Apocalyptic Technology: Naturalism and Nihilism

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0. Introduction

This isn't going to be a lecture about technology bringing about the end of the world. 'Apocalyptic' is meant in the original sense of 'bringing about a revelation', making apparent something that lay concealed. The revelation in question concerns the dependence of science on an article of faith, namely, that the universe is inherently comprehensible to the human mind. I will be showing how a particular technology – deep learning artificial intelligence used as a tool for scientific modelling – casts doubt upon that article of faith, revealing the extent to which scientists have depended on it up until now.

Amongst scientists this belief is normally left implicit, rarely articulated, but still a precondition for the possibility of their research. In a moment I'll say how the assumption figured in my own experience as a young neuroscientist, and how the later introduction of AI tools in neuroscience drew my attention to it. In twentieth century philosophy, however, a central task was to unearth and clarify the methodological commitments and philosophical implications of the rapidly advancing sciences. The career of Daniel Dennett is a tremendous example here. He combined great insight into the workings of the cognitive sciences with a visionary zeal for pushing us to see how an interpretation of those sciences might bring us to a view of ourselves different from any familiar one. This is where I will introduce the

word *naturalism.* Naturalism is ordinarily understood both as the view that denies the existence of non-physical, supernatural entities standing beyond scientific explanation, and that philosophy as a discipline should take its lead from the findings of empirical science.[1] Dennett was an exemplary naturalist in that his research as a philosopher tacked very closely to the paths of scientists, and in his rejection not only of obviously supernatural entities (such as gods) but any explanations of the mind and consciousness that veered towards postulating factors beyond the known mechanisms of physics, chemistry and biology. Furthermore, naturalism is itself an expression of the belief in the intelligibility of the universe. It is a way of stating that, to quote Dennett, when he was asked if that scientific enigma, the *hard problem of consciousness,* would be solved, "There ain't no magic here"[2]; or to quote the desk sign of a neuroscientist interviewed in the prestigious journal *Science,* "Everything is figureoutable."[3]

Before we get into the thickets of naturalism and the assumption of intelligibility, here is the plan of where we're headed. Firstly, I'll talk about neuroscience and technology, how deep learning is showing that the brain is less simple, and therefore less intelligible than scientists had optimistically assumed. Then, we have the question of why people have assumed this – to the extent that their assumption was made explicit, what justification was given for it? We'll see that back in the 17th century,

[1] https://plato.stanford.edu/entries/naturalism/

[2] "Daniel Dennett's naturalistic account of consciousness draws some people in and puts others off. 'There ain't no magic here,'" Rothman 2017 profile of Dennett in *New Yorker* magazine. https://www.newyorker.com/magazine/2017/03/27/daniel-dennetts-science-of-the-soul
And see Dennett 2017 *From Bacteria to Bach and Back,* Allen Lane pp.371-379 against the opinion that consciousness is an inherently unsolvable mystery.

[3] "In his modest office steps away from a buzzing refrigerator, Schrag displays an antique microscope—an homage to predecessors who applied painstaking bench science to medicine's endless enigmas. A small sign on his desk reads, 'Everything is figureoutable.' So far, Alzheimer's has been an exception." Piller 2022 *Science* 377:358-363.

during the so-called scientific revolution,[4] the justification was theological. This brings up the next question: without God, can we assume that the human mind has the capacity to make sense of all the various, immensely complicated workings of nature? Can we justifiably be naturalists? This is where *nihilism* comes in: we risk a crisis of faith for science itself. But don't worry -- I'll say a few words at the end about what this crisis might really amount to.

1. Deep Learning and Neuroscience

Though currently my academic home is a department of philosophy, I started out my career as a scientist in a lab. The research that led to my PhD was a combination of experiments to measure visual thresholds in human subjects (including myself) and programming computer models to simulate the responses of neurons in the early visual system, primary visual cortex, to see if our models could predict the thresholds we actually observed. My supervisor, David Tolhurst, had done seminal work in the 1970s recording directly from visual neurons, seeking to establish the hypothesis that the basic operation of cells in this area is to act as a linear filter of messages originally landing on the retina and passed up via the optic nerve to the brain. If the cells are linear it means that you can predict how they will respond to any complicated image or pattern of light sent to the eye – such as the images that you get when you look around this room – just on the basis of how they respond to very simple, artificial stimuli like these bars. If the linearity hypothesis were correct it would also mean that the behaviour of these neurons could be summarised by what is, mathematically, a very simple equation with just a few variables.

[4] 'So-called' because historians of science have been challenging the widely held view that science emerged in its essentially modern form during the 17th century. E.g. "There was no such thing as the Scientific Revolution, and this is a book about it." Shapin 1996 *The Scientific Revolution*. Chicago: Chicago University Press

Already by the 1990s it was clear that there were discrepancies between the data and the linearity hypothesis. In particular, it was found that the activity of any one neuron was influenced by the responses of other neurons around it to an unexpected degree. However, my supervisor and other researchers were aiming to make a few tweaks and additions to the original linear model that would account for these discrepancies and ultimately allow us to predict how the neurons would respond to realistic images, not just the artificial ones. I was in the lab in the early 2000s and we had some degree of success with these adjustments. We published three articles specifically on the problem of extending the model to realistic images[5] but I could tell that David was never fully satisfied with the results and he carried on tweaking the models in different ways, which he showed me when I came back to visit the lab after I'd left to do post-doctoral research elsewhere and had eventually started my new life as a philosopher of science.

During my time as a student there I remember thinking how curious it was that we were attempting to encapsulate the workings of these neurons in mathematical models which were, to be honest, trivially simple. (I hadn't learned any computer programming before starting in the lab, and my education in maths had finished after one year at university, which means that any advanced modelling would have been beyond me.) The thing was that even though I was not doing experiments on the

[5] Tolhurst, D.J., To, M.P.S., Chirimuuta, M., Lovell, P.G., Chua, P.Y. and Troscianko, T. (2010) Magnitude of perceived change in natural images may be linearly proportional to differences in neuronal firing rate. *Seeing and Perceiving,* 23:349-372.

Chirimuuta, M., Clatworthy, P.L. & Tolhurst, D.J. (2003). Coding of the contrasts in natural images by visual cortex (V1) neurons: A Bayesian approach. *Journal of the Optical Society of America A*, 20, 1253-1260.

Clatworthy, P.L., Chirimuuta, M., Lauritzen, J.S. & Tolhurst, D.J. (2003). Coding of the contrasts in natural images by populations of neurons in primary visual cortex (V1). *Vision Research*, 43, 1983-2001.

brain myself, I had to read a lot of papers reporting on the responses of these neurons in various kinds of experiments and it struck me that there was a great deal of intricacy here that was hard to pin down. And my supervisor had been studying the visual cortex his whole career and knew way more about these neurons than anyone else in the lab, and that very fact impressed me, how one scientist could devote so much time to one class of cell, and still not be satisfied that he's figured them out. If one cell is such a challenge, what hope have we for the whole brain? Yet, if the linear hypothesis were true, there was hope, because in the face of all this apparent complexity there would be one straightforward mathematical principle at play. It shows you how, in our lab, belief in the intelligibility of nature – to be specific, belief in the underlying simplicity of the brain – was so important. Otherwise, we couldn't say why there should be any expectation that some version of a linear model would be the key that would unlock everything we wanted to know about how these cells contribute to our rich and varied experiences.

I didn't think too much again about the challenge of building these predictive models until 2018 when I had a sabbatical to begin work on the project that would become *The Brain Abstracted,* a philosophy of science book about what is learned about the brain through building computational models.[6] I had the idea to revisit primary visual cortex and see how the current results stood. Attending conferences in neuroscience, I'd noticed that many labs had introduced a kind modelling based on deep convolutional networks (similar to AI models used for face recognition) as a means to predict the tough cases where cells are responding to realistic stimuli. The accuracy of predictions was remarkably better than had been achieved with versions of the linear model; at the same time, these models were not based on a linear hypothesis, or any hypothesis about the kind of function that these cells were performing and so

[6] Chirimuuta, M. (2024) *The Brain Abstracted: Simplification in the History and Philosophy of Neuroscience*. Cambridge, MA: MIT Press.

the theoretical payoff was unclear. They operated more like a black box, an oracle, that spat out the right answer without explaining to you what was going on. If your motivation, as a scientist, is to figure these cells out, this is unhelpful. I emailed David about this and he shared the sentiment: yes, the new methods work but it means giving up on science, he said.

In 2020 I published a paper discussing the conundrum:[7] either you can build a simple model that makes mathematical sense and gives you understanding of how the neurons respond in the way that they do, but only in a very narrow range of cases; or you can build an immensely more complex, mathematically opaque model that works accurately across the board but doesn't yield understanding of the responses. The goal of science, as I'd grown up with it, was to have both: understanding *and* the ability to make predictions. If you give up on one of these, understanding, then what you're doing isn't really science, it's engineering – that was mine and David's reaction.

Fortunately, I didn't have to choose between science and engineering because, by then as a philosopher, I had the luxury of sitting back to reflect on the significance of these developments, asking what these new AI modelling technologies have revealed. For one thing, they seem to suggest that not everything is "figureoutable". There may be some things in nature, like a single cell of a living brain, whose workings are so involved that to predict their responses scientists need to use AI to build models of such mathematical complexity that the models no longer make sense to their users.[8] This would mean that science, with its central goal of understanding the natural world, has some limitations; that because of the bounds in how much

[7] Chirimuuta, M. (2021) "Prediction versus understanding in computationally enhanced neuroscience." *Synthese* 199:767–790

[8] For discussion of this very possibility see Dennett 2017 pp.388-413. He calls such applications "post-intelligent design".

complexity any one person, or group of people, can make sense of, no matter how intellectually gifted, some questions about the natural world may not have intelligible answers. The other thing it revealed is the importance of the motivating assumption that we had held on to back then in the lab, that the workings of nature were inherently simple enough for us to understand. Why should people, especially scientists, come to think this? It's not obvious, when you just look at the world, that this should be the case, yet naturalism depends on it. This is where God comes into the picture.

2. Divine Reason and Divine Simplicity

The word "simple" derives from the Latin *simplex*, "one-fold". ("Complex" means "many-fold"). Unity, harmony, and simplicity are characteristics attributed to the divine across various religious traditions. Could it be that in past times, when modern science was in development, a religious cultural background made it natural to associate simplicity not only with God but with the world created by God and investigated by scientists? I think that account is basically correct. Numerous examples from the history of science can be given to illustrate it. I'll mention Galileo because his case is more often used to point out the hostility of religion to science.

In a famous quotation from *The Assayer* of 1623 he writes,

> Philosophy [by which he means 'physics'] is written in this grand book, the universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and read the letters in which it is composed. It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures without

> which it is humanly impossible to understand a single word of it; without these, one wanders about in a dark labyrinth.[9]

The metaphor of the "grand book" makes an obvious comparison with the other book, the Scriptures, that God provided so that we should know Him. Galileo is a key figure in the history of *mathematical* physics. Before the seventeenth century, maths had been used in a wide range of applications, including astronomy and engineering, but the dominant and prestigious Aristotelian natural philosophy did not prize mathematical knowledge as the route to the fundamental truths of the universe, as physicists since Galileo have done.

In the *Dialogue Concerning the Two Chief World Systems* of 1632 Galileo argues directly with the Aristotelians and here we find a startling claim about the power of mathematical reasoning: that in its capacity to attain necessary truths it is essentially like God's intellect, though limited in scope because we are finite creatures and God is an infinite being. "[W]ith regard to those few [mathematical truths] which the human intellect does understand," Galileo writes, "I believe that its knowledge equals the divine in objective certainty, for here it succeeds in understanding necessity, beyond which there can be no greater sureness."[10] A thing I should point out here is that mathematical representations of natural processes, from physical theories with their equations stating the fundamental laws, to the basic linear models I mentioned earlier, are the chief means by which modern science has achieved a simplification of nature. Mathematical representation is an *abstraction* away from the imprecise, hard to pin down, shifting character of things as we encounter them with our senses. The abstraction achieves a pared down object which only bears exact, measurable properties. Use of maths in science is indisputably convenient, but that by itself does not support the commonly held claim, like Galileo's, that a mathematical

[9] Translation from Drake, Stillman. 1957. *Discoveries and Opinions of Galileo.* New York: Anchor Books.

[10] Quoted p.19 in Craig 1987 *The Mind of God and the Works of Man.* Oxford University Press

representation is more true, more close to underlying reality, than a sensory one. Galileo's theology places his claim on a sure foundation: not only did God put mathematical relations into the architectural plan of the universe, but in addition we are endowed with a God-like reasoning faculty to apprehend those mathematical relationships.

In a book, *The Mind of God and the Works of Man* Edward Craig characterises the seventeenth century as, "an epoch which deified reason, figuratively and almost literally." He argues that this was bound to have an impact on ontology, how people took things fundamentally to be, leading to the view:

> that reality was an appropriate object for man's cognitive powers, that the world, in other words, was a thoroughly intelligible place. To begin with, it had been created by God; the Similarity Thesis told us that God's reason resembled human reason, and the doctrine of the divine perfection insisted that he possessed it and used it to the logical maximum. ….. Furthermore, this highly optimistic view of the potential of human reason was hardly likely to be accompanied by so pessimistic a belief as that the world was not a proper object for it; or, if theological backing was needed, that God had equipped man with these powers and then put him somewhere quite unsuitable for their exercise. Nothing would be more natural, therefore, than to hope and expect that the universe was in principle intellectually transparent.[11]

It is well recognised that Isaac Newton, an even bigger name than Galileo in the history of mathematical physics, was heavily preoccupied with theological, as well as

[11] Craig 1987 *The Mind of God and the Works of Man,* Oxford University Press pp.37-38

alchemical pursuits. He asserts that, "nature is exceedingly simple and comformable to herself."[12] This notion of nature being "comformable to herself" just means that what is discovered in one place or time or scale is likely to be found similarly elsewhere. Newton uses this to argue that the rules of motion observed at larger scales are likely to hold for small things too. Thus, we see that regularity, uniformity, is an important component of the idea that nature is inherently simple: some degree of regularity is in fact a condition for the possibility of scientific knowledge and understanding. If things were always changing up on us, we couldn't use past experience as a guide to the present. The emerging scientists of the seventeenth century were confident that God would not have put us in that predicament. But what if God drops out of the picture?

I like to imagine that David Hume, Scotland's most renowned philosopher, denied a position at Edinburgh University under suspicion of atheism, must have pondered the problem of induction while waiting for the sun to rise over Arthur's seat, taking in a view back in the 1700s a little like this one which is from my kitchen window. I'm not an early riser and one compensation for the long winter nights is that for a couple of months in the year I can watch the dawn light without any inconvenience to my schedule. Induction is the pattern of reasoning whereby we make predictions of future events based on past experience. It is crucial for empirical science, science grounded in observation. Hume posed the question of what makes it rational to believe that the sun will rise again in the morning. *Because it always has done in the past?* What makes it rational to expect that the future will conform to the same pattern as the past? We simply make that assumption, known as *the principle of the uniformity of nature*. Newton could appeal to God here, Hume would not, and naturalists like Dennett say we cannot.

[12] Quoted p.389 in Westfall 1981. *Never at Rest: A Biography of Isaac Newton.* Cambridge: Cambridge University Press.

And yet the sun rises, again and again, leaving the problem of induction an idle worry, a philosopher's worry. Or is it? Notice the clouds here. They don't just happen and happen again, not in the same way, not nearly exactly. This photo is just a snapshot of an unfolding process. There in the sky those clouds drifted on stage, rolling and turning in on themselves as they went along, the lights glancing differently from one instance to the next, until they vanished. No cloud pattern ever exactly repeats. The weather is what's known as a *complex dynamical system,* which means that fine grained predictions of what will unfold are impossible to make. Of course we have weather forecasts which use past observations and mathematical modelling to make coarse grained predictions of overall cloud density and type, and therefore chance of precipitation, but never at the level of detail of what we would actually expect to see if we stood there tomorrow: sea horse, then crab shape, then dappled school of fish. This is not the kind of detail that practical life ever requires, no-one would ever complain that a weather forecast fails to deliver this. But here the point is worth attending to a moment: for complex dynamical systems the past doesn't exactly reproduce itself in the future and there are therefore limits to what we can learn with induction, and therefore to the precision of forecasts. Economic markets are another kind of complex dynamical system. If they were perfectly predictable we would all be trillionaires, or the economy would explode, or both. To return to neuroscience, the brain is also a complex dynamical system. At the same time that I began thinking about the failure of the assumption of simplicity it struck me that a large part of the reason why it has not been possible to devise intelligible predictive models is to do with the brain's changeability, how neurons are constantly modulating their responses depending on new things happening elsewhere in the brain and beyond.[13] In neuroscience the principle of the uniformity of nature cannot be taken for granted.

[13] Chirimuuta, M. (2020) "Charting the Heraclitean Brain: Perspectivism and Simplification in Models of the Motor Cortex," in McCoy & Massimi (eds.) *Scientific Perspectivism.* New York: Routledge.

3. Darwin's Truly Dangerous Idea

It strikes me that the philosophers of the 19th century understood our current situation better than we do ourselves. It was then, especially following the publication of the *Origin of Species* in 1859, that an antagonism between science and religion began to form. It was then, and not in the age of Galileo, that science came to be implicated in a crisis of faith. What people noticed then, but seemed to forget later, was that the absence of God would make things tricky for science itself. Matthew Stanley describes how in Victorian Britain,

> many scientists and philosophers concluded that uniformity only makes sense in a theistic world. Without an ordering force (i.e., God), one would expect the universe to be a mishmash of chaotic events. The only guarantee for constancy of the laws of nature was the intent of the lawgiver. Temple and Argyll acknowledged that the uniformity assumption was critical for science, ("on no other assumption can Science proceed at all").[14]

Along with Hume, Friedrich Nietzsche is one of the most influential naturalists in philosophy. They each in different ways sought to rid their theories of knowledge, of existence, and morality, of the theistic principles that had structured philosophies of the past. Nietzsche was never one to leave an arresting implication unmentioned. He

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See also Chapter 7 in *The Brain Abstracted*.

The lesson of Section 1 was that some complex biological systems can be predicted by mathematically opaque AI models when other approaches fail. The point here is a more radical one, that for highly changeable systems, ones for which there are not fixed underlying principles of operation, there will be inherent limits to predicting them, whether through AI or other methods.

[14] p.250 Stanley 2014 'Where Naturalism and Theism Met: The Uniformity of Nature' in Lightman and Dawson (eds.) *Victorian Scientific Naturalism*. Chicago University Press. However, as discussed by Stanley, some scientists of that era, including T. H. Huxley (who coined the term *scientific naturalism* in 1892), attempted to reconcile the principle of uniformity with naturalism. See also Chapter 5 Peter Harrison 2024 *Some New World* Cambridge University Press.

observed how much the ethos of science -- the pursuit of truth for truth's sake, no matter how discomforting -- was indebted to religion, specifically Christianity,

> even we knowers of today," he writes, "we godless anti-metaphysicians, still take *our* fire, too, from the flame lit by the thousand-year old faith, the Christian faith which was also Plato's faith, that God is truth; that truth is divine.[15]

In the end Nietzsche renounced the ideal of absolute truth. The reasons are a little involved but they are very relevant to our topic. He says, here, the Christian faith is Plato's. Undoubtedly, Platonism was part of the intellectual matrix that shaped early Christianity but scholars today would not say that this ancient Greek philosophy is identical to Christianity. That would be inaccurate. There's a point of commonality, though, that I think Nietzsche gets right.[16] Platonists believed that beyond the changing world that appears to our senses there is a world of unchanging forms or ideas that we can come to know intellectually. In fact, knowledge, properly speaking, is only of the forms because changeable things cannot be pinned down with any certainty. When Galileo and Newton justified their endeavours by claiming that there is a hidden, simple, eternal and mathematically intelligible order to the universe, their theology is of a notably Platonic sort -- and this is aside from the issue debated still by historians of science over whether we should understand the scientific revolution to be a re-emergence of Platonism or another ancient philosophy, Epicureanism.[17] We have seen that scientists work on the assumption that everything is figureoutable, and that in turn rests on the idea that things *are* inherently simple enough for us to

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[15] §344 Nietzsche 1882/2008.*The Gay Science,* J. Nauckhoff (trans.) Cambridge University Press. The passage continues: "But what if this were to become more and more difficult to believe, if nothing more were to turn out to be divine except error, blindness, the lie – if God himself were to turn out to be our longest lie?"

[16] A commonality that holds under the rationalistic interpretation of Platonism that Nietzsche promoted. For comparison with an alternative tradition of interpretation see Gentzke 2021 'Christian Platonism and Modernity' in Hampton and Kenney (eds.) *Christian Platonism.* Cambridge University Press.

[17] Catherine Wilson (2008) *Epicureanism at the Origins of Modernity.* Oxford University Press.

understand, even when they *look* horribly complicated and intractable. Whether the underlying simplicity consists of Platonic forms or God's laws of nature, it's hard to see how science – the quest for understanding – survives without some such belief in a transcendent order. Nietzsche didn't think it would.

To indulge, a moment, in dramatic imagery of the sort Nietzsche himself might like, we have a picture in which the Church, personified as a woman, has given birth to an offspring, Science. Science grows both in strength and matricidal urges. At some point Science wields a sword against his mother and kills her off. The world belongs to Science now, except, unbeknownst to him, the umbilical cord attaching Science to the Church had never been cut. His life still depended on hers and little after her demise, Science perishes too, an inadvertent suicide.

So, for Nietzsche, the Death of God is no less the Death of Science.[18] In his rejection of Christianity, Nietzsche was equally at pains to rid himself of the tacit Platonism that had motivated and shaped the sciences through belief in the intelligibility of the cosmos and the possibility of obtaining simple, eternal truths. This was entirely consistent of him. All is complex, all is flux, including knowledge. Knowledge is power. Instead of science we have technology. Or rather, science reveals itself to have been technology all along. One feature of Nietzsche's account I should mention since much of the rhetorical force stems from it, is that the supposedly other-wordly ideals of Christianity and Platonism are contorted power plays. Will to power is the all-pervading force in human life and all life. Science could never have been the

[18] I should mention in passing that Kant's epistemology, being a response to Hume, addresses precisely the problem of how to shore up the foundations of science without theistic principles. His solution was to make "man the lawgiver of nature" but this concession to knowledge being from a (human) perspective (see Massimi 2018 "Perspectivism." In Saatsi (ed.) *Routledge Handbook of Scientific Realism*) is the start of the rot of relativism that many deplore (see note 28).

disinterested pursuit of truth, it only ever was a means for the acquisition of control, in other words, technology.

That might have sounded a little too dramatic for a Friday evening lecture at a Northeastern university in London. Always the risk when you bring up Nietzsche. But my point at the start of this section was that Nietzsche and his contemporaries somehow saw the future better than we understand our present situation. Nietzsche drew his naturalism to the logical conclusions which later naturalists veered away from. (Why that happened will be the question for our next, final, section.) For we have seen that to motivate the quest for scientific understanding one needs the assumption that everything is figureoutable, and that in turn rests on the idea of an alignment between a universe created by God and the God-like powers of our minds, between our reason and the suitability of the world to rational explanation. If, as naturalists hold, we acquired our minds through Darwinian processes, there aren't grounds to expect that the world we evolved in should be inherently intelligible to us. We don't need genuine truth in order to survive, only approximations and sometimes distortions. Indeed, as psychologist Donald Hoffman has argued, truth-seeking may be a non-adaptive strategy for animals like us that just need to get by in the world long enough to reproduce.[19] And so science – a business that yields accurate knowledge and understanding of our universe, as opposed to just technology, engineering, clever tricks that make stuff happen and help us survive – seems quite insecure. That, I submit, is Darwin's truly dangerous idea.[20]

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[19] Hoffman and Singh 2012 'Computational evolutionary perception' *Perception* 41:1073–1091

And see Cailin O'Connor 2014 'Evolving Perceptual Categories' *Philosophy of Science* 81:840-851

[20] Similar observations have been made by others. See Christophe de Ray 2022 'An Evolutionary Sceptical Challenge to Scientific Realism' *Erkenntnis* 87:969–989, and references therein.

4. Early and Late Naturalism, Complete and Incomplete Nihilism

At this point you might be feeling confused. I've changed the story too many times. First I said AI revealed something important about the limits of scientists' ability to comprehend the natural world, then I said this limit was recognised over a hundred years ago. First I said that Dennett was an exemplary naturalist, then I suggested that he did not sufficiently think through the implications of his naturalism. First I said that naturalism is an expression of belief in the intelligibility of the universe, now I'm saying that it actually implies the opposite! And in addition to this confusion, things were getting a bit heavy: talk of science lacking foundations, and never being science all along anyway! Since it's Friday evening I'm going to make this last part of the lecture more light-hearted. In the style of JS Bach, one of Dennett's favourite composers, I offer a piece of philosophical counterpoint, a fugue of Nietzsche and Dennett and a couple of other voices, where the early and late naturalists will take their parts and resolve confusion into a harmonious ending. The question to be answered is this: *why have later naturalists not appreciated the dependence of science on religion, why*

were they not worried, in the way that Hume and Nietzsche were, about the unintelligibility of the natural world, in the absence of the supernatural? [21][22]

In order to get Nietzsche to join in with us I'm having to make concessions to his way of seeing things. The first concession is about the cause of the Death of God (the big event that precipitates naturalism), and the second is about the consequences of this event. Dennett's view, and this is the view more commonly held, was that science brought about a crisis of faith because it offered better explanations of the world around us, such as the origin of life, compared with pre-scientific, supernatural stories. God died when educated people no longer found him credible; or rather, the Death of God was the discovery that he never existed in the first place. Nietzsche insists that this is not what happened. We'll go along with Nietzsche in not treating the existence or non-existence of God as a factual matter, but as an *affective* one:[23]

> 'Where is God?' ..[the madman] cried; 'I'll tell you! *We have killed him* – you and I! We are all his murderers. But how did we do this? How were we able to drink up the sea? Who gave us the sponge to wipe away the entire horizon?

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[21] John Dewey is another early naturalist who saw clearly that former assumptions about the intelligibility or "rationality" of nature stood to be overturned with the view that the human mind is the product of evolution, and this deeply informed his pragmatist epistemology of science:

"From the standpoint of traditional notions, it appears that nature, intrinsically, is *ir*rational. But the quality of irrationality is imputed only because of conflict with a prior definition of rationality. Abandon completely the notion that nature *ought* to conform to a certain definition." p.201

Quest for Certainty 1929 London: George Allen and Unwin.

For discussion of Dewey's radical conclusions on knowledge, post-God, see Richard Rorty 1999 'Pragmatism as Anti-Authoritarianism', *Revue Internationale de Philosophie*, 53:7-20.

[22] A historical explanation different to the one offered here is that the later naturalists just took it that the problem had been solved by the early naturalists such as T. H. Huxley who did directly address the status of the principle of uniformity of nature. See Stanley 2014, Harrison 2024 (note 14). But the issue of intelligibility is broader than just the status of the uniformity principle.

[23] A view more recently argued by Alec Ryrie 2019 *Unbelievers: An Emotional History of Doubt,* William Collins. Also illustrated by the persona of the atheist Ivan Karamazov in *The Brothers Karamazov.*

> What were we doing when we unchained this earth away from its sun? Where is it moving to now? Where are we moving to? Away from all suns? Are we not continually falling? And backwards, sidewards, forwards, in all directions? Is there still an up and a down? Aren't we straying as through an infinite nothing?[24]

God died because we put him to death, i.e., we killed the love for God in our hearts. We broke up with God: he was too controlling, we wanted our freedom back, it was a toxic relationship….. Whatever the story, we said in the end: God, I don't need you, you're nothing to me.

According to Nietzsche, this was not without risk. How could we have wiped away the horizon? The threat is nihilism. What is nihilism? '*That the highest values are devaluing themselves,'* [25] he once put it. It's hard to live in a world without fixed points, absolute ideals. Where are we going? Is there still an up and a down? Dennett, however, doesn't seem so troubled.

Nietzsche thinks that Dennett is in denial, that Dennett believes that we have fixed points – undeniable scientific facts, universal theories – because his conception of science is not sufficiently de-theologised. This, Nietzsche holds, is *incomplete nihilism*, the replacement of God with an unstable substitute, unstable because treated as a fixed, eternal ideal, while at the same time immanent, in the world, not supernatural. I'll quote Heidegger here – for once he has something helpful to add, from his exposition of Nietzsche.

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[24] §125 Nietzsche 1882/2008.

[25] "In a note from the year 1887 Nietzsche poses the question, 'What does nihilism mean?' (*Will to Power,* Aph. 2). He answers: '*That the highest values are devaluing themselves,' This answer is underlined and is furnished with the explanatory amplification: 'The aim is lacking; "Why?" finds no answer.'"* Quoted p.66 in in *The Question Concerning Technology and Other Essays,* Harper & Row.

p.64 "Into the position of the vanished authority of God and of the teaching office of the Church steps the authority of conscience, obtrudes the authority of reason. …. The flight from the world into the suprasensory is replaced by historical progress. The otherworldly goal of everlasting bliss is transformed into the earthly happiness of the greatest number."

p.69 "Incomplete nihilism does indeed replace the former values with others, but it still posits the latter always in the old position of authority that is, as it were, gratuitously maintained as the ideal realm of the suprasensory."[26]

Utopian Marxism is often understood to be an immanentization of the Kingdom of God – the taking of an other-worldy ideal and setting it up as an achievement for this world. Nietzsche is telling us that the late naturalism of Dennett and others is an immanentization of the Galilean and Newtonian projects, still holding on to their idea that we can have absolute knowledge, even though our minds are merely an evolved by-product of cosmic chaos, not sparks of divine intelligence in a rationally ordained cosmos. Moreover, Nietzsche will add, the science of Galileo, of Newton, was already an immanentization of the Platonic philosophy, where once the intelligible order had stood properly beyond the sensory world, not mixed up with empirical science. Heidegger chimes in that that was definitely a stage in the long, unfolding history of nihilism.

Let's pause the dialogue a moment. Nietzsche has said that Dennett can't admit to himself the skeptical implications of naturalism because, basically, it's too scary to look into that abyss: more comforting to be an incomplete nihilist and draw on science as a source of epistemic authority in absence of God. Now whether or not Nietzsche is correct about Dennett in particular, he does seem to be on to something when it comes to the general unease about "post-truth" today. Nietzsche, by the way, was an

[26] Heidegger 1952/1977

overt relativist, this is more or less what it means to deny absolute truth.[27] It's common that today when people want to offset the threat of relativism, they invoke science as a source of objective, absolute truths. Here is Tim Maudlin, a philosopher of physics, on the present danger:

> Caught in our own little thought-worlds, deprived of access to objective truth (because there is no objective truth), we can do no better than miscommunicate, misunderstand, and ultimately resort to raw institutional power to resolve our disputes….. the post-truth Age of Spin and Branding we live in… [28]

That's the dismal situation, Maudlin argues, that we arrive at from making the slightest concession to the relativistic idea that scientific knowledge cannot at least aspire to be eternal, universal, and independent of the contingencies of the human condition.

Hang on a minute, Dennett steps up. He has always been more of a pragmatist and less of a dogmatic scientific realist than Maudlin.[29] Of course science is the product

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[27] Martin Kusch 2020 "Primer on Relativism" in *The Routledge Handbook of Philosophy of Relativism*

[28] Maudlin 2018 'The Defeat of Reason' *Boston Review.* https://www.bostonreview.net/articles/grand-delusion/

[29] Dennett's concept of 'real patterns' can certainly be taken as close to scientific realism (e.g. Potochnik 2017 *Idealisation and the Aims of Science* Chicago University Press; Ladyman et al. 2007 *Every Thing Must Go* Oxford University Press). On the theological trappings of scientific realism:

"Torretti suspects, correctly I think, that the kind of 'realism' stemming from what I have called the fallacy of pre-figuration … is a hangover from a monotheistic perspective on knowledge and scholarship: 'The existence of a well-defined or . . . ready-made reality is no doubt implied by the standard monotheistic conception of God, but I have not the slightest ground for thinking that God's worldview can be articulated in human discourse. To entertain the notion that we could convey that view in words is a symptom of acute provincialism' – even though this provincialism is so often dressed up as universalism! This is something that a mature philosophy of science ought to be able to transcend: 'it is pragmatic realism, not the nostalgic kryptotheology of "scientific realism", that best expresses the real facts of human knowledge and the working scientist's understanding of reality' (2000, p. 115). Torretti maintains that 'science as it is actually practiced' is not concerned with looking for an 'absolute structure'

of evolved humans without Godlike minds, muddling through the natural world as best they can. Of course even our best scientific theories are shaped by those contingencies, but massively aided by cultural evolution.[30] Perhaps we shouldn't bet on any of them being universally true and unrevisable. The point is that they work really, really well – better than any other form of knowledge that humans anywhere have ever come up with. It's because they rest on comprehension of the world, and no religion or mythology has ever come close.[31]

Huh, Nietzsche retorts, you're giving me technology to try to demonstrate that science is something other than technology! It works because it works! We've bent nature to our will. You're telling me that's "comprehension", disinterested truth, and not Will to Power?[32] Yes I am, Dennett says, it's not blind technology. We *know* how it works. We *understand* things about the world and that's what makes technology powerful. You can't reduce science to technology. Seriously? Nietzsche says. That's not how things look anymore. Haven't you heard about that philosopher from Edinburgh, what's her name? Scientists are just doing technology now, they've given up on understanding things…..[33]

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of reality (ibid., p. 117)." p.217 Hasok Chang 2022 *Realism for Realistic People*. Cambridge University Press.

[30] Dennett 2017 chapter 13 .

[31] "Brute force trial and error would no longer suffice; you had to comprehend to compete." (Dennett 2017:331)

[32] The claim that science delivers understanding of nature appears separate from the scientific realist claim that it delivers (approximate) truth. However, these are connected in that the heart of scientific realism is the view that science is *explanatory,* not merely an instrument serving technological goals.

[33] This overstates my disagreement with Dennett. "It is now possible to make…. Things that do what we want them to do but which we really cannot understand. This is sometimes called black box science. You buy the latest high-tech black box, feed in your raw data, and out comes the analysis; the graphs are ready to print and publish, yet you couldn't explain in detail how it works, repair it if broke, and *it is not clear that anybody else could either."* (Dennett 2017:386)

I have to pause a moment again. Nietzsche has just drastically exaggerated my argument. Not that that should surprise us.

Turning back to the conversation, now it seems there's a bit of a pile on. Nietzsche haranguing Dennett: Really, Dan, you agree you're this thing that evolved from a fish and yet you think you can understand the universe, you can explain everything, even consciousness? What makes you think you understand anything better than a leech. Of course, the leech will insist, my bloodsucking technique is superlative, it must be that I have an exquisite understanding of mammalian physiology!

For once Heidegger is trying to be conciliatory. He pulls Nietzsche aside. Dan, just can't see it, he won't change his mind, this belief in scientific understanding, it's not rational it's what makes him feel at home in the world: by telling himself that everything is now, or will be, understood. It's his cosmic consolation.

That, indeed, was Heidegger's diagnosis of what is really at stake over claims for the intelligibility of the world, at least according to a recently published book. Whether it's ancient Greek philosophy or contemporary science, out of wishful thinking, there has been an identification of what ultimately is, of "the meaning of being with intelligibility and ultimately knowability"[34] as Robert Pippin writes, which means that it's now hard to think that things could be other than perfectly suited to scientific

An important difference remains, however: these confrontations with the limit to scientific intelligibility do not prompt Dennett to question his realist assumptions about traditional, explanatory science.

[34] p.x Pippin 2024 *The Culmination: Heidegger, German Idealism, and the Fate of Philosophy.* Chicago University Press

understanding.[35] If that's the case, it makes sense of the curious phenomenon I have discussed in this lecture: that the threat of naturalism to belief in the intelligibility of the world should have been revealed, then concealed, only to be revealed again by technology.

Thank you.

[35] Pippin 2024 p.14 p.14 "The tricky complications here are like the paradox of bad faith; in order to hide something from ourselves, we also have to hide from ourselves that we are doing so. The bottom line is: we do not know, are not aware of forgetting or of what we have forgotten (that is the point), and rely on the metaphysics of presence, with its profoundly comforting and so tempting implication that the way human beings can come to be at home in the world is by understanding it, making it ours by doing so, and by realizing our nature by exercising our rational capacity. That *reason* saves us from such homelessness has become far more comforting than all of the implications of abandoning that metaphysics and that comfort—none of which we can be said to be 'in charge of.'"