transmit electromagnetic energy. The (hypothetical) universal consciousness is *not* electromagnetism. It is a fundamentally different entity.

In practice the cogitations of theologians, philosophers, and scientists over the past few centuries and millennia have produced a spectrum of ideas to explain the relationship between consciousness and the material stuff of the universe – that is, between ‘mind and matter’; and all of these ideas in one form or another still have their adherents. Hence: some, broadly known as ‘idealists’ (not to be confused with political idealists), suggest that consciousness is the primary ‘stuff’ of the universe – and that matter is a product of consciousness; truly a creation of our minds.

Some, notably the early seventeenth century French philosopher Rene Descartes (1596-1650), favour the idea of ‘dualism’; that the universe contains both matter and mind – separate entities that operate in partnership. Others, broadly called materialists, think that material stuff – matter – is primary, and that intelligence and consciousness ‘emerge’ from matter that is suitably organized and complex. In *Consciousness Explained* (1993), the highly influential American philosopher Daniel Dennett argues in effect that consciousness is just the noise of neurones firing.

Personally (in common with many others) I like the idea that the fundamental stuff of the universe is ‘mind-matter’; that each is an aspect of the other, like two sides of a coin. Neither can exist without the other. It is a mistake to try to tease them apart just as it is a mistake to try to separate space and time. At least, as with space and time, it may be easier for practical purposes to consider each property separately. But we need to acknowledge that this is a simplification, for pragmatic purposes only. If we are interested in the truth – in describing the way things really are as accurately as possible – then we need the concept of mind-matter, just as we need the concept of space-time.

Intriguingly – and crucially – the idea of universal consciousness chimes well with some of the key ideas to emerge from quantum physics, and especially from ideas that sprung, before World War II, from the pioneer studies of Niels Bohr, Werner Heisenberg, and the Austrian-Irish physicist Erwin Schrödinger (1887-1961). For the early quantum physicists showed that the behaviour of fundamental particles in any one experiment depends crucially on the observer: the conditions that the experimenter creates, and indeed, most strikingly, on whether or not the trial is observed by a conscious being. As the physicist turned philosopher Peter Russell described in *From Science to God* (2003), a whole range of scientists since have echoed this thought. Thus, in the words of the British-American physicist Freeman Dyson (1923-2020):

At the level of single atoms and electrons, the mind of an observer is involved in the description of events. Our consciousness forces the molecular complexes to make choices between one quantum state and another (Dyson 1979).

Or in the words of the Austrian-Swiss American Wolfgang Pauli (1900-1958), a Nobel Laureate:

We do not assume any longer the detached observer, but one who by his indeterminable effects creates a new situation, a new state of the observed system (Pauli 1954, p.10).

But it was Max Planck himself who brought the ancient idea of universal consciousness into the canon of modern physics. For although he is commonly regarded as a conservative thinker, he declared:

I regard consciousness as fundamental. I regard matter as derivative from consciousness (Quoted in *The Observer*, 25 January 1931).

In more modern times, the Irish physicist John Stewart Bell (1928-1990), known especially for Bell's Theorem, said:

As regards mind, I am fully convinced that it has a central place in the ultimate nature of reality. (Quoted by Frasco, 2019)

Or this from the English physicist Sir James Jeans (1877-1946):

The Universe begins to look more like a great thought than like a great machine (Jeans 1930).

And here perhaps is the strongest statement of the idea from Britain's former Astronomer Royal, Martin (Lord) Rees (b. 1942):

The universe could only come into existence if someone observed it. It does not matter that the observers turned up several billion years later. The universe exists because we are aware of it (Quoted in Rosenblum and Kuttner, 2007).

For my part I like to think that this is the idea that lies behind the opening line of the Gospel of St John: 'In the beginning was the Word and the Word was with God and the Word was God.' The original Greek says 'In the beginning was the *logos*.' 'Word' is not the only possible translation and surely not the best. 'Consciousness' seems to me to express the idea more accurately.

It also seems to me that the idea of universal consciousness throws light on the nature of mystical experience. For, we might say, the mystic is one who tunes in directly to the universal consciousness, by-passing mere rationality, and thus experiences reality more vividly than ever human beings can in what we take to be our more 'normal' state of mind.

However, although so many great scientists (as well as other thinkers) take the idea of universal consciousness very seriously, and it clearly is of profound importance across the board, it

does not and cannot pass the Popper test of scientific respectability. It is very hard to see how such an idea could be falsified. After all, the way to test whether some hypothetical factor X is important, or whether indeed it exists, is to compare what happens when X is known to be present with what happens when we know it is absent. Thus, we can show beyond reasonable doubt (albeit never beyond all possible doubt) that a particular vitamin is indeed vital by comparing the condition of animals or of people when that vitamin is present with their condition when the diet is deficient. But if consciousness is indeed universal – if it is one face of the fundamental mind-matter – how can we ever create conditions in which it is absent, with which to compare the normal state of things? We can't. So, there can be no critical test. In short, the idea of universal intelligence has profound implications for all of science, and a great deal of science, suggests that it should be taken seriously. But at least by the criteria of Popper this most profound idea, which changes all science, does not itself belong in the canon of science. In fact the idea of universal consciousness falls squarely in the realm of metaphysics – beyond science. Indeed, the whole of science is like a floating island – floating in the pool, or indeed the ocean, of metaphysics. And if science is the art of the soluble, as Medawar suggested, then metaphysics can reasonably be seen as the art of the insoluble.

What should we do with all these notions?

Science, Religion, and Metaphysics

Metaphysics is indeed the study of things unknown and unknowable but as Muslim scholar Seyyed Hossein Nasr says, this does not mean that what is in the end unknowable cannot be subject to critical thought (Nasr 1968). *Contra* the logical positivists, science does not have a monopoly on critical thought. Indeed, says Nasr, metaphysics addresses 'the ultimate questions,' of which the two briefly outlined here are just two. (The other main metaphysical issues are 'What is 'good'?' And 'How come?' That is, once we have explained the world (assuming such a thing is possible) we still feel the need to ask – 'How come things are as they are?').

However, as a formal discipline, metaphysics does seem to have fallen out of the western psyche. Few universities outside the theological colleges offer the subject on their curriculum and those that do often have a seriously truncated view of what it is. Given its central importance in all ideas – including or even especially those of science – that omission matters. Indeed, says Nasr, the neglect of metaphysics as a formal discipline is at the root of all the world's ills on all fronts. We never seem to get round to addressing life's *ultimate* questions. We navigate in the dark.

Metaphysical ideas do of course surface in *bona fide* religions – the kind that are not mere cults – but then they are entwined with theology. Indeed, the core of all *bona fide* religions is metaphysical in nature. Each theology colours the metaphysical core in various ways but what is most striking is the *similarity* between the different religious traditions. Notably, all

emphasise *transcendence* – which I define as the general idea that there is more to the universe than science alone can get to grips with; and the essential idea of *oneness* – which, I suggest, lies at the roots of all moral thinking that is worthy of the name. Although the great religious traditions differ in their customs and manners all, too, share common moral *principles*. All in particular emphasize compassion, humility, and reverence for nature (in accord with its sacred status). The similarities are, or should be, the basis of *interfaith*: a dreadful name (an etymological train-crash dreamed up by a committee) but a profoundly important quest to create a meta-religion than brings all the great religious traditions together, including many of the ‘indigenous’ religions commonly called ‘pagan.’ The interfaith movement need pose no threat to the established traditions. But it enriches them all, and is enriched by all of them. After all, it is possible to be a good Christian, or a good Muslim, or a good Buddhist, or what you will, *and* subscribe to interfaith thinking – just as it is possible to be a good German or a good Frenchman *and* be a good European; or even, many would say, a better European.

Finally, I reckon science education should be profoundly revised. All too often it is taught primarily as a practical pursuit, as if its task in life was simply to provide high technologies – especially of the kind that contribute most immediately to the crude and doomed ambition of perpetual economic growth. Certainly, science teaching should continue to be ‘hard’; no shirking of detail or of maths. Overall, though, as the great seventeenth century founders of recognizably modern science would surely all agree, science should be conceived and taught primarily as an aesthetic and indeed a spiritual pursuit: its aim being not to ‘conquer’ nature but to appreciate nature more fully. Neither should it be seen to be innately atheistic, as it has become fashionable to suppose. Science, properly construed, enriches *bona fide* religion; and *vice versa*.

Since science and religion are clearly of such profound importance, it is a terrible pity – a tragedy indeed – that so many people, including many in positions of influence, still feel and teach that they are forever separate, and often are at odds. Truly we must seek reconciliation, as some great religious leaders and some of the greatest scientists have emphasized. Between the two great magisteria, their meeting ground is metaphysics. Truly it must be restored to the centre stage.

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CHAPTER SIX

EPISTEMOLOGY AND HIGHER EDUCATION IN THE MUSLIM WORLD

Shamim Miah

During the summer of 2019, university students were eagerly anticipating their grades, which would determine their final-year degree classification. At one department of the University of Sheffield, students complained about the grade they had received for their end-of-year work – these students were given 2:2's and Thirds. The university could have sign-posted the students to the protocols on standardisation, marking and moderation of assessments, together with reminding the students of the role of external examiners in overseeing the process of assessment and grading. Instead, the university, responded via email: 'thank you for raising the issue and thank you also for your patience.' It went to state that on reflection, the head of department, together with the director of learning and teaching had decided that, 'our normal procedures... failed us. For this we apologise unreservedly.' The department had concluded that it was in the best interest to 'uplift all the marks... less at the top and more at the bottom.' The poorly performing students had their marks raised by nearly 40 per cent. The few who had done well saw their marks barely change. 'Again, our apologies,' the message concluded, 'but we hope that this is a satisfactory resolution' (Lambert, 2019).

Grade inflations or the artificial inflation of university degree classifications has compounded the crisis within universities, which has been developing since the late 1970s and 1990s. The

proportion of students getting ‘good honours degree’ (defined by total of students receiving First or 2:1) has leapt from 47 to 79 per cent: at 13 universities, more than 90 per cent of students were given at least a 2:1 in 2019. In case you were wondering that this is restricted to post-1992 universities or former polytechnics, you would be mistaken. In fact, Oxford and Cambridge are leading the way: 96 to 99 per cent of their English, history and languages students get ‘good honours’ (Lambert, 2019). And, this is not limited to universities in Britain. A growing body of academic research has demonstrated that the quality of university degree has been degraded and devalued across the world, especially within the past 30 years (Smyth, 2018). The inflation of university degrees is symptomatic of a deeper epistemological crisis of knowledge in postnormal times (PNT).

Epistemological Un-veiling

Universities are now deeply entrenched with the commodification of higher education. If ‘the consumer is always right,’ then you might as well award them degrees they ask for! This ‘consumer rights’ logic to learning reduces knowledge to commodity, which is sold in the open market (Collini 2017). The rupture within higher education is often linked to neo-liberal ideas, yet paradoxically the solutions that are often presented by nation states and international bodies such as the IMF and the World Bank to tackle some of these problems are rooted within the free-market system. In recent times this neoliberal market-based approach to higher education has reached a crucial turning point ‘where it is not capable of healing itself with its current conceptual, intellectual, moral and organised capabilities’ (Sardar, 2017:1).

In order to fully understand the relationship between western forms of epistemology and the Muslim world we have to look back into history. If we take colonialism as a starting point, it becomes impossible to negate the role western academia played through production, consecration and institutionalisation of epistemology. In fact, the foundation of European higher education institutions in ‘colonised territories itself became an infrastructure of empire, an institution and actor through which the totalising logic of domination could be extended; European forms of knowledge were spread, local indigenous knowledge suppressed, and native informants trained’ (Bhambra *et al.* 2018:5). As Meyerhoff (2019) shows higher education only emerged as a mode of study through projects of capitalist-colonial worldmaking. As a result, the impacts of western episteme on Muslim countries have largely been destructive through the forceful elimination of local and indigenous forms of knowledge and promotion of European epistemology as de-facto universal knowledge.

The end of settler-colonial rule did not mark an end to Eurocentric modes of epistemology, but rather led to its reconfiguration. Despite the end of colonialism, European modes of higher education and learning remain firmly rooted in the epistemological traditions of their former colonial masters. Indeed, it is further entrenched in postcolonial economies particularly as the

rich Arab Gulf States continue to inherit an education system of their colonisers – despite the fractioned nature of the neoliberal model of higher education rooted in the West.

It is not a secret that western educational establishments have long been experiencing crisis of funding. In order to sustain its neo-liberal paradigm, many universities in the UK, US and elsewhere, have looked at the former colonies to expand their market influence. For example, some UK universities have successfully recruited non-EU students from China, India and the Middle East. According to Universities UK International (2019), in 2017-2018 international students represented almost 20 percent of the total undergraduate student cohort and 36 percent of all postgraduate students. In addition to recruiting international students, many universities have also become key providers of higher education throughout the globe by having a physical presence in many countries.

The Arab Gulf States, collectively known as the GCC (Gulf Cooperation Council), which includes the United Arab Emirates, Bahrain, Oman, Kuwait, Saudi Arabia, and Qatar, powered by oil wealth, view a ‘knowledge economy’ as part of their post-carbon economic future. This emphasis on ‘knowledge economy’ has made some of these countries a fertile ground for the expansion of Western universities. In order to up-skill the new generation of young people, many wealthy states, such as Qatar, Dubai and the United Arab Emirates, continue to draw inspiration from British, French and North American universities. The six Gulf States have provided a staggering \$2.2bn to US universities between 2012 and 2018 (England and Kerr, 2018) between them. This funding provides a range of services from soft-power influence to shaping educational and cultural ethos and values of the Gulf States. It translates into capital and revenue funding for establishing research centres connected to universities, paying academic chairs and fellowships, student scholarships, book publications and donations to archives and museums. Along with the funding of university faculties in the west, the Gulf States have also developed strong partnerships with a number of western universities through the establishment of International Branch Campus (IBC), a system of delivering higher education, within the private sector, through a partnership structure which requires the physical presence of one or more campuses. It is hardly surprising then that a number of US, British and Australian universities now deliver undergraduate and post-graduate courses via conferment of degrees in the Middle East.

Neo-liberal forms of higher-education, which developed during the 1980s and the early 1990s, proliferated IBCs throughout the Muslim world, with Dubai and Malaysia being the largest importers of IBCs in the world. Whilst IBCs exist within the private sector, the scale and financial support given to these institutions have blurred the boundaries between the public and the private sector. More crucially, a number of Muslim countries consider the development of IBCs as ‘part of their long-term education and economic development plans,’ and ‘have declared a desire to become regional higher education hubs’ (Kinser and Lane 2010; Verbik and Lasanowski 2007). This has led to financial investment of ‘Free Zones,’ managed by special legal authorities. For example, in the last 20 years, Dubai’s educational system has consisted of

three campuses of federal public institutions (Zayed University, Dubai Men's College and Dubai Women's College) and 47 private (that is, non-federal) colleges or universities. Thirty of the 47 private higher education campuses are located in four free zones and 25 of the free zone institutions are IBCs. The IBCs in Dubai include extensions of Rochester Institute of Technology (RIT) (United States), Herriot-Watt University (UK), and Manipal University (India) (Lane 2011:372). The government of Malaysia has also embarked upon a similar transition to become a leader in the knowledge economy since the 1990s. But as Lane (2011) notes, Malaysia had to curtail its ambitions due to fiscal concerns, which limited the flow of students to Western universities. It is estimated 'that the 20 percent of Malaysian students studying abroad in 1995 resulted in a monetary outflow of approximately US\$800 million and an untold loss of talent due to students not returning to Malaysia' (Lane 2011:373).

The growth of IBCs, combined with the rise of educational consultancies within some segments of the Muslim world, raise a number of challenging concerns relating to the uncritical acceptance of neoliberal norms of educational progress. It is clear that most countries appear to be attracting 'semi-elite institutions' from the US, Britain and Australia. In very limited exceptions, the universities opening IBCs are considered elite institutions (Lane 2011). For example, the universities of Oxford and Cambridge – the most selective and internationally renowned universities throughout the world are conspicuously absent from the IBC system. Both say that it would be impossible to replicate their teaching experience abroad. The 'collegiate system ... is simply not an exportable model' (Mathews 2012).

The global capital is now been used for the advancement of what is described as 'knowledge economies,' a euphuism for the entrenchment of neo-liberal capitalism – complete with its norms, values and cultural artefacts (Altback and Knight 2007). When education can be bought and sold in the free-market, it is not surprising to note that the World Trade Organisation (WTO) encourages this approach as part of 'trade in service industries' through issuing regulatory guidance as part of the General Agreement in Trade and Services (GATs) (Robertson 2006). This has benefited the western educational sector enormously. For example, UK IBCs increased from 9 in 2006 to 25 in 2011, overtaking Australia (12), but remained way behind the US (78). The most popular UK based IBC is the University of Nottingham with branches in Ningbo, China, and Malaysia. Indeed, Britain would like to expand this sector even further, as the former UK universities minister David Willetts, author of *A University Education*, pushed universities to use private capital to establish teaching outposts abroad. He argued 'our universities are well financed for what they do but underfinanced for big expansion. I want to see investors from Britain and abroad helping our universities access these big overseas markets' (Mathews 2012).

The investigations of the problems of epistemology, or discussions of futures of higher education in Muslim societies, cannot ignore the role of IBCs. The current IBCs' structure does not allow a space for any meaningful dialogue, let alone polylogue, on these crucial issues. IBCs reproduce some of the strict disciplinary silos as seen in many western university settings. Moreover, they

fail to include, let alone imagine, knowledge systems which do not conform to Eurocentric notions of epistemology. This not only permeates the values and visions of the university, it is also embedded within the curriculum it teaches, books it recommends to its students, and the pedagogical tools it uses to teach the set western canons. The education that the students receive is often out of sync with their cultures, values and worldview; they are almost completely ignorant of the intellectual heritage and literary canons of their own civilisation, and, for the want of a better word, brainwashed into uncritical acceptance of neo-liberal capitalism.

In a detailed analysis of the university sector, John Smyth (2018) unmask what is going on by forensically analysing the forces at work and the pathological and dysfunctional effects neo-liberal capitalism has on institutions of higher learning. In *The Toxic University*, Smyth is concerned about the state of the corporate model of higher education, especially the way knowledge is seen as a consumer brand. By drawing upon the zombie metaphor, he shows how the university system embody a ‘diseased reason’ with its inability to provide authentic explanation for complex issues ‘because the capacity of organizations to make judgments have become infected with alien ideas of neoliberalism’ (Smyth 2018:7). The problem is not only an issue of epistemology but also a crisis of leadership amongst academics which associates value and status to ‘fast scholarship’ and ‘celebrity academics,’ often detached from the process of wider intellectual understanding of how academic research connects to ‘society’s body of knowledge’ (Harvie 2000:120). This is not simply a case of ‘bad’ universities or academics; rather, it is a deep systemic predicament. The challenge faced by Muslim countries is to deconstruct, what Davis (2006) described as the ‘epistemological fog,’ or as the educational theorist Michael Apple (2016) put it, the ‘epistemological veil’ of neo-liberalism which often accompanies IBCs.

A critique of epistemology simply does not make sense without associating knowledge production with the economic model of neo-liberalism – the bedrock on which educational institutions are based. British economist and geographer, David Harvey (2007), reminds us that the transformation of neo-liberal ideology into a global behemoth did not occur by accident; rather, it advanced through academic political economic theory and practice. The seeds of economic neo-liberalism can be traced back to a series of economic experiments, starting in Chile after Pinochet’s coup against Salvador Allende in 1973. Following the coup, a group of economists linked to the University of Chicago – known as the ‘Chicago boys’ – immersed in the theories of Milton Freidman were ‘invited’ to help reconstruct the Chilean economy. In fact, since the 1950s, the US had already been training Chilean economists at the University of Chicago as part of a plan to oppose left-wing ideas in Latin America. During the early 1970s, the ‘Monday Club,’ comprised of leading business elites, developed a close working relationship with the Chicago trained economists by funding their works in order to champion privatisation, marketisation and free market economic theory. The theory ‘proposes that human well-being can be best advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterised by strong private property rights, free markets and trade’ (Harvey 2007:2). More crucially, the theory applied to higher learning is based upon the premise that education as a social good should be maximised through the

frequency of market transactions; in doing so it aims to bring all human action into the domain of the market. Whilst, a number of Muslim countries are looking at the West to develop their 'knowledge economies,' what they may be receiving is a market driven audit culture in which fifty percent of resources in universities is consumed by non-core activities (Smyth 2018: 182) where knowledge becomes a business proposition; something for sale across a wide market in the world (Docherty 2015:83).

IBCs and Uncertainty

The educational system in the Muslim world, whether the inherited colonial model or the imported IBCs, is not designed to solve the problems of Muslim societies. Indeed, it leads to continuation and intensification of the current social, cultural, and intellectual crisis. The social and cultural problems within Muslim societies are further compounded by the unstable, and fragile nature of global world order, and the complex, contradictory and chaotic character of postnormal times. Consider, for example, that the *Oxford English Dictionary* declared 'post-truth' as the 2016 international word of the year. All philosophical traditions, particularly Islamicate culture (Hodgson, 1974), have been preoccupied with notions of truth for thousands of years. It's only in the last thirty years that 'truth' has become unfashionable within western academic discourses. The term 'post-truth' was first used by the Serbian-American playwright Steve Tesich in 1992 in an article for *The Nation*. It was promoted by postmodern academics and scholars leading to the emergence, during the last decade, of post-truth politics, with emotions given precedence over hard facts. It now defines global political culture following the Brexit in the UK and the US presidential election of 2016. The post-truth world, signals the obscuring of ontological boundaries between truth, falsehood, and dishonesty. It has long been established that the blurring of these boundaries raises critical challenges to higher education; especially given that some academic disciplines reject any ontological notion of 'truth.' What impact does this have on Muslim students who are taught this as a natural phenomenon remains to be seen.

In light of post-truth politics, it is fair to state that during this critical phase of history, the very nature of knowledge is in doubt, and as a result we are witnessing a complete breakdown of integrity of university education. Moreover, it is for this precise reason that universities, as repositories of learning and knowledge transmission, and the relevance of university education, have been called into question (Caplan 2018). While the crisis of integrity and the epistemic foundation of higher education has a long and complex history, we need to remind ourselves that 'it's not just that the process of dissemination and transmission of knowledge have changed but also the very nature of knowledge itself; what actually constitutes knowledge and how we acquire it' (Sardar, 2017:18).

The crisis of epistemology is in part a reflection of wider fundamental changes within society, which have led to increases in complexity, uncertainty and ignorance, which have in

turn eroded trust in conventional institution. Even science, which has enjoyed considerable public confidence, has suffered from lack of trust. For example, recent findings from the John Hopkins COVID19 Civic Life and Public Health and the SNF Agora Institute of John Hopkins University revealed that nearly half of US adults expressed doubt about science (Barry *et al.* 2020). Furthermore, the global rush amongst academics to publish ground breaking research on COVID19 also compromised public trust in science; not helped by the revelation that scientists had published false data in leading medical journals, causing the two leading scientific journals, the *New England Journal of Medicine* and the *Lancet*, to retract two studies (Davey, 2020).

Indeed, Richard Horton, the editor-in-chief of the *Lancet*, cautioned against the ‘betrayal of science’ by the two UK scientific advisors on public display for the daily governments public briefing on COVID 19. ‘They’re supposed to be giving independent advice to the government,’ Horton said, ‘but they don’t give independent advice. They support government. Our scientific community has become the public relations wing of a government that has abjectly failed to respond to this pandemic’ (Appleyard 2020). Horton notes that reporters are interested in ‘gotcha’ questions rather than exploring deep and meaningful ideas: ‘political reporters don’t always know the scientific literature very well. So, it’s hard, even impossible, for them to ask detailed questions about the science.’ Horton goes on ask:

Where was the leadership from the medical establishment? Why are scientific advisers still willing to stand next to politicians every day giving cover to a government whose actions are undermining public health advice? Why are the elected presidents of royal colleges and scientific societies silent? The leadership of British science and medicine is in a collusive affair with government, frightened to disengage and criticise in case they lose their place at the political table. (Appleyard 2020).

‘We are following science’ was the mantra cited by government ministers to justify a raft of COVID-19 related policy measures, including compulsory face covering, lockdown based on various tiers, social distancing and the restriction on the number of people in social gatherings. This public display of science has major implications on the different ways scientific and empirical knowledge is organised, developed and constructed as policy. More crucially it assumes that science is a monolithic entity that delivers hard answers to complex questions. In fact, there are many scientific approaches to dealing with COVID-19 as we saw in Hong Kong, Singapore, South Korea, Germany and the UK. There have been concerns raised about the UK government’s handling of COVID-19 with its over-reliance on scientific-modelling published by Imperial College. The UK government was also accused of politicisation of scientific research, following the revelation that the Prime Minister’s controversial political advisor, Dominic Cummings may have influenced the deliberations of the Scientific Advisory Group on Emergencies (SAGE) committee. In fact, it can be argued that far from following science, the UK government has been *leading* science: they select the scientific advisors they wish to listen to, and then choose the scientific advice they wish to take. The SAGE committee was criticised

by a host of scientists, who then set up their own alternative committee: the Independent Sage, led by Sir David King, a former chief scientific advisor.

A key term repeated in Horton's recent book, *The Covid-19 Catastrophe: What's Gone Wrong and How to Stop It Happening Again*, is uncertainty (Horton 2020). The role of science, Horton suggests, should be to acknowledge and deal constructively with ambiguity, ignorance and complexity. Science no longer functions by its conventional problem-solving strategy. In other words, science has gone postnormal; it has to cope with many uncertainties, chaos and unpredictability in policy issues of risk and the environment. This crisis in scientific epistemology has long been pointed out by a number of academics working in the field of Postnormal Science (PNS). As Ravetz and Funtowicz pointed out in their classic 1999 paper, 'whenever there is a policy issue involving science, we discover that facts are uncertain, complexity is the norm, values are in dispute, stakes are high, decisions are urgent and there is a real danger of man-made risks running out of control' (Ravetz and Funtowicz 1999: 744).

Furthermore, it is argued that it would be misleading 'if we retained the image of a process where true scientific facts simply determine the correct policy conclusions' (ibid.). The rise of the digital age has further undermined the status of scientific knowledge based on the quality-assurance provided by academic peer-review process and publication. The scientific journal, Ravetz has argued, 'is losing its status as the sole gatekeeper — simultaneous guarantor of quality, certifier of property, medium of communication and also archive' as other means of sharing material, assessing quality and screening out the incompetent or fraudulent are emerging to fill the gap' (Ravetz 2012). As a counter balance to uncertainties in both 'products and process,' postnormal science introduces the notion of 'extended peer communities,' which bring in a number of different perspectives, disciplines, actors and stakeholders to the issue being explored and discussed. As such, postnormal science makes science a broader social and cultural issue that involves the community as a whole. During the Covid-19 pandemic, it became clear that more and more scientists were publishing their data and findings on websites known as 'preprints,' which are not peer reviewed but are open access. The process allows, as science journalist Ehsan Masood notes, 'hundreds, if not thousands more people, lay and expert, to become part of the research process' (Masood 2021) — a development that will likely become a standard practice involved extended peer communities.

In the Muslim world, science is still taught as a linear Comtian process — steadily advancing in certainty, knowledge and control of the natural world. It is presented as a positivist endeavor, grounded on data and empirical values which lead to 'true' conclusions — which then go to determine correct and impartial policy, although science and policy are seldom explored in universities in Muslim societies. So what is being taught as science no longer functions either as a characteristic of contemporary science nor as a lived reality. Students memorise facts and formulas, with no historical or societal context. They thus develop two contradictory perspectives on science: it is something that banishes uncertainty and doubt; or something that proves the truth of their faith — the second perspective leads to pseudoscience and what

is known as *ijaz*, the so-called scientific miracles of Islamic sources such as the Qur'an and Hadith (Guessoum 2011).

Internet, AI and Double Consciousness

Muslim students obtain a great deal of their information, on Islam as well as other subjects, from cyberspace which has become a ubiquitous feature of contemporary social life. It governs and shapes politics, society, identity and education. In *Post-Truth Era*, Roy Keys (2004) argues how the rise of the internet, 24 hours news and social media, have made misinformation and telling lies inexcusable and even acceptable. The internet adds a different dynamic to post-truth by providing repetition and echo-chambers which spread the content rapidly and globally. The role of technology is now so central and pivotal that for many higher education cannot be imagined without the ubiquitous and constant use of cyberspace and other technology. Massive Open Online courses (MOOCs) were well-established trends before the Covid-19, but the pandemic has further speeded its use. David Noble argues that the current mania for online degrees and distance education is about further 'commodification of higher education, of which computer technology is merely the latest medium, and it is, in reality, more a rerun than a revolution, bearing striking resemblance to a past today's enthusiasts barely know about or care to acknowledge, an earlier episode in the commodification of higher education known as correspondence instruction or, more quaintly, home study' (Noble 2002, p.7). What links earlier efforts with current push for online learning is not technology but profits in the guise of education. An interactive online system is no substitute for interpersonal education where students and teachers, and students and students seek individual and collective self-knowledge.

Cyberspace is now an essential ingredient in the life of Muslim students – from cradle to grave. Gary Bunt's detailed study of Muslim cyberspace shows the role cyberspace plays in deciding names for the new-born, how new-Muslims declare the *shahada*, and how Muslims learn and teach their religion. But it is not only in the realm of piety that cyberspace is shaping Muslim life; increasingly students rely on the internet to obtain their basic teaching material and content, attend their lectures and take their examinations. Cyberspace is so central to Muslim life that 'there are people for whom being online in the name of Allah represents an obligation' (Bunt 2009:11); not surprisingly 'cyber jihad' has become a big movement amongst university students.

The arrival of Artificial Intelligence (AI) is set to transform education further. AI is seen by many to be more revolutionary than the printing press, or the internal combustion engine. Indeed, it is not an understatement that AI will fundamentally transform human history itself. Currently, the future of AI is firmly in the hands of big commercial companies, known as the Big Nine; six of these companies are based in the US – Google, Amazon, Apple, Microsoft, IBM and Facebook; the remaining three are based in China – Baidu, Alibaba and Tencent. Webb (2019) argues that the six US companies are motivated by financial interest, whilst the China based

companies will continue to be motivated by social control. None of these companies can be said to be interested in serving humanity's best interest; and are now utilising advanced level AI to increase their profits and monopoly. AI is usually seen through three broad types: artificial narrow intelligence (ANI), artificial general intelligence (AGI), and artificial super intelligence (ASI). According to Amy Webb (2019), the big nine have moved beyond ANI and are currently functioning within AGI, which they hope will someday 'be able to reason, solve problems, think in abstraction, and make choices as easily as we can, with equal or better results.' Technological breakthroughs in AGI will inevitably lead towards ASI, which will range 'from being slightly more capable at performing human cognitive tasks than we are, to AIs that are literally trillions of times generally more, smarter than humans in every way (Webb, 2019:143-144).

Early implementation of AI in education will focus on controlling all aspects of teaching: from class room management, to presentation of material, giving and marking assignments, to setting examinations and reporting results. Virtual laboratories will replace practical work in the class. All of this would have an impact on how students see machines, themselves and other humans. If they are always reacting with robots, they may actually acquire some of their characteristics; and start to behave like machines (O'Connell 2017)! As such, the universities will have to introduce new tools to ensure that students are 'robot proof.' Josef E. Aoun, President of the Northeastern University in the US, suggests that students have to be taught 'Humanics' to build their innate human strength and to ensure that they can 'compete in a labour market in which brilliant machines work alongside human professionals' (Seldon, 2018, p.229). Aoun suggests that humanics has a 'two-fold nature':

The first consists of the 'new literacies.' Existing literacies in reading and writing, as well as numeracy, will no longer be sufficient alone. In future, universities need to add 'data literacy,' to help students read, analyse and utilise the ever-growing volumes of information, 'technology literacy,' which is necessary to give students a grounding in coding and engineering principles so they might understand how digital machines work, and finally, 'human literacy,' to teach students about the humanities, design and communication so they can understand and operate better in a human world.

The second aspect of humanics...are the 'cognitive capacities or higher-order mental skills, mind sets or ways of thinking about the world. These demands four separate skills. The first is 'systems thinking, the ability to view an enterprise, machine or subject holistically and make connections between its function in an integrated way.' The second is 'entrepreneurship,' which is about implying the creative mind to the world of work and the economy. The third is 'cultural agility,' necessary for teaching students how to conduct themselves in complex, global environments, and understand different cultures and people. The fourth capacity, 'critical thinking,' which...gives students the tools to engage in rational analysis and discernment (Seldon, 2018, pp.229-230).

Will humanics be enough to deal with the emerging challenges? Much of what Aoun suggests, universities ought to be teaching already. A bigger concern is the racialised nature of AI. It is widely accepted that AI is deeply biased towards those who write the programmes in the

first place; in other words, it promotes the worldview of the programmers and coder, that is, white European men at the expense of non-western cultures and people (Noble 2018, O’Neil 2016). The automatic teaching machines will only enhance the power of western cultures and neoliberal capitalism, further entrenching zombie disciplines (see chapter four) and outlooks which are the problem in the first place.

Indeed, the very survival of the university as a physical teaching and research institution is at stake. It is a distinct possibility that most conventional universities will become less and less important and turn into, or be replaced by, ‘digital universities,’ with no campuses, requiring little or no physical interaction for the students. The Covid-19 pandemic has already had a major impact on the higher education sector with many western universities threatened with closure. Seldon suggests that it is a real possibility that universities could disappear both in physical and virtual forms. ‘Universities could go the same way that atheists see the great cathedrals, temples and mosques going, sold off or converted into shopping malls,’ he writes (Sheldon 2018, p.243). If AI could do the job of teaching better than humans, and even show more kindness and care than mortals, then, within a couple of decades, universities will no longer be needed.

Scott Galloway, an advertising theorist, points out that universities in the US will be ‘like department stores in 2018. Everyone will recognize they’re going out of business, but it will take longer than people think. There will be a lot of zombie universities. Alumni will step in to help. They’ll cut costs to figure out how to stay alive, but they’ll effectively be the walking dead. I don’t think you’re going to see massive shutdowns, but there’s going to be a strain on tier-two colleges’ (Walsh 2020). As competition for online students intensifies, bigger, more financially secure universities will seek partnership with giant tech companies: MIT with Google, Berkeley with Microsoft. Eventually, Galloway argues, a small number of ‘cyborg universities’ will monopolize higher education, selling education as a high end, expensive, consumer brand:

The strongest brand in the world is not Apple or Mercedes-Benz or Coca-Cola. The strongest brands are MIT, Oxford, and Stanford. Academics and administrators at the top universities have decided over the last 30 years that we’re no longer public servants; we’re luxury goods. We get a lot of ego gratification every time our deans stand up in front of the faculty and say, “This year, we didn’t reject 85 percent of applicants; we rejected 87 percent!,” and there’s a huge round of applause. That is tantamount to the head of a homeless shelter bragging about turning away nine of ten people who showed up last night. We as academics and administrators have lost the script (Walsh 2020).

Given the racial and ethnic bias of AI, and the take-over of institutions of higher education by neoliberal corporations, we can safely say that educational futures of Muslim societies is rapidly being colonised. The coming generations of Muslims would be educated by western IBCs, and/or AI teaching machines designed and maintained by profit maximising corporations, or by indigenous universities still teaching colonial curriculum and zombie disciplines. The very consciousness of future generations of Muslim students is at stake.

Consciousness, as the sociologist, historian and pan-Africanist scholar, W.E.B. Du Bois (d.1963) has argued, affects our decisions, the way we think and act, and the way we interact and seek to change or not change the world. It is not innate; rather it is a product of our socialisation, history, social standing and education. In order to expand the thinking around consciousness within society, Du Bois developed the idea of ‘double consciousness’ in his classical text *Souls of Black Folks* to refer to the internal conflict experienced by marginalised or colonized groups in an oppressive society. Whilst Du Bois is writing about a particular racial discourse, his ideas can be extended to explain the current, and emerging, Muslim predicaments. The DuBoisian critique speaks to the Muslim condition, especially given that the relationship between the West and the Muslim world is deeply rooted in colonialism and postcolonialism, when terms such as Islam and Muslims were understood within the purview of colonial epistemology.

Thus, Muslim double consciousness was shaped and formed under the colonial period and continues within the post-colonial experience. For Du Bois double-consciousness, is the sense of ‘always looking at one’s self through the eyes of other, of measuring one’s soul by the tape of a world that looks on in amused contempt and pity. One ever feels his two-ness, — an American, a Negro; two souls, two thoughts, two unreconciled strivings; two warring ideals in one dark body, whose dogged strength alone keeps it from being torn asunder.’ This condition Du Bois argues is a product of history and politics; ‘the history of the American Negro is the history of this strife – this longing to attain self-conscious manhood, to merge his double self into a better and truer self’ (Du Bois 1999:10-11). For Muslim societies, double consciousness now has an added layer – the experience of living in colonised futures that writes of their alternative futures just as their history itself was suppressed, marginalised and, in some cases, written off.

But double consciousness also has emancipatory features, especially given its ability to mediate between ‘agency and structure, individual and society and minority and majority subjectivities’ (Meer, 2015). Du Bois, also argues that given the experience of colonial and racial oppression, the ‘Other’ has a stronger and grounded understanding of emancipation and freedom in a way that the West cannot. This allows the development of a better and truer self; a ‘second-sight’ which transcends looking at one’s self through the lenses of the West. For Muslim societies, this positive self-assertion is not predicated upon nationalism or Islamist separatism nor a neoliberal assimilation but rather an enduring embrace of Islamic ideals and concepts. That requires developing emancipatory educational epistemologies.

Navigating TRIGOXIC Knowledge

To shape desirable futures, it is pertinent to note the changing nature of knowledge and epistemology. This is because universities are not only spaces for education and learning, they are places which validate which histories and knowledge are valuable and essential for the future. 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 within PNT continues to inform commercial and political ends, the Big-Nine use it to inform Artificial Intelligence, not only to influence human behaviour but also to transform the course of human history (Webb 2019). 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 fears, especially given its political weaponization by the far-right in Europe and the US and Hindu nationalists in India. More crucially, we can observe how proliferation of data and information fundamentally transforms knowledge itself through heightened rates of uncertainty and chaos.

Changing forms of epistemology, especially what has been termed as TRIGOXIC knowledge within PNT, raises fundamental challenges for society (see chapter one). TRIGOXIC knowledge, which embodies forms of emergent knowledge, covered by the smog of ignorance, incorporates 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 worldview). These critical changes in society will have overpowering impact on education, especially given that the fundamental essence of what constitutes 'knowledge' will undergo profound transformations. As such, the Muslim societies cannot ignore the questions raised by TROGOXIC knowledge. For example, what if TRIGOXIC knowledge becomes the main educational feature of higher education, and finds its way in textbooks or university syllabus? We have already seen the recent objections surrounding decolonising higher education (Bhambra, 2018), particularly over the ways in which colonialism and imperialism continues to play a pivotal role in writing the history of the non-west. More crucially, we know how orientalist knowledge is often used as teaching resources to educate the emerging generations.

Muslim societies also have to take the role of AI seriously. What will happen when AI replaces educators, what impact will it have on Muslim futures? This is not distant possibility but is happening now! For example, in 2019, British educational technology developers Century Lab in partnership with the Flemish regional government launched AI assistants in schools across half of Belgium. In 2012, the MIT Media Lab distributed preloaded tablets to primary school children in Ethiopia without teachers or instructions. The result within months demonstrated that children were able to recite the English alphabet and able to write complete sentences in English. In *The New Digital Age*, Eric Schmidt and Jared Cohen, two of the leading figures within Google, view education as 'an important pillar behind innovation and opportunity' (Schmidt and Cohen, 2014:21). They see rising connectivity reshaping traditional forms of learning and teaching within Europe and beyond through the medium of smart devices devoid of any teacher contact within the next few years.

It is crucial to point out that tackling some of the key questions and concerns, around AI and TRIOGOXIC knowledge, should not start with a break from the past. Rather, some of the

classical Muslim approaches to epistemology provide a link between the past, present and the future. This is not only central for the development, evaluation and transmission of ideas but allows for the development of Du Bois' 'second-sight,' essential for a society to navigate the present circumstances. What we need are epistemologies that liberate education from historic, present and future colonisation and are firmly grounded within the Islamic purview. The writings of Ibn Khaldun (d.1406), for example, can provide some insights to how we approach this epistemological challenge. Ibn Khaldun reminds his readers that the first principle of tackling epistemological problems requires 'human action in the outside world,' which 'materializes only through thinking about the *order of things*, since things are based upon each other' (Ibn Khaldun, 1958: vol.2, p.415). We need to appreciate the sequence of events as well as how they are connected to each other. We have to make connection between what is happening on a global scale with what is happening and required on a local scale in Muslim societies. For Ibn Khaldun, critical thinking is paramount – it is what distinguishes animals from humans. He urges that teachers should develop rational faculties to perceive, which he defines as consciousness, things and events beyond their apparent, surface appearance. For Ibn Khaldun, our ability to think has three degrees – each of these degrees provide practical pedagogical tools for educators. The first degree is 'man's intellectual understanding of things that exists in the outside world in a natural or arbitrary order, so that he may try to arrange them with the help of his own power' (Ibn Khaldun, 1958: vol.2, pp.412-413). He goes on to point out how this form of intellect, which he defines as 'discerning intellect,' is used by people to gain things which are useful to their livelihood and to shun things that will bring about any harm. The second degree or 'experimental intellect' includes the ability to think with ideas and experiences and appropriate behaviours needed in dealing with others or demonstrating leadership skills. This 'mostly conveys apperceptions, which are obtained one by one through experience, until they have become really useful' (ibid.). The third degree includes the speculative intellect, which provides hypothetical and theoretical knowledge of things that require no practical activity and go beyond sense perception. Ibn Khaldun adds that the combination of the three forms of intellect, leads to 'pure intellect' and true understanding of human reality.

While Ibn Khaldun's ideas provide both theoretical and pedagogical insights for reconfiguring higher education, a truly liberating epistemology of education has to be based, I would argue, on the *maqasid al-shariah*. It should be noted, at the outset, that we are not talking about the shariah as it exists today; but the original objectives – the *maqasid* – of the shariah as an Islamic way of being. The *maqasid* are crucial to rethinking the objectives of higher learning, the purpose of education and the principles through which it should be guided; and they provide tools to assess the overall objective of learning by critically assessing the current neoliberal normative model.

The *maqasid* approach allows the contextual understanding of Islamic value structures to be applied in different socio-political contexts. This approach to Islamic theology can be traced back to the works of Imam al-Juwayni (d. 1085), his student, al-Ghazali (d.1111) and, most importantly, the writings of al-Shaybani (d.1388). *Maqasid* is a complicated science which

sees the nature of shariah from an ethical, rational and multi-dimensional perspective. The key objective is to focus on the principle of higher objectives in Islam ‘to promote good and ward off evil.’ It also draws upon the classical views of al-Qarafi (d.1285) who stated that ‘a purpose (*maqasid*) is not valid unless it leads to the fulfilment of some good or the avoidance of some mischief (*mafsada*)’ (Auda 2008:4).

The consensus amongst the scholars is that *Maqasid* lies in the higher objectives of shariah, which constantly shift and embrace different socio-cultural landscapes. For Ghazali (d.1111) the *maqasid* consist of the preservation of religion, life, mind, lineage and wealth. Writing in the fourteenth century the Andalusian legal scholar, Imam al-Shatibi (1388) in his *Al-Muwafaqaat fi Usool al-Sharia* defined *Maqasid al-Shariah*, and saw *maqasid* as the attainment of good, welfare, advantage, benefits and warding off evil, injury, loss of flora and fauna (Raysuni 2013). More recently, Ibn Ashur (d.1973) expanded the concept of *maqasid* to include freedom as one of the main purposes of shariah, while Muhammad al-Ghazali (d.1996) included principles of equality and human rights (Alwani 2003). ‘*Maqasid* is one of today’s most intellectual means and methodologies for Islamic reform and renewal,’ notes Auda (2008:22). It offers a practical way forward, especially given that it is a methodology rooted *within* the Muslim scholarly tradition, free from any colonial baggage.

The *maqasid* approach also offers principles which links education with contemporary concerns. It does this by exploring the objectives of education with ethical concerns, especially relating to ecosystems, climate change, genuine rights, equality, human dignity and civic society. The purpose and value of education is not determined by a market system linked to economic outputs, rather the value of education is linked with the emancipation and liberation of self, environment and communities. The *maqasid* outlook is geared to the activation of this hitherto dormant consciousness.

The rekindling of Muslim consciousness can be facilitated with the help of kindred western scholarship. The reactivation of an indigenous, critical ‘second sight,’ does not mean rejection of all western knowledge. There is a rich scholarly tradition of contemporary theorisation of society, especially relating to ideas of conflict and change, that we need to consider in rethinking the aims and purpose of higher education, and redesigning institutions of higher learning in Muslim societies. For example, Donna Haraway provides a crucial way forward from the complex, contradictory, chaotic (Friedman 2010; Sardar 2017d) nature of society. In urgent times, Haraway argues, we must resist the temptation of addressing the troubles through false consciousness of imagined safe futures; and learn to ‘be truly present, not as a vanishing pivot between awful and or endemic pasts and apocalyptic’ futures. This requires rejecting both conspiracy theories and also the messianic technology induced saviour complex by a grounded understanding of what the future requires: ‘staying with the trouble by making odd kin; that is, we require each other in unexpected collaborations and combinations’ (Haraway 2016:4). The way forward is predicated upon what Haraway defines as ‘tentacular thinking’: she draws upon the image of the spider, the eight-legged tentacular, as a metaphor to question the premise

of human exceptionalism and bounded individualism within western philosophical thought. Haraway reminds us how the spider ‘is in place, has place, and yet is named for intriguing travels elsewhere’ (Haraway 2016:31). The complexity of the spider’s web as it connects different points, reminds us of how human and non-human destiny are interconnected. Tentacular thinking questions the binary separations, and works through the tangles in order to empower collective thinking and make kin with unknowns in storytelling – stories that have been told and more critically those yet to be told. She suggests that we are approaching a new epoch, the Chthulucene, where both human and non-human exiles from environmental disasters, provoked by neoliberal capitalism, will come together. Unlike the dominant western narratives, it is important to note that human beings are not the only important actors in this drama – with tentacular thinking the order is ‘reknitted: human beings are with and of the earth, and the biotic and abiotic powers of this earth are the main story...diverse human and nonhuman players are necessary in every fibre of the tissues of the urgently needed Chthulucene story’ (Haraway, 2016:56). The tentacular metaphor reminds people of the collective responsibility and agency in tackling some of the big questions of our postnormal times ‘by making critical and joyful fuss about these matters.’

Conclusion

In late November 2020, the story of 21-year-old Eva Hammond went viral. Hammond, a Law graduate with a 2:1 degree from Liverpool John Moors University, had struggled to secure a graduate job. As a result, she applied for a job at the fast-food chain, McDonald’s. Following the first interview, she received a letter stating that ‘after careful consideration, we’re sorry to inform you that we won’t be inviting you to the next stage of our interview process.’ The rejection letter went on to state that she did not qualify for the job as McDonald’s has a rigorous application process with a high number of applicants (Croll, 2020). Hammond’s case raised a number of critical questions relating to the neo-liberal market driven model of education, which fails to deliver on its basic objective by castigating graduate to, what British economist Guy Standing describes as, a life of precarity. Standing shows how neoliberal policies have resulted in growing number of people across the world living and working precariously, often in a series of short-term jobs, without stable occupational identities or careers. It is fair to state that the current neo-liberal model of education, which is unfortunately gaining popularity within Muslim countries, will no doubt be counter-productive. The market-based model of education has created zombie graduates; students who are semi-literate and devoid of any critical analytical faculties. These graduates are found not only in specialised technological sciences but also in the social sciences, arts and humanities.

However, it not only the neoliberal market-based education system, which is unfortunately gaining popularity in Muslim countries, that needs to be challenged and replaced. The pedagogic assumptions also need to be critically overhauled, especially given that many educational

practices encourage commercialisation and aggressive profit-making. The uncritical acceptance of technology to aid learning within educational establishments, as promoted by Silicon Valley tech billionaires (Schmidt and Cohen, 2014), are contextually irrelevant, pedagogically unsound and a bad substitute for good teaching. As Christodoulou (2014) in her detailed critique of educational orthodoxy has argued, the ‘basic knowledge canon’ is obsolete and deficient, but more crucially the pedagogical tools used to teach the inadequate knowledge canons are predicated upon an uncritical acceptance of the writings of Jean-Jacques Rousseau (d.1778), John Dewey (d.1952) and Jean Piaget (d.1980).

Ironically, the internalisation of neo-liberal education system, and all the IBCs in the Middle East, has made very little impact on the international league table. The *Times Higher Education World University Rankings 2020*, which includes almost 1,400 universities across 92 countries, reveals total absence of any Muslim country within the top 100 universities in the world. It is also worth noting that grade inflation in UK universities actually acts against Muslim students – thanks largely to Islamophobia and ‘widespread societal discrimination against Muslims’ that is deeply ‘embedded in institutional structures’ of universities (Scott-Bauman, 2020). Only 18% of Muslim students achieved a 1st class degree classification at the undergraduate level, compared to 30% of those from non-faith backgrounds. Moreover, less than two thirds of Muslim students graduate with a 1st or 2:1 overall (Guest et al, 2020).

An epistemological framework which simply emulates the West, or forces Muslim societies to constantly look at themselves through the lens of western perceptions and worldviews, has colonised the past and present of educational institutions in the Muslim world, and threatens to colonise the futures of the next generations. A future orientated Muslim consciousness, and a ‘second sense’ based on Islamic concepts and notions, are crucial to emancipate education from its colonial legacy, the current neo-liberal impasse, and to decolonise Muslim futures. An educational model devised after the second world war, rooted in the neoliberal logic, has now passed its ‘sell by’ date. There is a great urgency to articulate and think outside the neo-liberal tale of human experiences. The ability and capability of future generations in the Muslim world depends on making epistemological issues central to all concerns about higher education.

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AFTERWORD: THE JOURNEY FOR EPISTEMOLOGICAL JUSTICE

Anwar Ibrahim

In the mid-1970s, I found myself immersed in a series of conversations with a group of notable Muslim thinkers. It was widely recognised that there was a *Crisis in the Muslim Mind* (AbuSulayman 1993). The ummah was in a state of disarray – but that was hardly news, it had been in trouble for quite some time. The moment seemed ripe for a change of course. Yet, much of the intellectual discourse of that period was occupied with political movements, with a tendency towards factionalism, tribalism, and a toxic elitist outlook in academia. Jamaat-e-Islami, Tablighi Jamaat, The Muslim Brotherhood, Salafism, Wahabism, Deobandis, and countless Shi'a and Sufi movements, were as secluded from contemporary challenges as departments have become in universities. All set on fixing the ummah in their own way. During my university days, I too was caught up in all the fervour. As the leader of the Muslim Youth Movement of Malaysia (ABIM), we could have easily followed in the footsteps of other Islamic movements. After I started attending these series of conversations, my political activism would land me in prison for the first time under Malaysia's Internal Security Act (ISA).

Not much has changed since then. At the time, I was also spinning many plates and wearing many hats. But first and foremost, I was a student. While working on my master's degree in literature, I was supervised by the Malaysian philosopher Syed Muhammad Naquib al-Attas. My performance in the classroom earned me a front row seat, with pen and notebook at the ready, for one of the great intellectual debates of the twentieth century. Al-Attas had spent

some time at McGill University in Montreal at the end of the 1950s. There his path crossed with the Palestinian-American philosopher Ismail al-Faruqi. They became friends; and al-Attas invited al-Faruqi to Malaysia to give a series of lectures and talks. At the same time, there was a contentious debate between Naquib al-Attas and his brother, the distinguished sociologist, Syed Hussein Alatas. I also attended the lectures by Hussein Alatas, who focussed on endemic corruption and poor governance in Malaysia, and emphasised the captive mind in development studies (Alatas 1972, 1977). The lectures often stretched from *Isha'a* to *Fajr*.

These conversations kicked off an investigation that would forever bind the fates of the four of us in search of a resolution to problems that were not new, but whose prescience weighs heavy on the storms we face today. Eventually, the conversations evolved to bring in Seyyed Hossein Nasr, the Persian-American philosopher. We were not just political respondents; we were grappling with higher ethical and metaphysical ideas. We were not constructing a haphazard, pragmatic State for Islam; rather, we sought the construction of an ideal state as envisaged by Abu Nasr al-Farabi, the tenth century philosopher, and author of *On the Perfect State* (1998). Most importantly, we investigated the roots of the crises of Muslim thought and society and saw the problem for what it truly was – something epistemological.

Stating the problem has always been relatively easy. The twentieth century was a great realisation of this problem: a grave injustice had condemned Muslim societies to failure upon failure thwarting any attempt at progress. The injustice, we all agreed, confounds us at an epistemological level. Even though many projects have been undertaken to tackle the problem, it continues to paralyse the ummah while the world carries on. The West, and particularly Colonialist sentiments, controlled our methods of knowledge creation and was convincing many of us that their way was the only way to discover truth. The methods and ideas of Islamic history were rapidly disappearing, studied only by a few in academia, and admired largely as exotic and superfluous. In Universities, Islamic studies were given a dark corner of the eclectic wing of the theology department. The West's defined Islamic history as a 'dark age' and the Muslim world as underdeveloped and lacking critical, modern thought. And while the age of revolution and postcolonial zeal prompted a revival of the old thinkers, the West's command over the production of knowledge, with its epistemological bias, controlled our thought and our disciplines (Elmessiri 2006). Now, well into the twenty-first century, stating the problem remains just as clear as it ever was. Yet, the solution evades us while new complexities lurk on the horizon of our digital futures that make matters worse as the West itself enters into a new epistemological crisis, taking the rest of us by proxy.

The epistemological crises hidden within the advent and proliferation of social media, artificial intelligence, algorithms, and post truth, threaten the whole world and it will take a global dialogue and collective wisdom to navigate what comes next as Ziauddin Sardar points out in the first chapter. Muslim societies' continued inability to create knowledge not only keeps us from the table of that global dialogue, but entangles us in a chaotic web of colonised minds and dispossessed futures. In postnormal times, the nightmares only gain greater colour and resolution. The worst-case scenario is played out when humans stop thinking for themselves,

colonised by our past and the machines we created, to the point where our values are erased from all historical memory (Adam 2017, Singer and Brooking 2018, Vallor 2018, Walter 2021).

Back in the 1970s, there was no lack of effort or desire to resolve the crisis. Innumerable conferences were organised all over the world to address it head-on throughout the 1980s and 1990s. I was also influenced by Indonesia's efforts at decolonisation. The Indonesian brand of multicultural Islam and inclusive liberalism appealed to me. In particular, I was impressed by Mohammad Natsir, scholar of Islam and the former Prime Minister of Indonesia; and I read his *Capita Selecta* (Natsir 1954), a collection of articles published in various newspapers and magazines, dutifully. Equally impressive were the ideas of Indonesian *alim* and novelist Abdul Malik Karim Amrullah, known by the pen name of Hamka. His numerous novels and articles were required reading during my student days (Hamka 1982, 2003). Both Hamka and Natsir proved that indigenous scholarship can be produced to reconcile Islam and modernity.

There was an urgent need, we thought, for a method or approach that could break Muslim knowledge from Western bias and dominion. There was total absence of Islamic discourse in modern disciplines. Universities were still strongly tied to western disciplines without alternatives or anyone to challenge or contest ideas. There was a critical need, we thought, to bring Islam into the centre from the periphery. The idea that developed out of the conversations between al-Faruqi and al-Attas would come to be known as 'Islamization of knowledge.' A great debate, bordering on scandal, erupted over who was first to come up and use the term between the two giants. Citing publication date after publication date, ranging throughout the 1970s and 1980s, each side attempted to demonstrate that 'Islamization of knowledge' was their idea. In all honesty, the argument could extend back to the birth of each intellectual; and frankly, since we are all products of the past we inherit, perhaps even further. This was the tendency towards elitist factionalism which kept all the various Muslim intellectual movements from crosspollinating. The great irony is that all these movements, as well as al-Faruqi and al-Attas themselves, were pursuing the same goal. Unfortunately, the failure to see the beauty in their diverse approaches prevented a synthesis from occurring.

Al-Attas approached the problem as a Sufi traditionalist. It was not so much the Arabs but Sufis who brought Islam to the Malay Archipelago centuries ago. He saw an essential interplay of Malay history, language, literature, and culture with Islam. Drawing his inspiration from Ibn Arabi and al-Ghazali, he was the first thinker in the region to make a distinction between *din* and religion. Religion is a set of beliefs. In contrast, *din*, al-Attas argued, has four components: indebtedness, submissiveness, judicious power, and natural inclination (al-Attas 1985, p.48). For him, modernity was at the core of all Muslim problems. In contrast, al-Faruqi, who had a deep familiarity with western philosophers and a brilliant ability to navigate classical Islam and modernity, was a modernist through and through. While acknowledging the dismal state of the ummah, he did not see modernity as the death of Allah, but argued that we needed to retake the modern world from the perspective of Islam by Islamizing knowledge in general, and the disciplines of social sciences in particular (al-Faruqi 1982). He saw the potential within

the Islamic world to derive everything the Western world had claimed to invent; Muslims just needed the educational infrastructure to pull themselves out from their historical collapse the Ummah found itself in, either through its own fault or through the domination and duress of others. He also warned against the rising notion of Arab nationalism as well as Arabism. Hossein Nasr added another provocative element to the debate. Nasr was a rigid traditionalist; and from traditional sources, he was able to deepen the meaning of Islam and derive some heavy intellectual substance (Nasr 1978, 1989). Nasr's discourses include sources which are orientated around *ahyl-e-bait*, thus broadening our collective exposure to Islamic legacy. Nasr and al-Farqui butted heads constantly on modernity's roll in the Muslim interregnum.

Both al-Attas and al-Faruqi were an extension of the conventional discourse on *tawheed* – the fundamental Islamic concept of the unity of God. Both considered their projects to be *tajdid* – renewal of Islamic thought. Yet, al-Faruqi and al-Attas proved to be like oil and water. Al-Attas would go on Islamising in his own fashion through various endeavours that would lead to, with my support when I became Minister of Education, the creation of the International Institute of Islamic Thought and Civilisation (ISTAC). The ISTAC library has one of the best collections on Islamic thought in the region, including the complete works of the celebrated Pakistani-American scholar, Fazlur Rahman. Meanwhile, al-Faruqi would return to the US and, with a group of friends, establish the International Institute for Islamic Thought (IIIT). The accent was on Islamization; that was what was needed, we all thought, at the time. There was a lot of work to do to make Islamic thought relevant again – for Muslim societies, for the world, and for universities throughout the world. And, indeed, a great deal of work was done! Conferences were held. Books were written. Textbooks were produced. University departments were established (IIIT 1988, 1989, AbuSulayman 1987, Lodhi 1989).

Alas! As the years went on, the flaws of the Islamization of knowledge project – both in al-Attas and al-Faruqi versions – began to appear. It was just one-dimensional. Islamization lacked the plurality and diversity that a changing world demanded. Islamization had put the ummah on the defence, turning it into an isolated enclave. After the death of al-Faruqi, there were attempts at revising the Islamisation project, turning it towards Islamic legacy and the classics of Muslim civilisation, championed by Shaykh Taha Jabir al-Alwani (al-Alwani 2003, 2005). However, in its political form, Islamization fed into the West's worse fantasies about Islam. Western political thinkers saw knowledge, along with politics, as a battlefield. And when the Cold War left the apparent victor, the democratic West, without an enemy, it inevitably needed a new enemy. So, a clash appeared imminent.

Shifting Paradigms

Following the turbulent post-9/11 noughties, with the Arab Spring echoing the tumultuous background of the 1970s, 1980s and 1990s, it was time to take up that conversation again.

The epistemological project required a course correction. We needed to learn from all the work done since the mid-1970s, consider and understand the changes that had taken place during the past decades, reorientate ourselves, and infuse fresh energy into the project. I faced opposition from two fronts. At this time, I had recently been released from prison following my attempted political assassination in 1998 when I was within reach of being Malaysia's Prime Minister. Free and with public sentiment weighing in our favour, I was making my comeback as a general election approached and my new political party was set to win many seats in Parliament. My Malaysian colleagues thought I was mad, interrupting my momentum with the premiership so close at hand, to travel to London for intellectual discussions on the nature and relevance of epistemology. While in London, my colleagues and friends called me mad for wanting to go back and campaign in Malaysia. They will throw you back in prison, they said. My friend, Ziauddin Sardar, would constantly cite the proverb of the frog and the scorpion, noting the nature of scorpions is to sting you, and ask, why must you let them ride on your back across the river. While the scorpion cannot abandon his nature, how could he expect me to abandon mine? What I had to do was build bridges. Throughout all my experiences, Sardar has been my friends for decades; as a scholar of science, technology, knowledge, and futures, he has a multidisciplinary perspective and is well plugged into the zeitgeist of the times. He always emphasises the importance of ethics and values. I had countless vibrant debates with him, and he would constantly challenge me. But this time he presented me with my most difficult challenge. Sardar was a severe critic of the project of Islamization of Knowledge (Sardar 1985, 1989); and equally strong critic of al-Faruqi, al-Attas, and Nasr. I thought, Sardar would bring in a different perspective to our conversation and would be an excellent addition to our ongoing conversation.

But it was not an easy task; both IIT and Sardar had to be convinced. Thanks to the tireless support I received from the late Jamal al-Barzinji, one of the founders and then the President of IIT, along with Anas Al-Shaikh-Ali, Director of the London Office, we were able to bring Sardar into the conversation. Sardar argued, in his greatest display of diplomacy to date, that the Islamization of knowledge project was both partially right and partially wrong. It was right in suggesting that the dominant modes of knowledge production were epistemologically biased; but it was wrong in assuming that this bias can be sponged with a dose of Islamic values or Islamization. In fact, Sardar argued in our meetings in London, the epistemological bias was not only a problem for Islam, it was also a problem for the West – and both needed rescuing from an aggressively colonising epistemology unconcerned with morality, and determined to undermine any notion of humanity. Both the East and the West needed a strong dose of epistemological justice.

Justice, so paramount to the foundational beliefs of Islam, holds a special place in my heart. Its namesake is borne out in the political party I founded, and its objectives accent every move I make in my career, not just as a politician, but as a critical intellectual with a concern for the ummah and peace and harmony on the planet. Justice has to be maintained on a multitude of levels – from the inner toil of personal justice to the justice found between individuals,

communities, nations and states. Justice is also needed in how we treat nature, how we see others, and how we acquire knowledge (Ibrahim 2021). But justice cannot be sought in isolation; it requires collaboration and cooperation, seeing value in the efforts of others, and consider different viewpoints and outlooks. The new direction for the project had to echo the rich diversity of the thinkers who had brought it to this point, but also incorporate new and wider perspectives, see Islam and the West not as antagonists but as mutually cooperative sides working to shape better, more humane and sustainable futures.

Sardar was given the task – or, if I am honest, it was imposed on him – to rethink the project and make it more relevant to contemporary, ever changing, times. He reframed the project: moving it away from ‘Islamization of Knowledge’ to become a discourse on ‘Integration of Knowledge’ – an emerging, multi-generational discourse, geared towards producing new knowledge, that evolves and matures organically, based on the values of justice and humility, that respects different modes of being and knowing, gives due importance to objectivity as well as inner experience. There is also emphasis towards the future, an unbridled concern for the future generations, creation of new disciplines to meet the challenges of postnormal times, and working to produce new knowledge and new institutions – intellectual and physical – simultaneously.

The paradigm shift from Islamization to Integration was to be announced at a IIIT conference in Istanbul, organised in collaboration with Istanbul University, in March 2016. But before the conference, we suffered a double whammy. My dear friend and colleague, Jamal al-Barzinji, died on 26 September 2015. And, the worst fear of my colleagues came to pass. I was supposed to give the keynote address for this conference, but the scorpion’s sting had fallen and I was again imprisoned in Malaysia. A portion of the conference was devoted to Barzinji’s memory, and the herculean task he accomplished in establishing and guiding IIIT. Sardar stepped in to give that address and the exchange of ideas that took place would bring about the seminal book by Sardar and Jeremy Henzell-Thomas, *Rethinking Reform in Higher Education: From Islamization to Integration of Knowledge* (2017). We continue to address the epistemological crisis we face in our digital futures; and this book is a sequel to our earlier work. The project ignites a deep concern into a predicament that threatens everything, yet hides beneath the surface. There is a deep neglect that is being exposed in some of the revelations of this volume. Epistemology is not only the heart of our knowledge base; it is the tool by which knowledge and truth are justified and differentiated from opinion or belief. It lurks beneath the surface because it is taken for granted.

Philosophers, on the whole, tend to scoff at a discussion of epistemology. This is ancient history to them. Let us get to the real questions, they say. No wonder a glance through any substantial texts on the subject seem to end with the Enlightenment, only extending beyond this the translation needed to fit the needs of analytic philosophers and to fill the atheists’ munition reserves. This is folly. Any school of thought that wishes to advance, and especially to have any bearing in our real world, must incorporate the seminal changes that have taken place in knowledge production over the last few decades; and rethink and reorientate their position in the light of change. Constantly improving our thoughts and ideas is regarded as a necessity in many

non-western worldviews. This is essential, for example, to the philosophy behind Confucius's *junzi* or exemplary person. It is not about getting to the top of the mountain – no one ever will, and if they did, they would have no more reason to act for the good. Instead, they must continually improve themselves, for we are flawed humans that can always use a bit of course correction. This virtue is essential to Islam as well. As the Quran declares, 'Allah will not change the condition of a people [for the better] until they change what is in themselves' (13:11).

The modern world of constant, instant updates, the internet of things, and always being connected, distracts us. Our focus rarely drifts from our career-centric and narrow field of study driven pursuits. And when the working day is done, our minds fall under the spell of endless screens, be that of the all-pervasive social media or the constant onslaught of globalised popular culture. Instant gratification soils our efforts to reflect and reform, to progress, in other words, to philosophise, which unfortunately has become a bad word. Further alienated, we cast the act of philosophising as a disconnected, ethereal practice of hopeless idealists. And before we know it, our philosophical foundations rot. Yet these foundations inform our language, our thoughts, and our actions whether or not we recognise them.

When we examine the philosophy of knowledge, we find that it is woefully dominated by not only dead thinkers, but by dead Western thinkers. When we crack into this first sphere of philosophical influence, we find a mess of convenience, a consequence of the refreshing intoxication of postmodernist thought. There is endless discussion of who precedes who amongst epistemology, ontology, metaphysics, or even phenomenology. The important thing to note, however, is their interconnectedness and, as the crisis on our hands reveals, the almost self-organising nature these schools take on. Often ontology is allowed to determine epistemology and phenomenology. Just hope that the ontology being used comes from a worldview that recognises your existence and, more importantly, possession of rights. Historically, dominant ontologies have not been forthcoming with such recognitions, despite its less-than-convincing claims of being enlightened by its Christian origins. When Western ontologies are taken as given, more of us tend to be the Other, rather than a being capable of rational thought. And even if we can hope for the philosophers to untangle this web, we are left wondering if the Western mind can out-think itself. This brings to mind the famous quote, the title of the first chapter of British theorist Mark Fisher's *Capitalist Realism*, and attributed to the American postmodernist literary critic Fredric Jameson as well as the Slovenian philosopher Slavoj Žižek, that 'it is easier to think of the end of the world than the end of capitalism' (Fisher 2009). So, within the dominant epistemological framework, it seems impossible to think of a world not based on, or biased by, western disciplines. The champions of Islamization, Ismail al-Faruqi and Naquib al-Attas, were not only aware of the difficulty of thinking outside the Western framework, but also how that framework was oriented to exclude certain peoples, particularly Muslims, and the cherished notions and ideals of non-western societies.

The perceptions that Muslims are outsiders to the modern world was further enhanced with the Clash of Civilizations thesis promoted by British American Orientalist, Bernard Lewis

(2004) and American political scientist Samuel Huntington (2002). So, Muslims were given the label of the exotic, esoteric other, particularly of western liberalism. These strange people with strange ways became a sort of intellectual obsession for many during the second half of the twentieth century. Of course, projecting Islam and Muslims as the darker side of the West was nothing new. Indeed, an ignorance this powerful requires ample gestation time. In the West's flawed ontology, which imparts and arms its epistemology and phenomenology, everything needs a category – and the categorisation of Muslims as demonic others has a long history in the West. A point well illustrated by Edward Said in *Orientalism* (1978). While Orientalism as a concept existed before Said (Tibawi 1964, Sardar 1999), his opus generated a whole new industry, an intellectual trend as wide ranging as the Clash of Civilization paranoia. I think, Said cast Orientalists in a rather immutable mould. While the type of Orientalism he discussed was a brand embodied by some of its worst accesses, it was rather confined. There were also a great number of Orientalists looking to uplift the position of the Other, and many who were simply ignorant to the confusion, too often resulting in harm, they had caused (Irwin 2007). But Said's work became the opiate of the masses and the battle lines were drawn. And this tragedy added to the body count of the postmodernist's long campaign aimed at the assassination of Truth. Orientalists were the ones who shot first, linking what began as a curious investigation to unabashed Islamophobia. A clash was due; and with the fall of the Soviet Union, and the events of 11 September 2001, it duly arrived, with massive loss for Muslim societies. Yet, despite the critical discussions and efforts of the 1980s and 1990s, the knowledge production needed was not occurring. It was a clash of ignorances.

Both the Western and Islamic worlds are at fault here. The attempt to define and separate what was and has always been irrevocably tethered is bound to lead in failure. So, we return to square one!

Classical Disputes and Deliberations

Epistemological concerns were uppermost amongst Muslims during the formative and classical periods of Islam. The Qur'an calls on Muslims to always be seeking greater knowledge. We need to be learning constantly and continuously; and the assumption often points to expanding our knowledge beyond our own boundaries. There is ample evidence to suggest that Muslims took this advice very seriously. Indeed, as Franz Rosenthal tells is in *Knowledge Triumphant: The Concept of Knowledge in Medieval Islam* (1970), there were over five hundred definitions of knowledge during that period. And it did not really matter where knowledge came from. Early Muslim philosophers, such as al-Kindi and al-Farabi, had no problem looking to the ancient Greeks and seeing their struggle as but another chapter in the long human story of seeking the truth and justice which God calls upon Muslims to pursue. Ibn Sina combined Aristotelianism and Neoplatonism with other ideas introduced through Islam. But Ibn Sina was no mere chronicler of Aristotelian peregrinations. In *The Logic of the Orientals (Mantiq*

al-mashriqiyyin), he distances himself from the Peripatetic works and articulates certain logical distinct views. These philosophers created a distinct intellectual tradition that spawned vibrant discourse among Muslim thinkers. That the discourse sometimes became vitriolic, an intra-Muslim clash of substance, is no doubt indicative of the robust and animated zeitgeist of the classical period of Islamic history.

Al-Ghazali, as is well known, led the assault on ‘the aberrant development of heretic or heresy-leaning’ of Aristotelian philosophers (al-Ghazali, translation 1963). While he appreciated the importance of *falsafa*, al-Ghazali attacked their teachings. Later, when Ibn Rushd came to the defence of the philosophers (Ibn Rushd, translation 1954), with his refutation of the refutation (or literally the incoherence of the incoherence), he too saw that, like moths to a flame, al-Farabi and Ibn Sina, might have ventured too close to the light and, in some instances, suffered a slight overdose of applying Greek philosophy to issues of Islamic cosmology. The upshot: contrary to general perception, Ibn Rushd on his own volition, purged the Aristotelian precepts of what he had considered to be ‘Neoplatonic adulteration.’

In synthesising Aristotelianism with Islam, Ibn Rushd stood out as a leader in its exposition, blazing the trail in the discourses on epistemology, ontology, ethics, and in political philosophy. But he was also an expositor par excellence of Plato’s *Republic*. Consequently, in Christendom his thought morphed into a new school of thought under the label ‘Averroism’ (Akasoy and Giglioni 2013). His expositions were adopted wholesale by thirteenth-century scholastic philosophers in the Latin Christian and Jewish intellectual traditions. He promoted the development of scholastic theology, which opened up Christianity to the discourse of reasoning and intellectual analysis, and led to a renaissance in the sixteenth century. While Thomas Aquinas grudgingly called him ‘The Commentator,’ Dante in his *Divina Commedia* denounced him as one ‘who made that commentary vast,’ placing him in Limbo, the liminal space in Hell, alongside Ṣalaḥ ad-Din and Ibn-Sina.

Western philosophy remains afflicted with the judgment-laden paradigm of referring to Ibn Rushd’s philosophy as ‘Averroism’ bearing connotations of intellectual snobbery, as if all Ibn Rushd had to contribute was mere recycling of Aristotelian precepts. The nineteenth century French Orientalist, Ernest Renan, for example, dismissed Ibn Rushd as a pure rationalist and saw absolutely no originality in him in connection with Aristotle apart from being a mere commentator (Renan 1852). Renan’s arguments provided good fodder for detractors and Islamophobes in their attempt to deconstruct the intellectual achievements of Islam and advance a narrative of ‘Christian Europe’ being the saviour of Greek rationalism. Nothing could be further from the truth. The fact is Ibn Rushd’s differences with Aristotle go beyond the surface as evidenced in the unity of the three philosophical treatises, *The Book of Decisive Treatise*, *On the Harmony of Religion and Philosophy* and *Incoherence of the Incoherence*, manifesting a specific synthesis of Almohad Islam and Aristotelianism. For example, in response to al-Ghazali, concerning the question of divine causality, Ibn Rushd, while maintaining Aristotle’s position concerning the Prime Mover being unmoved, posits that God yet moves the world for

‘The Originator is He of the heavens and the earth: and when He wills a thing to be, He but says unto it, “Be” and it is – *kun fa yakūn*’ (Ibn Rushd 1954, pp.89-70). Creation *ex nihilo* is categorically rejected because nothingness is secondary to existence, manifesting Ibn Rushd’s position that God creates matter and form from the metaphysical building blocks ‘on which the secondary causes act in order to instantiate what was only potential’ (di Giovanni 2013). The departure could not be clearer. Unlike Aristotle who posits that the Prime Mover causes the movement of other things as only a final cause, Ibn Rushd construes it not only as a final but effective cause. In metaphysical terms, celestial souls are utterly immaterial and as such utterly indistinguishable from the Prime Mover. That clearly nails the lie to the time-honoured appellation of mere commentator. As Dominique Urvoý, the French historian of Islamic philosophy, so aptly puts it, ‘far from being “mere” commentary, this is original exposition, in opposition to the Master himself’ (Urvoý 2003).

There was, in parallel to the great debate between al-Ghazali and Ibn Rushd, another equally epic clash. It concerned the epistemological conceptions of justice; and it planted the seeds of epistemological discord for intra-Muslim intellectual conflict that persists till today. The debate was between two eleventh century luminaries of Islamic scholastic theology (*kalam*): the Mu‘tazili philosopher ‘Abd al-Jabbar and the Ash‘ari theologian Ibn al-Baqillani. Both ‘Abd al-Jabbar and Ibn al-Baqillani fundamentally agreed that justice was defined by how humans interpret the intuitions and internal experiences that God created in them. But, as the Malaysian philosopher of law, Faiz Abdullah, puts it ‘that was about all that they agreed on and the rest was open season!’ (Abdullah 2019). Justice, according to *kalam*, is based on knowledge, which in turn is divided into two broad categories: necessary (*ḍarūrī*) and acquired (*muktasab*) knowledge. ‘Abd al-Jabbar defines justice by looking at the intention of an act and the purpose that is meant to be served; the goodness and badness of acts, their praiseworthiness or otherwise, he argues, are all matters known necessarily through intuition and reason. Ibn al-Baqillani, on the other hand, condemns the notion that justice is known intuitively and that the reason (*‘aql*) by itself is a way to knowledge of whether an act is prohibited, permissible, or mandatory. The *Shari‘ah* rules can only be determined through the divine commands, not human efforts, he suggests. Necessary knowledge does not constitute proof that God has created in humans the innate ability to know and reflect. On the contrary, it is testimony to our utter dependence on God: we cannot know anything, argues Ibn al-Baqillani, much less make sound ethical assessments, without God’s direct intervention.

The multipartite clashes between Abd al-Jabbar and Ibn al-Baqillani, as well as al-Ghazali and Ibn Rushd, are still with us to this day. They have transmogrified into conflicts of existential threats; and continue to polarise Muslim minds. In this confrontational stance, we cannot hope to solve the myriad crises before us alone, let alone navigate urgent epistemological issues. The clash of ignorances we face is not simply a clash between the West, whatever that is, and the East, whatever that is, but also a clash within the Islamic intellectual tradition itself. The battlefields of these clashes are a veritable Battle of the Five (and many more) Armies from Tolkien’s *The Hobbit*, and it promises to be just as chaotic and bloody. Meanwhile the ummah, as we are all too aware, continues to suffer.

If our endeavour is not to ‘Islamize’ knowledge in the thought of al-Faruqi, or ‘de-westernize’ knowledge, as Naquib al-Attas would have it, then we need to seek an accommodation and synthesis – an integration of the best of all possible worlds. From our perspective, we need to bring all strands of Muslim thought together – the traditionalists and modernists, the Sunni, the Shia, the Ismailis, the westernised and not-so-westernised, the left and the right – for they are all peas in the same pod. As I know from my own political experience and intellectual endeavours, the key to lasting change is in bringing all the disparate parties together into a polylogue that enriches debate and discourse from several perspectives and provides it with a solid, holistic foundation.

Here, I would suggest, that the philosophy of the great South Asian poet and philosopher, Mohammed Iqbal, may be more useful than historical scholarly clashes. Iqbal cannot be easily pigeon-holed, even though in terms of political philosophy, he is sometimes castigated as being an apologist for the western model of democracy. Some of Iqbal’s writings are not easy to penetrate and frustrate our understanding of his position, such as in his account of al-Ghazali and Immanuel Kant. As a result, he has been seen and described as a socialist, a revolutionary, a Sufi, a traditionalist and even a modernist. As a multifaceted individual, he was all these things – you have to be able to understand the complexities of a complex world. But a close reading of Iqbal reveals strong echoes of Ibn Rushd. Like Ibn Rushd, he regards reason and faith, science and values, as two sides of the same coin:

Reason makes the traveller sharp-sighted.
 What is reason? It is a lamp that lights up the path.
 The commotion raging inside the house
 What does the traveller’s lamp know of it? (Mir 2000)

In ‘Reason and Heart,’ a poem in *The Call of the Marching Bell (Bang-i-Dara)*, Reason declares:

I am a guide for those who are lost.
 I live on earth, but I roam the skies
 Just see the vastness of my reach...
 I interpret the book of life...

The heart acknowledges the claims of reason. And replies:
 You penetrate the secret of existence
 But I see it with my eyes
 You deal with the outward aspects of things,
 I know what lies within...
 Attaining the ultimate in knowledge only makes one restless –
 I am the cure for that malady.
 You are the candle of the Assembly of Truth,
 I am the lamp of the Assembly of Beauty.

You are hobbled by space and time
 While I am the bird in the Lotus Tree (Mir 2000)

The message that knowledge without values can be ‘as cold as death,’ but when it is blended with love, compassion, humility, and justice, it can join the ranks ‘celestial spirits,’ is also hammered in other poems – such as ‘A Dialogue between Knowledge and Love’ in *Message from the East (Payamme Mashriq)*. *Payamme Mashriq*, his great collection of philosophical poems, is Iqbal’s reply to Goethe *West-Eastern Divan* (1827, translation 2019) a collection of lyrical poems inspired by that giant of Persian literature, Hafiz. Iqbal acknowledges the knowledge acquired by the West, but decries that this knowledge cannot comprehend the essence of humanity’s problems:

The eye sees just the colour of the tulip and the rose;
 But far more obvious, could we see it, is the flower’s core.
 It is not strange that you have the Messiah’s healing touch:
 What is strange is your patient is sicker for your cure.
 Though you have gathered knowledge, you have thrown away the heart:
 With what a precious treasure you have thought it fit to part! (Iqbal 1922).

But there is neither an overbearing denouncement of the West nor overzealous chanting for the East. The East/West divide was no cause for loss of faith for Iqbal. Any way you slice it, for Iqbal, the complementarity of religion and philosophy leaves no room for arid secularism. Human virtues, he argues, again and again, are essential for the pursuit of knowledge. Both, East and West have to acknowledge and adjust to change:

The motionless shore said, ‘Though I have long been here,
 I am not yet aware of my identity.’
 The restless wave rolled fast and said, ‘For me
 To roll on is to be, to lie still is not to be’ (Iqbal 1922).

Where We Stand

Times change; and in postnormal times accelerating change in the norm. In an interconnected, globalised world, rapid change generates complex problems that require complex approaches to navigate. Adopting to the changing nature of change, requires the spirit of polylogue that brings different perspectives to examine the problems we face, grants agency to those left voiceless, and exposes conscious, unconscious, or confirmation bias. The deep philosophical reflections that remain exhaustingly overdue can be conducted in a demystified fashion and can bring about actual results. The polylogue approach is also essentially democratic; it brings our best minds from different philosophical traditions of Islam as well as the East and the West. We

are in a transitional period right now, one that can be seen from many different worldviews and disciplines, and that exists on multiple planes. The unbridled Western dominant mega-institutions and disciplines are not coping well and the cracks in their siloes are opening into crevasses of contradictions. They are held together by flimsy plasters, the ignorance we hide, and the lies we tell each other so we can sleep at night. This is well articulated in contributions to this volume: the increasing irrelevance of dominant epistemology to tackle complex problems and issues discussed by Christopher Jones, the manufactured worldviews delineated by Liam Mayo, the absence and suppression of metaphysics noted by Colin Tudge, the epistemological unrevealing in the academia exposed by Shamim Miah, and the prevalence of Zombie disciplines in higher education highlighted by Liam Mayo and Shamim Miah. Given these epistemological misdemeanours, coupled with postmodernism's haphazard abandon of truth and our misguided views of justice, we stand waiting for the disaster that will spell an extinction-level event in human history.

This troubling threat was made apparent in Kuala Lumpur when Sardar gave a keynote address at the Digital Futures Conference of November 2019 – it came to be the first chapter of this volume. Like the fog of war, the Smog of Ignorance blinds us to our realities, perpetuating the clash of ignorances that the old paradigms have become addicted to – the only way for them to keep themselves relevant in our rapidly accelerating world. Meanwhile, grave injustices are allowed to run rampant, ignored, or flat out denied for a variety of conveniences. Our acts are unjust because our epistemology is unjust. And we are about to wilfully repeat the process that brought about this crisis in the first place.

The grand illusion continues into our futures; or, more precisely, the extended present that masquerades as future. Just as the dominance of the West confounded our epistemology, now we are handing over that definitional power to algorithms, machine-learning, and AI. And since these programmes were designed by those bearing the same Western biases, they also adopt the xenophobic hate that is both consciously and unconsciously a part of their makers, squaring, even cubing the problem. A flurry of brilliant studies has shown how our technology is racist and infected beyond the emotional level by the epistemological biases of their, often white and western, creators (Noble 2018, O'Neil 2016, Eubank 2017). Once again, all in the interest of convenience. To even call this a crisis is disingenuous. This is a tragedy at the gates. But this is not our fate.

Epistemological reform is the new banner we have to rally behind. Knowledge now is intrinsically linked to Western power; and pernicious variety of Orientalism, as Wael Hallaq argues, has now permeated all fields of knowledge, from law and philosophy, to scientific inquiry and systematic destruction of the natural world, and academic thought such as sovereignty and the self (Hallaq 2018). Integration of knowledge is about liberating knowledge from what John Bishop (2007) calls 'isolationist epistemology' and open up knowledge production to different ways of knowing. In an Integration of Knowledge approach, we can come to the global table and bring a voice that demands equal respect in an effort to resolve the issues and crises that

we are facing on a complex, globalised level. Integration is, of course, at least a two-way process. It encourages the incorporation of non-western values and concerns in the production of global knowledge. It seeks unification of physics and metaphysics. And it forces us to do some serious introspection: where we come from as Muslims, where we are going, where we ought to be going, and where we stand collectively as humanity. In a confrontational framework, it is too easy to blame all the wrongs on the West, essentially othering those who sought to other us in the first place. Such reductionism narrows our own conceptions and actually prevents us from comprehending the true scale of the complexity of our world and the epistemological shifts we need to navigate this complexity. We cannot allow ourselves to be overcome with the arrogance and hate that allowed this great divide between East and West to flourish. Integration requires collaboration not separation. It gives us the opportunity to work together to create new paradigms, new ways of solving problems, and new ways to live sustainably on the planet.

As Islam teaches us, and futures studies and postnormal times theory support, we must not despair. The future is plural and the more aware of this fact and literate we are in thinking about it, the more open, inclusive, empowering, and multicultural we can make it. Justice is not some heavenly ideal or lost romanticised notion of hither history, it is an ongoing practice and something to be continually aimed towards in our futures. Just as there is no need to recognise every puritan call for a battle to the death with the West, we shouldn't feed the call of luddites to destroy every machine. In fact, the less unilateral, extremist action taken, the better. We also need to continue to bring more voices to the table and fortify our logic and thought so that we can work across the globe. It will take a collective, multidisciplinary, and multicultural effort to navigate our way to the other side of this storm.

The Integration of Knowledge project requires a revitalisation of our creativity and imagination as well as a strong infusion of ethics. These values arise from coming together and pooling our resources with reasoned, critical reiterations. Civilisational dialogues as well as polylogues can remind us of how interconnected our world and our civilisations really are. The lies and the fake news can be seen for what they are and more compassionate and humane grand narratives can be excavated from the imperative to collaborate, integrate, and synthesise. In striving for epistemological justice, we also need to bring philosophy down from its abstract and elitist pedestal to something for everyone in our real world. Finally, our journey towards epistemological justice must be based on an enlightened view of Islam, removed of its demonised caricature, and the West, freed from its fear-based ignorance, as equals in cooperation – a sort of *Covivencia* that untethers the way of the world from animosity and clash towards integrated, collaborative, constructive, and critical knowledge creation.

Only through striving for epistemological justice can we aspire to higher truths, and shape viable, thriving, and sustainable futures for all.

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EDITOR'S NOTE

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INDEX

- 'Abd al-Jabbar, 165
Abdullah, Faiz, 165
Abu al-Fida, 7
Abul Wafa, 7
Ackoff, Russell, 21–22, 27
agency, 85, 98–99
AI (Artificial Intelligence): biases and prejudices
in, 33–34, 144–145; and economic paradigm,
47, 51–52; and emergent knowledge, 3, 30–32;
and epistemological crisis, 157–158; and higher
education, 13, 143–146; and human behaviour,
147; Human Computer Interaction (HCI),
34–35; and human intelligence, 59; as potential
black swan disruption, 55, 56; in schools, 147;
and technology-based epistemologies, 50–51;
and wisdom, 33–35, 36. *See also* Big Data;
knowledge; technological innovations
Alatas, Syed Hussein, 92, 157
Alexander, Samuel, 13
Algorithmic Information theory, 25
Al-Alwani, Shaykh Taha Jabir, 159
Amazon, 25, 68
American Dream, 11
Amin, Samir, 88
Anthropocene, 4–5, 6, 53
anthropogenic mass, 2
anticipatory action learning, 96–97
anticipatory imagination, 5–6, 15, 85, 102. *See*
also imagination; Mutually Assured Diversity
(MAD)
Aoun, Josef E., 144
Appadurai, A., 90
Apple, 25
Apple, Michael, 139
Aquinas, Thomas, 111, 164
Arab Gulf States. *See* GCC (Gulf Cooperation
Council)
Archaean life, 57–58
Ardelt, Monika, 34
Aristotle, 8, 10, 19, 23, 164–165
Artificial Intelligence (AI). *See* AI (Artificial
Intelligence)
astronomy in twentieth century, 122–123
Atkins, Peter, 118, 125
al-Attas, Syed Muhammad Naquib, 156–157,
158–159, 162
Augmented Reality, 35
Australia, 75, 138
autonomy of knowledge, 30
Averroism, 164
Ayer, A. J. (Freddie), 125
Bach, J. S., 116
Bachelard, Gaston, 66
Bacon, Francis, 9, 115, 125
Bacon, Roger, 114
al-Barzinji, Jamal, 160, 161
Baudrillard, Jean, 72, 73, 93
Bauman, Zygmunt, 94
BBC, 9
Beck, Ulrich, 84, 94
Becoming, 100
behaviorism, 114
Belgium, 147
Bell, John Stewart, 131
Berlin, Isaiah, 9–10
Bhambra, G. K., 89
biases and prejudices: in AI (Artificial
Intelligence), 33–34, 144–145; in epistemology,
157–158, 160; in UK universities, 151
Big Data: and 4Ss (speed, scope, scale,
simultaneity), 27; and complexity, contradiction
and chaos (3Cs), 27; and emergent knowledge,
2–3, 30; and feedback loops, 70–71, 76; and
knowledge, 24–27, 65–66, 147
Big Tech, 11
biology in twentieth century, 123–124
biotechnology, 52
al-Biruni, 7
Bishop, John, 168

- Blackburn, Simon, 20
 black elephant events, 4, 50–53
 black jellyfish events, 4, 53–54
 black swan events, 4, 55–58
 blue sky events. *See* black swan events
 Bohr, Niels, 121, 122, 130
 Boisot, M. H., 22–23
 Boyle, Robert, 9
 Braidotti, Rosi, 98–99
 brain evolution, 110
 Brent, R., 96
 Brethren of Purity, 8
 Brockmeier, Jens, 98
 Brooke, John Hedley, 118
 Bryson, Steve, 25
 Bunt, Gary, 143
 Burke, Don, 77
 Burke, Tarana, 78
 Bush, George H.W., 77
 Bussey, M. et al., 97
- Cambridge University, 138
 Canals, A., 22–23
 capitalism: and conquest, 11–13; and
 contradiction, 47, 51; economics and culture,
 51–52; as hindrance to collective survival, 1–2;
 and knowledge, 2–3; surveillance capitalism,
 11–12, 28–29. *See also* Western civilisation
 Capra, Fritjof, 119
 Carnap, Rudolf, 124–125
 catfishing, 56–57
 Century Lab, 147
 certainty vs. truth, 113
 Chandler, Davie, 15
 ‘Chicago boys,’ 139
 Chile, 139
 China, 29, 51, 138, 143
 Chomsky, Noam, 72, 114
 Christodoulou, D., 151
 Clammer, J., 94
 Clash of Civilisations thesis, 162–163
 climate change: as black elephant, 52; as black
 jellyfish, 53; estimation of threat, 55–56;
 normalcy and postnormalcy overlap, 75; tipping
 points reached, 57; and uncertainty, 44
 Cohen, Jared, 147
 colonialism and epistemology, 136–137, 157–158
 complexity, contradiction and chaos (3Cs), 46–47;
 and Big Data, 27; and ignorance, 24; and
 technology-based epistemologies, 50–51; and
 wisdom, 31–32
 Comte, Auguste, 92
 conflict and chaos, 47
- Confucius, 19
 conquest, 9–13
 consciousness (universal intelligence), 129–132
 consensual knowledge, 30
Consumer Report, 29
 Coole, Dianne, 100
 Cooper, Paul, 31
 Copernicus, Nicolaus, 115
 COVID-19 pandemic: and change, 48–49; and
 higher education, 145; and ignorance, 59; and
 trust in science, 6, 141–142; and uncertainty, 44
 Crick, Francis, 123
 critical thinking, 148
 Cukier, Kenneth, 28
 culture and imagination, 94–96
 Cummings, Dominic, 141
- D’Ancona, Matthew, 25
 Dante, 164
 Darwin, Charles, 117, 118, 123, 128
 Data-Information-Knowledge-Wisdom (DIKW)
 hierarchy, 21–24, 30–31, 33
 data manipulation, 26
 Dator, Jim, 14
 Davenport, T. H., 25
 Davis, Mike, 139
 Davies, Merryl Wyn, 45
 Dawkins, Richard, 117
 death, conquering of as goal, 12
 de Boer, T. J., 8
 decolonialism, 89
 Deleuze, G., 86, 100
 demographic shifts, 48, 51
 Dennett, Daniel, 130
 Derrida, Jacques, 72
 Descartes, Rene, 9, 66, 130
 development and poverty, 88–90
 Dewey, John, 151
 Dickens, Charles, 112
 digital cultures, 4, 67–69. *See also* worldviews,
 manufactured
 digital influencers, 75–76
 DIKW (Data-Information-Knowledge-Wisdom)
 hierarchy, 21–24, 30–31, 33
 Dirac, Paul, 128
 disciplines, traditional, 9–10
 disciplines, zombie. *See* zombie disciplines
 double consciousness, 146
 Drake equation, 54
 dualism, 130
 Dubai, 137–138
 Du Bois, W. E. B., 146, 148
 Dunlop, I., 55

- Durkheim, Emile, 92, 93
 Dussel, Enrique, 95
 Dyson, Freeman, 130
- Eco, Umberto, 73
 economics as discipline, 90–91
 education. *See* higher education
 Einstein, Albert, 67, 110, 114, 119–120, 129
 Eisenstein, Paul, 67
 Eliot, T. S., 18, 37
 emergent knowledge, 2–3, 30–32. *See also*
 knowledge
 Enlightenment, 6–10, 23, 111–112
 environmental limits, 4–5
 epistemological justice: classical disputes and
 deliberations, 163–167; Islamization of
 knowledge project, 156–159; paradigm shifts,
 159–163; reform, 167–169. *See also* higher
 education; knowledge; postnormal times (PNT)
 theory; worldviews
 epistemological ruptures, 66–67, 79–80
 epistemologies. *See* AI (Artificial Intelligence);
 higher education; ignorance(s); knowledge;
 Muslim scholarship; postnormal times (PNT)
 theory; science; values; Western civilisation;
 wisdom; worldviews; zombie disciplines
 Ethiopia, 147
 existential threats, 54
 Extinction Rebellion (2019), 13–14, 75
- Facebook: and AI (Artificial Intelligence), 143;
 data collection by, 25–26; fakes on, 26, 47–48;
 in postmodern and postnormal practices, 74;
 and power shifts, 68
 faith: and reason, 111, 112, 127, 166–167; and
 science, 6–7, 15, 51, 111, 132–133. *See also*
 religion
 fake news. *See* lies and falsehoods
 Fallon, Michael, 77
 al-Farabi, 8, 20, 157, 163, 164
 Faraday, Michael, 121
 Farecast, 28
 al-Faruqi, Ismail, 157, 158–159, 162
 Felder R. M., 96
 Fermi paradox, 54
 Ferrari, Michel, 34
 Feyrabend, Paul, 21
 Feynman, Richard, 127
 Fieschi, Catherine, 27
 final cause (Aristotle), 10
 Fisher, Mark, 15, 162
 Fontowicz, Silvio, 6
 forbidden knowledge, 31
- Foucault, Michel, 66, 88
 4Ss (speed, scope, scale, simultaneity). *See* speed,
 scope, scale, simultaneity (4Ss)
 Frankfurt, Harry, 27
 Franklin, Rosalind, 123
 Fraser, Nancy, 65
 Fremaux, Anne, 4–5
 Fricke, Martin, 22
 Fuller, Buckminster, 21
 Funtowicz, Silvio. O., 45, 142
 future shock, 57
 futures thinking, 95–96
- Galileo, 67
 Galloway, Scott, 145
 gargantuan information, 28–30
 Gates, Bill, 6
 GCC (Gulf Cooperation Council), 136–137
 General Relativity, 120
 geography, 89
 Gettier, Edmund, 20
 al-Ghazali, Abu Hamid, 19, 20, 23, 148, 149,
 158, 164
 al-Ghazali, Muhammad, 149
 Gibbons, M. T., 96
 Gibson, William, 57
 Giri, Ananta Kumar, 90, 100
 Glanvill, Joseph, 9
 Gleick, James, 28
 Go, J., 92
 Godel, Kurt, 126
 Goodall, Jane, 114
 Google: and AI (Artificial Intelligence), 34, 143;
 data collection by, 25; data use by, 11, 28; maps,
 25; partnerships with universities, 145; and
 power shifts, 68; as source of knowledge, 68, 72.
 See also AI (Artificial Intelligence)
 Gould, Stephen Jay, 112
 grade inflation, 135–136, 151
 grand narratives, 72–73
 Greek philosophy, 8, 163–164
 Gross, Matthias, 23–24
 Guattari, F., 86, 100
 Guhin, J., 88
- Habermas, Jürgen, 72
 al-Haitham, 7
 Haiti slave resistance, 91–92
 Hallaq, Wael, 168
 Hamka (Abdul Malik Karim Amrullah), 158
 Hammond, Eva, 150
 Haraway, Donna, 149–150
 Harvey, David, 139

- Heisenberg, Werner, 122, 130
- Herman, E. S., 72
- higher education: as big business, 88–89; commodification of, 136–140, 143, 150–151; and COVID-19 pandemic, 145; grade inflation, 135–136, 151; historical purposes of, 87–88; and knowledge production, 59, 87; rise of disciplines, 87; secularism in, 51; zombie metaphor of, 139. *See also* epistemological justice; knowledge; worldviews; zombie disciplines
- , IN MUSLIM WORLD: overview, 135–136, 150–151; International Branch Campuses (IBC), 12–13, 137–143, 151; internet, AI and double consciousness, 143–146; *maqasid al-shariah* approach to, 148–150; TRIGOXIC knowledge in, 146–150; uncertainty and post-truth, 140–143; Western domination of, 136–140, 157–158. *See also* Muslim scholarship
- hikma* (wisdom), 20. *See also* wisdom
- Holocaust, 94
- Horton, Richard, 141–142
- Hoyle, Fred, 123
- Hubble, Edwin, 122–123
- Human Computer Interaction (HCI), 34–35
- humanics, 144
- Huntington, Samuel, 162–163
- Husain, Matt, 89
- Hutton, James, 116–117
- hydrogen sulphide (H₂S) poisoning threat, 57, 58
- Ibn Arabi, 20, 158
- Ibn Ashur, 149
- Ibn al-Baitar, 7
- Ibn al-Baqillani, 165
- Ibn Hazm, 19, 23
- Ibn Khaldun, 7, 13, 23, 37, 92, 148
- Ibn Rushd (Averroes), 8, 19, 164–165, 166
- Ibn Sabin, 19
- Ibn Sina, 8, 20, 163–164
- Ibn Tufayl, 8
- Ibn Zuhr, 7
- Ibrahim, Anwar, 15, 156–169 (Afterword)
- idealists, 130
- ignorance(s): and complexity, contradiction and chaos (3Cs), 24; as component of knowledge, 23; and emergent knowledge, 3; invincible ignorance, 32, 78; in micro-moments, 79; plain ignorance, 30; postnormal contradiction, 49; scientific: oceans, 57–58; taxonomy of, 23–24; and TRIGOXIC knowledge, 147; and uncertainty, 69; vincible ignorance, 29–30, 78–79. *See also* knowledge; postnormal times (PNT) theory; wisdom
- Ikhwaan al-Safa, 8
- imagination: anticipatory, 5–6, 15, 85, 102; and culture, 94–96; and values, 97
- India, 77, 92–93, 138
- individualism, 2, 12–14
- Indonesia, 158
- Ingersoll, Karin, 58
- innovations. *See* technological innovations
- Instagram, 25–26
- instrumental reason, 9–10
- Integration of Knowledge, 161, 168–169
- intellect (Ibn Khaldun), 148
- International Branch Campuses (IBC), 12–13, 137–143, 151
- International Institute for Islamic Thought (IIIT), 159, 160
- internet: in higher education, 143–146; scale of change, 48–49. *See also* AI (Artificial Intelligence); Big Data; lies and falsehoods; social media
- intuition and reason, 111, 112, 127, 166–167
- invincible ignorance, 32, 78. *See also* ignorance(s)
- Iqbal, Mohammed, 166–167
- Islamization of knowledge, 156–159, 160, 166. *See also* Muslim scholarship
- Jabir ibn Hayan, 7
- James, C. L. R., 91–92
- Jameson, Fredric, 72, 162
- Jeans, Sir James, 131
- Jevons paradox, 46
- John Gospel of, 131
- John Paul II, Pope, 111
- Jones, Christopher, 3–4, 44–60 (Chapter 2)
- Jung, Karl, 110–111
- justice, 165–166
- al-Juwayni, 148
- Kant, Immanuel, 10
- Keats, John, 128
- Kekule, Friedrich August, 127
- Kemp, S., 48–49
- Keys, Roy, 143
- Al-Khalili, Jim, 123
- al-Khwarizmi, 7
- Kidwai, Ayesha, 77
- al-Kindi, 163
- Kingsmith, A. T., 66, 67
- knowledge: and academic disciplines, 87–89; autonomy of, 30; and Big Data, 24–27, 30; and capitalism, 2–3; challenges to tradition sources, 45; commodification of, 136–137;

- in digital culture, 67–69; DIKW hierarchy, 21–24, 30–31, 33; emergent knowledge, 2–3, 30–32; and gargantuan information, 28–30; historical discourses of, 19–20; integration of, 161, 168–169; Islamization of, 156–159, 160, 166; levels of unknowns, 128–129; lies and falsehoods, 26–27, 47–49, 56–57, 65; modern debate on, 20–21; necessary knowledge, 165; and neoliberalism, 88–89; objective knowledge, 3, 30–31; and Orientalism/Orientalists, 163, 164, 168; philosophy of, 162–163; and postmodernism, 44, 162–163; and post-truth, 140; and power, 88; TRIGOXIC knowledge, 3, 13, 32, 146–150; and verifiability, 125–126. *See also* AI (Artificial Intelligence); higher education; ignorance(s); Muslim scholarship; postnormal times (PNT) theory; science; values; wisdom; worldviews; zombie disciplines
- knowledge economies, 137, 138, 140
- Kogan, Barry, 19
- Kuhn, Thomas, 21, 67, 128
- lags, creeps and bursts, 75–79
- Lane, J. E., 138
- Latour, Bruno, 21
- Lauer, Matt, 76
- Lavoisier, 67
- Lehrer, Keith, 20
- Levitin, Daniel, 26
- Lewis, Bernard, 162–163
- lies and falsehoods, 26–27, 47–49, 56–57, 65. *See also* worldviews, manufactured
- Lind, Heather, 77
- Listman, Jennifer, 77
- Liu Cixin, 54
- Locke, John, 10
- logical imperialism, 10
- logical positivism, 10, 113, 124–126, 129
- Lorenz, Konrad, 114
- Lovelock, James, 52
- Lukacs, Gyorgy, 6
- Lummis, D., 89
- Lyell, Charles, 117
- Lyotard, Jean-Francois, 21
- Macron, Emmanuel, 77
- Making Peace With Nature* (UNEP), 5, 6
- Malaysia, 137, 138
- maps, conventional vs. Google, 25
- maqasid al-shariah* (objectives of shariah), 148–150
- Marcel, Gabriel, 128–129
- Marlowe, Christopher, 120
- Maroney, McMayla, 77
- Marx, Karl, 92–93, 98
- Masood, Ehsan, 142
- Massive Open Online Courses (MOOCs), 143
- mass media and falsehoods, 26–27, 49
- al-Masudi, 7
- mathematics, 126
- matsutake mushrooms metaphor, 1–2
- Maxwell, James Clerk, 121
- Maxwell, Nicholas, 20, 36
- May, Theresa, 77
- Mayer-Schonberger, Victor, 28
- Mayo, Liam, 4, 5–6, 45, 65–80 (Chapter 3), 84–102 (Chapter 4)
- McCallum, Michael, 95
- McClintock, Barbara, 127
- McDonald's, 150
- McFadden, Johnjoe, 123
- McGowan, Todd, 67
- McGowen, Rose, 76
- McLennan, G., 93
- Medawar, Peter, 126–127
- Mendel, Gregor, 123
- Mendelev, 67
- Menon, Nivedita, 77
- Merchant, Carolyn, 9
- metaphysics: and science, 7, 112, 113, 132–133; and secularism, 51
- #MeToo movement, 77–79
- Meyerhoff, E., 136
- Miah, Shamim, 5–6, 12–13, 84–102 (Chapter 4), 135–151 (Chapter 6)
- Michelson, Albert, 118–119, 120, 129
- Microsoft, 25, 34, 145
- Midgley, Mary, 20
- Milano, Alyssa, 77, 78
- mind-matter, 130
- Miskawayh, 38
- MIT (Massachusetts Institute of Technology), 145
- MIT Media Lab, 147
- modernity, 89–92, 158–159
- 'Monday Club,' 139
- Montesquieu, 92
- Monty Python's Flying Circus, 14
- Moore's Law, 46, 48
- Morley, Edward, 118, 120
- Morton, T., 59
- Morton, Timothy, 100–101
- Muslims as Other, 162–163
- Muslim scholarship: classical disputes and deliberations, 163–167; conceptualisation of knowledge, 19; epistemology, 148; modernity, 158–159; objectives of shariah (*maqasid al-*

- shariah*), 148–150; purging of Islamic heritage, 8–9; science, 7–9, 114; truth, 140; wisdom, 23, 38. *See also* higher education, in Muslim world; Islamization of knowledge
- Mutually Assured Diversity (MAD), 85, 97–98, 99, 101, 102
- mysteries, 128–129
- Nasr, Seyyed Hossein, 8, 132, 157, 159
- Nassar, Larry, 77
- Natsir, Mohammad, 158
- necessary knowledge, 165. *See also* knowledge
- neoliberalism, 88–89, 91, 136–140, 150–151
- Newton, Isaac, 67, 115, 119, 124, 128
- Newtonian mechanics, 9–10, 115
- Nichols, T., 68
- Noble, David, 143
- non-European societies (Marx), 92–93
- normal and postnormal, 75
- normalisation, 71–72
- Nowotny, H., 90, 96
- Nozick, Robert, 20
- objective knowledge, 3, 30–31. *See also* knowledge; science
- objectives of shariah (*maqasid al-shariah*), 148–150
- Occam's razor, 114
- Omar Khayyam, 7
- omniscience, 110, 113
- ontologies, 162–163
- Ord, Toby, 13
- Orientalism/Orientalists, 163, 164, 168
- Other, 73, 88, 162–163
- outliers. *See* black swan events
- Oxford University, 138, 145
- paradigm shifts, 128, 159–163
- Pauli, Wolfgang, 131
- Paxson, Thomas, 20
- philosophy of knowledge, 162–163
- Piaget, Jean, 151
- plain ignorance, 30
- Planck, Max, 121, 131
- planetary boundaries, 4–5. *See also* climate change
- Plato, 8, 19, 20, 23, 92, 119
- PNT (postnormal times) theory. *See* postnormal times (PNT) theory
- Polanyi, Karl, 88
- Pomerantsev, Peter, 26
- Popper, Karl, 21, 30, 126
- positivism, 92
- posthumanism, 101
- postmodern condition, 4, 72–74
- postmodernism, 21, 44, 93–94, 162–163
- postnormal condition, 4, 67, 69–71, 72–74
- postnormal epistemes, 66–69
- postnormal tilts, 78–79
- postnormal times (PNT) theory: overview, 3–4, 44–45; complexity, contradiction and chaos (3Cs), 45–47; facing challenges, 13–15; ignorance, 24; ignorance and uncertainty, 49; origins of, 45–46; potentialities menagerie, 3–4, 50; potentialities menagerie: black elephants, 50–53; potentialities menagerie: black jellyfish, 53–54; potentialities menagerie: black swans, 55–58; speed, scope, scale, simultaneity (4Ss), 47–49; transitoriness of postnormalcy, 98; unthought epistemologies, 59–60
- post-structuralism, 44
- post-truth, 140–143, 157–158
- poverty and social sciences, 88–90
- Price, Derek de Salla, 24
- Price, Roy, 76
- Prime Mover, 164–165
- Prusak, L., 25
- QAnon, 48
- al-Qarafi, 149
- Qatar, 137
- quantum mechanics, 120–122, 124
- Quiggin, J., 86
- Qutb al-Din Shirazi, 7
- Ramirez, Rafael, 33
- Rao, V., 71–72
- Ravetz, Jerome, 6, 20, 45, 142
- Raworth, K., 90, 91
- Ray, John, 115
- Rayner, Steve, 23
- al-Razi, 7
- Read, Rupert, 13
- reality, 109–110
- reason: instrumental, 9–10; and intuition/faith, 111, 112, 127, 166–167
- Rees, Martin, 131
- Reid, Julian, 15
- religion: and intuition, 112; and metaphysics, 132–133; and science, 6–7, 15, 117–119. *See also* faith
- Renan, Ernest, 164
- Robertson, Ritchie, 10
- Robinson, Stanley, 58
- Roman civilisation, 8–9
- Rorty, Richard, 72
- Rosa, H., 90

- Rosenthal, Franz, 163
 Rousseau, Jean-Jacques, 151
 Rowley, Jennifer, 23
 Rumi, 20
 Rumsfeld, Donald, 69
 Rushbridger, Alan, 26
 Russell, Peter, 130
 Rutherford, Ernest, 121, 122
- Sadra, Mullah, 20
 Said, Edward, 163
 Sardar, Ziauddin, 1–15 (Introduction), 11, 18–38 (Chapter 1), 45–46, 65, 67, 73, 78, 85, 88, 95, 97–98, 101, 160, 161
 Sarkar, Raya, 77
 Sarton, George, 7
 Schindler, D. C., 12
 Schmidt, Eric, 147
 Schrödinger, Erwin, 130
- science: clinical research and DIKW hierarchy, 30–31; and desire to understand, 109–111; and faith, 6–7, 15, 51, 111, 132–133; as form of worship, 115–116; and high technology, 116; history of, 6–7, 113–119; history of, twentieth century, 119–124; logical positivism, 124–126, 129; and mathematics, 126; and metaphysics, 7, 132–133; method of, 125–126; postnormal nature of, 6–7, 53–54, 140–142; public trust in, 6, 141–142; and reason, 112; and religion, 117–119; as spiritual pursuit, 133; and truth, 124–129; universal intelligence, 129–132; and values, 166–167. *See also* AI (Artificial Intelligence); knowledge; technological innovations
- science education in Muslim world, 140, 142–143
Scientific American, 53
 scientism, 113
 Scott, P. B., 96
 Scott, Ridley, 76
 secularism, 51, 167
 Seldon, Anthony, 145
 self-improvement, 162
 Sergeant, Carl, 77
 sexual harassment accusations, 76–78
 Shariah goals and objectives, 13
 al-Shatibi, 149
 Shattuck, Roger, 31
 al-Shaybani, 148
 al-Sijistani, 23
 Skúlason, P., 87
 Smith, Adam, 10
 Smyth, John, 139
 Social Darwinism, 92
 social media: blurring of reality, 93; and data collection, 25–26; as global threat, 157–158; and misinformation, 47, 48; number of users, 48–49
 sociology, 91–94
 Socrates, 110
 Somerville, Mary, 115
 space in digital culture, 69–70
 space-time, 119–120
 Spacey, Kevin, 76
 speed, scope, scale, simultaneity (4Ss): Big Data, 27; #MeToo movement, 77–78; and postnormal times, 3, 47–49
 Spencer, Herbert, 92
 spirituality, 133
 Spivak, G. C., 88
 Spratt, D., 55
 Standing, Guy, 150
 Stanford University, 145
 Stevenson, Robert Louis, 111
 Streeck, W., 90–91
 surveillance capitalism, 11–12, 28–29
 Swartwood, Jason D., 33
 Sweeney, J., 53
- Tainter, J. A., 46
 Taleb, N. N., 55
 technological innovations: and complexity, 46; and contradiction, 47; digital cultures and worldviews, 4; and disruptions, 51–52, 56–57; as fix for all problems, 6; misuse of, 116; and multiple epistemologies, 45; surveillance, 11–12, 28–29; and toxic knowledge, 3, 31. *See also* AI (Artificial Intelligence); postnormal times (PNT) theory; science; worldviews, manufactured technomoral virtue, 37
 telecommunications and internet, scale of change, 48–49
 televisual communication, 93
 tentacular thinking, 149–150
 Tesich, Steve, 140
 Thatcher, Margret, 93
 theories, definition of, 125
 third nature (Tsing), 1–2
 3Cs (complexity, contradiction and chaos). *See* complexity, contradiction and chaos (3Cs)
 time, relativity of, 119–120
Times Higher Education World University Rankings 2020, 151
 Tocqueville, Alexis de, 10
 toxic knowledge, 3, 31. *See also* knowledge
 transmodernity, 95–96, 100–101
 TRIGOXIC knowledge, 3, 13, 32, 146–150. *See also* knowledge

- Trump, Donald, 14
- truth, 109–110, 113, 124–129. *See also* knowledge; metaphysics; science
- Tsing, Anna, 1–2, 14, 15
- Tudge, Colin, 6–7, 15, 109–133 (Chapter 5)
- Twitter, 25–26, 47, 48, 74
- uncertainty: in decisions and planning, 55–56; and ignorance, 69; in micro-moments, 79; and post-truth, 140–143; sources of, 44, 49
- UNEP (UN Environment Programme), 5, 6
- United Arab Emirates (UAE), 137
- United Kingdom, 138, 141–142, 151
- United States, 138, 141, 143, 145
- universal intelligence, 129–132
- University of California Berkeley, 145
- University of Chicago, 139
- University of Nottingham, 138
- unknowns, levels of, 128–129
- unthought epistemologies, 59–60
- Urvoy, Dominique, 165
- Ussher, James, 117
- utilitarianism, 10
- Vallor, S., 33, 35, 37
- values: and higher education, 138–139; and imagination, 97; and individualism, 12–13; Islamic, 148–150; and knowledge construction, 68–69, 75, 94–95, 169; and reason, 6, 8, 9–10; and science, 166–167; and uncertainty, 49, 142; and wisdom, 20, 36, 88. *See also* knowledge; wisdom; worldviews
- Varley, Laila, 33
- Vattimo, Gianni, 73
- verifiability, 125–126
- Vervaeke, J. et al., 94
- vincible ignorance, 29–30, 78–79. *See also* ignorance(s)
- Viracini, Lorenzo, 11
- Vosoughi, S., 48
- Wallace, Alfred Russell, 117, 118
- Watson, James, 123
- Webb, Amy, 143–144
- Weber, Max, 92, 93
- Wegener, Alfred, 118
- Weinstein, Harvey, 76–78
- Werbos, Paul, 58
- Western civilisation: colonialism and epistemology, 136–137, 157–158; decline of, 51, 59; demise of, 13–14; dominant assumptions of worldview, 4–5, 12, 15, 52–53; Enlightenment, 6–10, 23, 111–112; and modernity, 89–92, 94; paternalism of, 34; and postmodernism, 73. *See also* capitalism; epistemological justice; higher education; postnormal times (PNT) theory; zombie disciplines
- Weststrate, Nic M., 34
- Whewell, William, 115
- wicked problems, 23, 35, 50, 51–52
- Wiesel, Elie, 77
- Wilkie, Tom, 31
- Willets, David, 138
- William of Occam, 114
- wisdom: overview, 18–21; and academic disciplines, 20, 88; and AI (Artificial Intelligence), 33–35, 36; as communal virtue, 36–38; and complexity, contradiction and chaos (3Cs), 31–32; as human characteristic, 22, 34–35; Muslim scholarship on, 20, 23, 38; realization of our shortcomings, 110; and values, 20, 36, 88. *See also* ignorance(s); knowledge; postnormal times (PNT) theory
- Woolgar, Steve, 21
- World Trade Organisation (WTO), 138
- worldviews: and Big Data, 27; of climate change deniers, 56; collapse of, 94; and digital cultures, 4; dominant Western assumptions, 4–5, 12, 15, 52–53; and education, 12–13, 138–139; epistemology embedded in, 2; and invincible ignorance, 24; Islamic, 8; limitations of secular worldviews, 58; paradigm shifts, 128; scientific, 46. *See also* values
- , MANUFACTURED: overview, 65–66, 79–80; lags, creeps and bursts, 75–79; normalisation, 71–72; and postnormal condition, 69–71; postnormal epistemes, 66–69; postnormal vs. postmodern, 72–74; tilts and vincible ignorance, 29–30, 78–79
- Wyrzten, J., 88
- Yapa, L., 90
- Zagzebski, Linda, 20
- Žižek, Slavoj, 162
- zombie categories, 84
- zombie disciplines: overview, 5–6, 84–85, 102; anticipatory imagination and mutually assured diversity, 96–98; culture and imagination, 94–96; disciplines and knowledge, 87–89; and modernity, 89–92; postnormal agency, 98–99; sociology, 91–94; transmodernity, 95–96, 100–101; zombie metaphor, 85–87, 100, 139. *See also* higher education; knowledge
- Zuboff, Shoshana, 2, 11

Our established, age-old notions of knowledge have ceased to be meaningful in postnormal times.

What we define as true knowledge, and the ways in which we create it, have changed radically. The emergence of 'Big Data' and Artificial Intelligence, as well as 'fake news', 'alternative facts', 'deep fake', and 'post-truth' have changed the nature of knowledge production. Established disciplines, such as economics, sociology, anthropology, political science, have lost their significance. Revengeful capitalism, based on profit-driven algorithms, has not only led to environmental destruction, but has also ruined our understanding of what actually constitutes knowledge. In an era that defines societies by questions of knowledge, it becomes necessary and urgent to ask: how is knowledge produced, how is it distributed, and who decides what is true knowledge and what is not?

Emerging Epistemologies explores the changing nature of knowledge production and investigates how emerging epistemologies are transforming our perceptions of the present and the future. The contributors to the volume examine digital landscapes, zombie disciplines, higher education, the role of metaphysics, and epistemological justice; and argue that epistemology does not exist in a vacuum but is determined and embedded in the worldview and culture of society. The chaos and contradiction that accompanies our increasingly complex world requires us to see through 'the smog of ignorance', and seek new ways of thinking and creating knowledge that promotes sustainability, diversity, social justice and appreciates different ways of knowing, being, and doing.

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