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As darkness settled over the small German town of Jena in the late winter of 1798, large groups of young men rushed to the town university's biggest auditorium to listen to their new philosophy professor.

They jostled for seats, took out ink and quills and waited. At the lectern, a young man lit two candles and the students saw him bathed in light.

There is a "secret bond connecting our mind with nature," the professor, Friedrich Schelling, told the students. His idea, that the self and nature are in fact identical, was as simple as it was radical.

He explained this by pointing to the moment when the self becomes aware of the world around it.

"At the first moment, when I am conscious of the external world, the consciousness of my self is there as well," he said, "and vice versa — at my first moment of self-awareness, the real world rises up before me."

Instead of dividing the world into mind and matter, as many philosophers had done for centuries, the young professor told his students that everything was one. It was an idea that would change the way humans think about themselves and nature.

John Dickson (studio)

That reading comes from a *New York Times* essay, penned by historian and author Andrea Wulf on the legacy of German philosopher Friedrich Schelling.

It hints at our theme today: the forgotten art of Natural Philosophy.

There are many ways to define Natural Philosophy but basically, it's the evaluation of the natural world, how it holds together, and what it all broadly *means* for us as thinking creatures. It goes back at least to Aristotle in the fourth century BC. Departing a little from his own teacher Plato, Aristotle thought our senses - not just our minds - were partly reliable. As creatures in creation, we are attuned to observing and reflecting on the natural world.

Before the term “science” was minted in the 19th century, many great thinkers in the fields of astronomy, physics, anatomy, medicine, and mathematics, were known as “natural philosophers” - people who philosophised about nature.

They studied both what we call “science” and the “liberal arts” (literature, logic, rhetoric, and so on). In fact, they combined the two into a coherent whole.

Friedrich Schelling was part of this tradition.

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> *Unlike Isaac Newton, who had described matter as being essentially inert, or the French philosopher René Descartes, who had declared animals to be machines, Schelling’s so-called naturphilosophie (nature philosophy) questioned these mechanical models of nature. Instead, Schelling pronounced that everything — from insects to trees, stones to birds, rivers to humans — was part of one great organism.*

John Dickson (studio)

Don’t fret. We’re not going to be endorsing the panentheism Shelling sometimes seemed to be endorsing - namely that divinity is *in* all natural

things. But he's a good example of a tradition of holding all knowledge - physical as well as philosophical - together in a coherent framework.

In the 18th and 19th centuries, natural philosophy fragmented into the disciplines of modern science; think Chemistry, Biology, Physics, and the like - and the philosophers were left to play by themselves.

This pivot to specialist disciplines - unencumbered by philosophy - did coincide with undeniable technological and medical progress, but it is debatable whether this intellectual fragmentation resulted in those breakthroughs, and it is probably undeniable that this splitting apart of natural study and philosophical study has led to a society that is big on progress, industry, health, and entertainment, but is light on meaning, the very thing that gives humans a sense of significance in the world.

And that brings me to my guest today - back by popular demand. Few people have thought more deeply about both science and meaning than long-time Oxford professor Alister McGrath.

Alister was on the show way back in season 2, to talk through why science and religion are complimentary. At the time, he was Andreas Idreos Professor of Science and Religion at Oxford.

He's since retired. I say 'retired' but he's one of those lofty professors they still entrust with keys to all the Oxford vaults and who is still pumping out important works, like his latest one, *Natural Philosophy: On Retrieving a Lost Disciplinary Imaginary,* in which he makes the case for *a bit more* natural philosophy in the scientific world.

It's a classic question for this podcast: What could contemporary science possibly learn from those old fuddy-duddy ways of thinking about reality? Quite a bit, as it turns out.

I'm John Dickson, and this is Undeceptions.

INTRODUCTION

JD: Um, as you well know, Alastair, there's a sign above one of the old school entrances from the Bodleian courtyard that reads, uh, *Scola Naturalis Philosophiae*. What on earth did students do when they entered that door into the classroom?

Alister McGrath: When they entered that door, they would have entered a realm of reflection on what nature is all about, how it works, and also what does it mean, and perhaps even more importantly, how do we live meaningfully in this world?

What are our responsibilities towards nature? What can we learn from it? What can we learn about it? It's really this total way of engaging the natural world and becoming better people as a result.

JD: And this is the definition of natural philosophy.

Alister McGrath: This is natural philosophy. If you read scientific textbooks and say, Hey, science was once called natural philosophy. No. Natural philosophy is a natural science, but it adds on taking nature seriously and learning from it, not just learning about it. So in effect, we are entering a lost world, but a world that you and I need to reclaim.

John Dickson (studio)

Like most philosophical traditions, natural philosophy can trace its roots back to Ancient Greece.

Plato insisted on the importance of maths for living in the real world. (By the way, yes, my dear American friends, it is ‘maths’ not ‘math’, because the subject is mathematics not mathematic. We don’t shorten statistics to

stat but stats. In the same way, mathematics becomes maths. I know I won't convince anyone, but here I stand, I can do no other!!!!!).

Anyway, Plato wrote of maths.

> *"For the soldier must learn the art of number or he will not know how to organise his army, and the philosopher also, because he has to rise out of the transient world and grasp reality, and therefore he must be able to calculate,"*.

That said, it was Plato's student Aristotle who took natural philosophy to new levels, as I mentioned earlier.

If Plato liked to live up in the clouds of pure ideas, Aristotle liked to carry out little expeditions between heaven and earth, between pure ideas and practical observation of Nature. And this formed the basis of classical education.

It was mediaeval Christians - like Alcuin of York in the 8th century - who preserved and promoted this classical approach, insisting that students (boys and girls, rich and poor) learn 7 disciplines: the first three, or trivium, were grammar, logic, and rhetoric (that's all designed so you could think and communicate thoughts); the next four, or quadrivium, were more about interrogating reality: arithmetic, geometry, astronomy, and music. Together, these formed the so-called 'liberal arts'. And this was the foundation of all education until about 5 minutes ago. Only after this foundational education, did a student learn the law, or theology, or medicine, or history, or whatever.
The key idea behind it all was that knowledge was integrated.

JD: It was a unified world, wasn't it? It was a time when people thought all knowledge was connected in some way. Unpack that sort of unity of knowledge that undergirds the natural philosophy approach.

Alister McGrath: If we look at the heyday of natural philosophy, say the 17th century, what we're talking about is, um, no divisions into disciplines - Biology, physics, mathematics. The whole thing is seen as one body, one Big intellectual playground, all of which is interconnected.

Therefore, if you look at perhaps the best ever work of natural philosophy, which is Johann Kepler's, uh, work, uh, of 1619, which is on the, um, heavenly harmonies.

I mean, basically it, it, there's mathematics, there's music, there's what we now call physics, not what I call astronomy. It's all there together, but it's not broken up.

It's a seamless, integrated way of thinking about the natural world. And you know, we've lost that vision. I wonder if we can reclaim a bit of it.

John Dickson (studio)

Kepler was a German astronomer, mathematician, and musicologist: 1571-1630. He described certain laws of planetary motion, like the planets move around the sun eliptically. That’s a pretty important one.

In 2009 NASA named a telescope after him. The famous Kepler Telescope was stationed in space to observe planets outside our solar system. Kepler, a devout Christian, would have loved the thought of this thing looking further into God’s design in the universe. The thing was retired in 2018, on the 388th anniversary of Kepler’s death, and now it’s just floating through space … somewhere.

Anyway, at the core of Kepler's thinking was the idea of “cosmic harmony”.

He wrote:

> *“The heavenly motions are nothing but a continuous song for several voices (perceived by the intellect, not by the ear) …*

Physics, astronomy, and music; it was all related.

JD: How does natural philosophy differ from that other thing people think about as natural theology? They are different, but in what way?

Alister McGrath: I think natural philosophy was a neutral word.

It was simply, in effect, here is this world. Isn't it amazing? Let's try and make sense of it. Let's try and appreciate it. Let's try and live properly within it. Um, uh, Robert Boyle, for example, spoke of, um, a priest in the temple of nature. You're trying to understand it, but you're trying to reverence it as well.

Natural theology is, um, a contested notion, but it would normally mean something like this. There's a pathway between the natural world and God. Now, interestingly, Natural philosophy includes that. In effect it would be very much, you know, and not simply what is nature saying us about, telling us about itself, about our place in nature, but also in what way does nature enable us to appreciate God.

But natural theology, as that term is now used, would mean something like an apologetic undertaking which aims to demonstrate either the rationality of the Christian faith or the existence of God on the basis of either pure natural reason, o r intelligent reflection on the natural world. And you get that idea in natural philosophy, but it's part of a bigger picture.

JD: Tell me about the origins of natural philosophy. I mean, you took us to the 17th century, but in a sense, um, we can say Aristotle was doing natural philosophy. Can you unpack the origins, but particularly Aristotle's approach?

Alister McGrath: We're stepping back 2, 000 years from the 17th century. And Aristotle was remarkable.

Aristotle himself wasn't really a scientist, but he lived on the island of Lesbos Um, and, um, Was enchanted by a natural world and and local fishermen would bring him reports of what fish did and Aristotle began to think Well, maybe maybe there's some patterns here. Maybe we can try and explain these complex patterns by positing some general principles and so we find Aristotle beginning to develop the ideas that there's the world of appearances and behind it there is a kind of patterning or a kind of set of first principles, once you've got those sorted out Then you know, you're really in business.

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> *“In every inquiry, the examination of material elements and instruments is not to be regarded as final, but as ancillary to the conception of the total form. Thus, the true object of architecture is not bricks, mortar or timber, but the house; and so the principal object of natural philosophy is not the material elements, but their composition, and the totality of the form to which they are subservient, and independently of which they have no existence.”*
>
> ***Aristotle - On Parts of Animals***

Alister McGrath: So in effect, we have here, um, the beginnings of what we now call natural philosophy or even natural science. What I think Aristotle is really good about is trying to say whatever you think, you have to be governed by your observations, it's about the phenomena have to be preserved. Whatever your theory is, it has to be able to accommodate what you observe. So in other words, facts are sacred. Interpretations can vary, but you've got to make sure that those observations find the way into -

JD: Did he differ a little from his master, Plato, on that on that score, in emphasizing natural phenomena?

Alister McGrath: I think he did. I think that if you take Plato, I mean, Plato and Aristotle both have a great interest in the Greek word theoria. It means a way of beholding things. And for Aristotle, this explicitly includes the natural world. For Plato, um, it's a bit like, um, A sort of intellectual world, which curiously doesn't really engage nature at all. Plato doesn't really seem to think that reflecting on the natural world is important.

If anything, Plato is saying, look inside yourself, You know, whereas Aristotle is saying, well, you can do that if you want to but, really, look at that world and learn from it.

John Dickson (studio)

Aristotle's "natural philosophy" was summed up in what he called Physics and Metaphysics, the study of the physical world and the contemplation of what it all means.

This formed the basis for elite Greek and Roman education, before it was - we might say - democratised a little in medieval Europe.

JD: What about the so called medieval period? How early in that post-classical world do we find people doing what we can recognize as natural philosophy.

Alister McGrath: Well, we can see what we'd recognize now in natural philosophy in, for example, the, the work, the work of the Venerable Bede in Northumbria, you know, It, it, I mean, basically he's trying to reflect on nature and make sense of it.

John Dickson (studio)

Woo-hoo! Bede!

Go check out episode 94 for everything on *Venerable Bede*! More in the show notes!

Alister McGrath: But I think it really natural philosophy begins to flourish again in what we call the Middle Ages, particularly in the 13th century.

And a very important development here is at the University of Paris, where There are tensions between the Faculty of Philosophy, or the Faculty of Arts, and the Faculty of Philosophy.

And in effect, a sort of consensus emerges that there's this thing called theology, which relies on revelation and scripture, and there's this thing called natural philosophy, which actually allows human reason unaided to kind of in a way roam over the natural world and make sense of what it sees.

So if you like, there was almost like a gentleman's agreement that these two were different, but actually they could talk to each other in some meaningful ways.

JD: Have you got some good examples of, uh, natural philosophers in this Middle Ages period?

Alister McGrath: Well, Albert the Great stands out for a number of reasons.

John Dickson (studio)

Albert the Great was a German friar and university professor in the 13th century - and a shout out here to all our German listeners - your country has *loads* of great natural philosophers! (and historians, and theologians, and musicians …).

As well as being a philosopher and scientist, Albert was also a Bishop. People called him *Doctor Universalis …* 'teacher of everything' - Researcher Al and Producer Kaley want to make an Albert T-shirt out of it.

Anyway, Albert read and commented on pretty much all of Aristotle, and he passed that knowledge on to a young shy student who eventually eclipsed him: Thomas Aquinas. Thomas was nickname was Doctor Angelicus – basically, the teacher who was out of this world!!!

But … back to Albert, who reckoned natural philosophy was not just the domain of Christians with theological interests. It was for every thinking person.

Alister McGrath: he loved Aristotle and thought he could use him theologically as well as in terms of natural philosophy.

But Albert the Great basically, uh, emphasized that in engaging the natural world, you do not have to make use of Theological techniques, which in effect depend on divine revelation. He was saying you can look at the world through a kind of theological lens, and that's great, but you don't need to. You can simply engage nature on its own terms, and that's what natural philosophy is.

JD: And you think it reaches its peak in the 17th century, um, so you've mentioned Kepler. Are there others that you think are doing good natural philosophy?

Alister McGrath: Well, Isaac Newton's, um, uh, De Principis, the Principles of Natural Philosophy is probably the best-known and the most influential work of natural philosophy.

John Dickson (studio)

Newton's 1687 work *Philosophiæ Naturalis Principia Mathematica - The Mathematical Principals of Natural Philosophy,* or *Principa* for short - is regarded by many scientists today as the "most influential scientific book ever written". See the show notes for the references.

Like Friedrich Shelling mentioned at the top of the show, Newton saw all physical reality, especially gravity (his big topic), as imbued with the divine power.

Alister McGrath: And interestingly, for reasons we don't quite understand, So much happens in England, uh, particularly here in Oxford and also to some extent in Cambridge. So it really is beginning to emerge as a very significant way of thinking. So I would say the 17th century really, if you like, is the golden age of natural philosophy.

JD: Is it an accident that it comes to this golden age in a thoroughly Christian worldview?

Alister McGrath: I think that, uh, if I put it like this, um, the Christian worldview, gives you a very good lens to look the natural world through. I mean, a number of points. Number one, um, it gives you religious motivation. God made this world, therefore, um, whatever God made is good, we therefore need to look at it and value it and appreciate it and also try to understand it.

Because in some way, the greater glory, the greater wisdom of God is manifest in the wisdom and the glory of this created order. That's a very

important thing. You find that in Calvin. But it's a commonplace, actually, within natural philosophy. But the second point, which is really interesting, is the sense of a coherent universe.

Um, you might think, of Colossians 1. 17. “All things cohere, or hang together in Christ”, that's there in natural philosophy. There's some hidden coherence that we can find by intelligent reflection. So if you like, it's saying we inhabit a coherent world and hence we can live meaningfully within this world. But another point about the 17th century is that during the 17th century, England had its First and only war of religion, you know, Charles versus Parliament, the civil war.

Once that was over, once the monarchy was restored, there was still these massive tensions, um, in England between Puritans, Anglicans, Catholics, all these things, unresolved.

And natural philosophy came to be seen as a way that every religious person could kind of have a seat at the table. And in effect, it was seen as a way of achieving some, some way of reintegrating British intellectual culture when it had formed to bits over other issues.

JD: So it's not just a unitary form of knowledge. It was sociologically unifying, do you think?

Well exactly. And the Royal Society of London, which was founded by Charles II, um, really, uh, it had two agendas. One was to promote what we now call natural science.

Alister McGrath: But its second agenda was to kind of bring people back together again, so in effect, uh, England's intellectual life could be rekindled and reignited. So there was that very important cultural theme going on.

John Dickson (studio)

The Royal Society still exists today - it's the oldest independent scientific academy in the world, founded in 1660. Their motto was, and is, Nullius in verba, "On no one's word." Basically, empirical facts not authority.

It sounds like a rejection of religion - that's how 'facts not authority' is now often used. But it wasn't at the time. Founding members of the Society were people like the chemist Robert Boyle, who was devoutly interested in finding God's wisdom in fundamental physical realities, and the mathematician John Wallis, who was an active clergyman.
That's not to suggest this natural philosophy movement was all religious. It was, as Alister tells me, 'ecumenical'.

JD: Were there people who were avowedly not Christian, but still happily did natural philosophy and would have called it natural philosophy?

Alister McGrath: I think natural philosophy was seen as ecumenical, if I can use that word. I mean, they didn't use that word, but if you look at, um, uh, medieval culture, you'll see there's a, there are several types of Christian natural philosophy.

There's an Islamic natural philosophy, particularly in Spain. There's a Jewish natural philosophy. Um, and it's all, they're all doing the same thing, but interestingly, bringing their own specific theological commitments to this, and finding they could work with it. So if you like, natural philosophy is a broad church, and certainly those who were agnostic or atheist, although actually people kept quite quiet about that in the 17th century, would have had a seat at the table without any particular difficulty.

JD: Yeah, so because they felt there was no, um, real intellectual, uh, break between studying the natural world and studying ethics, studying aesthetics and, and so on. They held them together even if they didn't believe in God.

Alister McGrath: I think that's basically it, that, that, um, A Christian natural philosophy would say, look, believing in God brings an awful lot of added value.

You know, it actually roots the whole thing, gives it a firm grounding, and actually allows you to transfer your sense of wonder at the beauty of nature to worship God. Not everyone wanted to go that way, but actually people could see that you could go that way. So there's a willingness to suspend difference on that point.

John Dickson (studio)

The Middle Ages saw some amazing contributions from natural philosophers beyond European Christendom.

In 9th-century Baghdad, the “House of Wisdom” was a community of Christian scholars working side by side with their Islamic buddies - it would make an amazing episode, actually. Basically, Byzantine Christian scholars of the 7th to 9th centuries gave the Islamic world the classical Greek traditions of mathematics, astronomy, medicine, and philosophy, especially Aristotle. Then the Islamic scholars made huge strides in all these areas, before taking that knowledge, including Aristotle, back into the far West in Spain. And from there - almost doing a geographical and intellectual circle - this knowledge came back into Western Europe from Spain, just before the time of Albert the Great in 1200. Oooh, that’d be fun!!!

And then there’s the amazing Jewish natural philosopher Moses Maimonides (also called Rambam). He was born in Spain around 1100, but did much of his best work among Muslims in Egypt. He wrote on Jewish law and Bible, astronomy, and Philosophy. His book Guide for the Perplexed (great title) was an attempt to reconcile Hebrew-Jewish traditions with Greek philosophy and rational observation.

We could go on with these historical examples …

But there's another question to ask.

Why did all this cross-disciplinary, cross-cultural, interfaith natural philosophy lose steam?

How did cold hard *science* become the party-pooper at the natural philosophy shindig?

That's … after the break.

****BREAK 1****

MEDIA - Breaking Bad - 'What About the Soul?'

John Dickson (studio)

That's a scene from the first season of the legendary TV drama *Breaking Bad.*

It's a haunting flashback in which Walter White is breaking down the components of the human body with his friend and colleague, Gretchen Schwartz (the scene cuts between the memory, and "present day" Walter disposing of the decomposed body of a man he's just killed - lovely stuff).

I thought Breaking Bad was brilliant. And I hated it. In fact, Buff and I only watched up to this gruesome episode and then stopped.

Anyway, Walter is all science; Gretchen is more philosophical–open to the idea of the soul.

Walters' playful dig - “there’s only chemistry here” - could function as a motto of some approaches to the natural world. It’s only ‘stuff’, and the ‘stuff’ points to nothing beyond itself.

JD:-When was the parting of the ways? When did natural philosophy get parted? Booted out and hard natural science come to be the term that we use now.
Alister McGrath: Um, I would see this happening during the 19th century. And I think it happens for a number of reasons. I think one of them is that, um, natural philosophy begins to lose its intellectual traction. You know, people begin to feel that, um, it doesn't really engage the new questions of the, emerging culture of the Industrial Revolution.

So that's an issue, because if you think about England's Industrial Revolution, let's say it begins in the 1790s, okay, um, but basically this is now about exploiting nature, um, for commercial purposes. And that doesn't fit well with natural philosophy, which is very much about respecting nature. So the tension begins to emerge, but really, um, it's, it's, what happens in the 19th century are writers like Thomas Huxley is a very good example, who will say that, um, in effect, um, uh, we, we don't need natural philosophy, we just have natural science. Science in effect is the new category we're going to use, and we're getting rid of the Philosophy thing all together. Science is what matters.

John Dickson (studio)

Thomas Huxley was known as “Darwin’s Bulldog” thanks to his staunch defence of Charles Darwin's ideas on evolution.

He didn’t have much time for natural philosophy.

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> *When simple curiosity passes into the love of knowledge as such, and the gratification of the æsthetic sense of the beauty of completeness and accuracy seems more desirable than the easy indolence of ignorance; when the finding out of the causes of things becomes a source of joy, and he is accounted happy who is successful in the search, common knowledge passes into what our forefathers called natural history, whence there is but a step to that which used to be termed natural philosophy, and now passes by the name of physical science.*
>
> *In this final state of knowledge the phenomena of nature are regarded as one continuous series of causes and effects; and the ultimate object of science is to trace out that series, from the term which is nearest to us, to that which is at the farthest limit accessible to our means of investigation.*

Alister McGrath: The word scientist was minted actually, um, by William Huell, a well-known Cambridge philosopher. And he thought, look, If you do art, you're an artist. If you do science, you're a scientist. And this is about the investigation of the natural order. It's very analytical, and there isn't really any sense of, um, appreciating or comprehending or valuing nature, or seeing it as a signpost to something greater. It's understanding it in its own terms, and that's it. That's the end of it.

John Dickson (studio)

We now have a word for someone who can combine all kinds of knowledge - scientific, historical, theological, artistic, and so on. We say they are a “renaissance man” or woman. That’s because during the Renaissance of the 14th century, people were still interested in all the disciplines and how they related to each other.

But Alister tells me: as a practical matter, this just became very difficult as time went on!

JD: To what degree did the acceleration of knowledge contribute to this parting of the ways? I'm assuming, you know, at the beginning of the 17th century you could know most things about what we know of the natural world, you could have read most philosophy, you could have read most theology, but with the explosion of knowledge that comes, people just sort of gave up trying to know philosophy and theology as well as the information given to us by natural science.

Alister McGrath: This a very important point.

There are some scholars who say that the phrase, um, the Renaissance man began to be used essentially in the 19th century because people felt we've lost this. The Renaissance man is an idealized, um, scholar of the 16th century, who in effect knew philosophy, knew physics, knew biology, not by those names, but basically would see all of this as something that you could manage and hold together. And then gradually it became a little bit more dispersed.

The idea of the Renaissance became having a group of people who might be able to come together and bring these things together. But it was getting too much for one individual to manage. So if you like, we have the fragmentation of knowledge, not because knowledge itself is important. can be fragmented easily, but because a single individual can't take it in. And we have this, um, fascinating phenomenon of, um, what is in effect information overload. A single individual no longer can cope with a huge body of literature as you find disciplines Emerging and then subdividing and the result is that, um, today you have such specialization, such a specialist body of literature that in effect one scientist may not even understand what another scientist is doing, let alone be able to converse with them.

You have the fragmentation of science. And that's what happens really in the 19th century. People are saying this, this is happening. And in fact, uh, in English we do use the word science. But that was a deliberate

political choice in the 1830s Because people were worried that, um, if we spoke of individual sciences, that might to lead to fragmentation of a community of knowledge.

And therefore you said it's science, it's a scientist, and that means in effect you're all part of this single big community. But I have to say that that really is now a hopeless idealization because of the massive expansion of scientific disciplines and the fragmentation of disciplinary knowledge.

John Dickson (studio)

After the Renaissance came the Scientific Revolution.

It’s where the action was in the 17th and 18th centuries. That’s when we get the disparate disciplines of biology, chemistry, physics, and so on. Pretty soon, a physicist couldn’t hope to know much about what the biologists down the road were discovering, let alone what the great philosophers were up to.

Knowledge became intensely specialised and separate … and … so was lost the very notion of integrating what we discover about reality, let alone finding meaning in it all.

JD: So let's talk about what's lost, um, because of this parting of the ways, what is lost? Uh, for our world, for the scientists, uh, by this turning our back on natural philosophy.

Alister McGrath: Well, I think the first thing we lose is any sense that nature is special or that nature in some way Um, if you look at something like Steven Weinberg's recent attempt to give a history of natural sciences, it's very much a functional approach to nature.

And, and Weinberg's very clear, we have to leave behind these outdated ideas of science engaging with meaning or value. It's simply trying to work out how things function. Um, and, um, to me, we have lost something there in a big way. Um, you know, I mean, I, I think I understand how human bodies work, but I think there's more to human beings than just our biological functionality.

You know, it's that kind of thing. So we have lost a bigger picture. I think science nowadays is seen rather as a technocratic discipline where in effect you have people who research, who, um, crunch numbers, but if you want to know the meaning of life, or what is, what is good, you're not going to ask them.

What do they know about it? So in effect we have, if you like, a disengagement of what would once have been seen As one of the most important areas of reflection on this topic with the big questions of meaning and value. So we've lost something very, very big there.

John Dickson (studio)

Despite the fragmentation of the sciences, several notable modern thinkers have kept the flame of natural philosophy alive.

One is the late Austro-British academic Sir Karl Popper.

Popper is best known for developing the idea of falsification; a good scientific hypothesis is credible only if it has the ability to be disproven.

Less well-known is Popper's idea of “three worlds” …

Alister McGrath: Popper is really very interesting. As a philosopher of science, he was really very engaged with trying to work out what

distinguishes science from pseudoscience, like Marxism or indeed Freudianism. And I think he did a lot of very good things there. One thing he did was to, um, introduce his idea of the three worlds.

Now when I say three worlds, I do not mean three, um, individuate and different worlds. disconnected worlds. It's more three broad areas of thought that actually are interconnected. There's the idea of theory, the world of theory. There's a world of objectivity, you know, and it's a world of subjectivity. In other words, we're dealing with the external world, we're dealing with the way we feel about things, and we're also dealing with these intellectual constructs we develop called theories.

And what Popper realized was that actually while your emphasis might vary, you could find a way of holding all of these together. A good theory enabled you to maintain the objectivity of nature while at the same time Integrating your subjective responses to nature, like awe, beauty, wonder. In other words, he gave us a framework for recovering what had been lost.

So I think Popper is very, very interesting, but unfortunately, he's not widely cited, um, in this context.

JD: Yes, and in fact he's often associated with, um, just the objectivity part. That, uh, he was really just encouraging us to think about what can be objectively, uh, nailed down. And that the other two dimensions didn't seem Uh, to be as important to those who, you know, post Popper.

Alister McGrath: That's right.

I mean, and Popper was a very rich thinker, uh, and it's understandable people would focus on those aspects of his thinking that they particularly liked or appreciated. But he does go broader than that. And I find him very helpful because, um, he gave me this framework for saying, look, although these things have drifted apart, there is a framework which allows us to bring them back together again.

And, I mean, what I would want to say actually is, although Popper is a secular writer. I can easily see as a Christian how I could say, if I say,

look, I've got Christian theology as my base, you know, my, this vision of reality, that in effect does for me what Popper's idea of the world of theory does, which is to give me this coherent intellectual framework that brings these things together.

Um, so for me, Christianity gives us this. My concern was trying to say, well, I'm talking to people who don't share my Christian presuppositions. How can I begin to show them how they can bring these things back together again? I think Popper really is very helpful there.

John Dickson (studio)

Next up on McGrath's list of modern natural philosophers comes arguably the most famous modern thinker of them all: Albert Einstein.

JD: What about Einstein? You mention in your book that he comes close to being described as a natural philosopher.

Alister McGrath: I have to admit, I love Einstein.

Um, I mean, I first encountered Einstein here at Oxford, uh, in 1971 when I began to study chemistry. He was a wonderful, uh, option on quantum theory. And Einstein, of course, was a very big name. We studied him in detail. I found him wonderful. Um, what I found particularly engaging was the way in which he said, look, um, science, religion, Ethics and politics are all different, but they're all very important, then you can hold them all together.

Because they are different, they are not incompatible for that reason. That's a very important point. But Einstein, I think, really is a natural philosopher, as Newton was. You know, because, in effect, he's saying, I want a big picture of, um, The natural world, and it is going to include, um, religion is going to include, well, obviously, mathematics is going to include, well, actually, ethics, too, you know, and saying we want to try

and find this, and as you'll know, Einstein had this relentless quest for unification.

READING

> *"We are in the position of a little child entering a huge library filled with books in many languages. The child knows someone must have written those books. It does not know who or how. It does not understand the languages in which they are written. The child dimly suspects a mysterious order in the arrangement of the books but doesn't know what it is. That, it seems to me, is the attitude of even the most intelligent human being toward God."* ***Einstein in the Saturday Evening Post, October 26, 1929.***

Alister McGrath: I think I can follow him through and say look, we all need a big picture of reality to hold things together. Popper gives us one, though people tend to only focus on one bit of it, but Christianity really is good at doing this for us. It gives us this wonderful lens, or if you want, you know, think of C.S. Lewis's image of a sun rising on a landscape. You suddenly see how everything's there and is interconnected. So, it's very important. Einstein really helped me just to see how important a big picture is. And then beginning to realize as I discovered Christianity, that actually Christianity did something similar, but in my view even better

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John Dickson (studio)

As a treat for our PLUS subscribers, I asked Alister about Einstein's approach to faith. Was he really the archetypical atheist as many would have us believe? If you're interested in the answer, consider becoming a PLUS subscriber at undeceptions.com/plus

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John Dickson (studio)

Einstein certainly wasn't an atheist - he openly pondered a "mind behind the universe" - but a rising intellectual mood of atheism probably did play a role in booting the natural philosophy tradition out of field!

That's after this short break …

****BREAK****

MEDIA - Werner Herzog Tape

John Dickson (studio)

That's legendary film director Werner Herzog, giving a rather grim piece-to-camera in the middle of the Peruvian jungle.

Herzog was filming a documentary called 'Burden of Dreams' about the arduous making of his 1982 feature film *Fitzcarraldo.* Some say the documentary about the *making of the film* is better than the film it was documenting.

AI: Funnily enough, just quickly, so that Herzog thing is sampled in one of my favourite death metal bands

KP - I was going to ask you…

Mark - yeah, that was bizarre

Al - And I've messaged them to let them know that we're using it, and they go back to me, so we've got a ~~swiss~~ death metal band pretty keen to hear this episode, which is great.

KP - can you ask if we can use the song?

AL - sure, I'll send you the tune and see what you think of it… it's pretty hectic.

John Dickson (studio)

Sydney death metal act Lo! - One of researcher Al's fav bands, actually. Anyway, thanks so much guys for letting us play this. And everyone should rush out and listen to them, go listen on spotify - Lo! - and search for the song 'The Gleaners'. Anyway, thanks so much guys for letting us play this.

MEDIA: Gleaners - Lo!

John Dickson (Studio)

But anyway … Herzog's observations about the destruction, violence and chaos of the jungle illustrate where Alister fears science without a little natural philosophy might lead: a blindness to the harmony of the universe.

Many other thinkers have echoed Herzog's pessimism in recent years.

Physicist Brian Greene's book *Until The End of Time* grapples with the concept of a meaningless universe, and ties the fate of humans to the demise of the solar system.

Meanwhile, philosopher David Benatar sensationally argued that even being born is bad, due to the chaos of existence! His book is titled *Better Never to Have Been: The Harm of Coming Into Existence.* Amazing stuff!

Is this where the world of science and humanities leads *without* the influence of Natural Philosophy?

JD: Could a dedicated atheist, or even one of these new anti-theists, be a good natural philosopher?

Alister McGrath: Well, I imagine that they would say that they could. Um, I would, um, suggest what they're doing really is saying I can understand nature as a self contained closed system, um, and make some sense of it and maybe even appreciate its beauty.

I think that the older forms of natural theology and natural philosophy were porous to the idea of transcendence. In other words, we are looking at nature, isn't it wonderful, but nature is almost like a system of signs pointing beyond itself. And therefore natural philosophy is inevitably going to end up heading in the direction of theology or philosophy or, or even music, you know, the idea of harmony.

There's something deep there that goes way beyond our objective analysis of nature.

So I think that, um, the term naturalist might mean different things to different people. For me, it includes this willingness, this receptivity towards going further and saying nature is not a closed system. In effect, it is porous to the transcendent and the appreciation of the beauty of this world, in effect, opens up possibilities for thinking about something Beyond this,

JD: without requiring a particular doctrine. Once you get to that -

Alister McGrath: Absolutely. Let's take an example. Let's take Roger Penrose Who I, you know, he won the Nobel Prize recently. He's an Oxford man. So, you know, a local hero.

John Dickson (Studio)

Sir Roger Penrose is a mathematician, physicist, philosopher of science, and Nobel Laureate in Physics - Alister has some cool-nerdy friends!

He got the 2020 Nobel Prize for his work on black holes.

He's not religious, but he's got a natural philosophy vibe about him. Consider this statement he made.

> *"I think I would say that the universe has a purpose, it's not somehow just there by chance … some people, I think, take the view that the universe is just there and it runs along—it's a bit like it just sort of computes, and we happen somehow by accident to find ourselves in this thing. But I don't think that's a very fruitful or helpful way of looking at the universe, I think that there is something much deeper about it."*

Alister McGrath: He and I have talked about this. I mean, he is not a religious man.

He would not describe himself as religious. But as you will know, Um, he in effect says to make sense of this world, we have to propose a, almost a platonic mathematical world Which really exists independently of us, we discover it, we don't invent it. And when you discover that, it makes sense of what we see around us.

So, you can see where he's going, and in effect, you know, as a

JD: it's clearly metaphysics, if not theology -

] **Alister McGrath:** He's going into metaphysics, He doesn't want to go into theology. But he's clearly going into a transcendent way of thinking. And I would say to him simply, Look, I'm with you on this, but I can, I can rename this, and I can do even more with it than you can.

JD: What are some modern crises that you think the natural philosophy approach to knowledge can help with?

Alister McGrath: Well, let me mention some. I mean, I think we really do need to rediscover this. One is the way in which, in effect, we have allowed the investigation of nature to become detached from the appreciation of nature and a desire to preserve nature.

That's a real problem. Um, I mean, here in Oxford, you know, you have, you have of concerted efforts in the 17th century to have a sort of, um, physic garden, you know, a way of preserving the best of the natural world. I think the difficulty is that we are now seeing, um, sort of the emergence of an ethic which is saying, if we can do it, we will do it.

Um, if it enables us to live longer, we will do it. In other words, the sense is the world is there for our exploitation and our convenience. The original natural philosophy saw, in effect, that the world as being something wonderful which we had the privilege of investigating, the privilege of inhabiting, and studying the world enabled us to live better lives in this world.

A second thing we have lost, and again, in principle, I think we can recover at least something of this, is a sense that nature, in effect, is, it is wonderful. But part of its wonder is its capacity to point beyond itself. You know, in effect, um, one of the most amazing things, uh, uh, that happened during the 17th century was what's called the mathematization of nature. The realization that that to nature, you, you could, in fact, bring in these mathematical frameworks, which were wonderful, and they fitted.

In other words, that nature was pointing to something even more beautiful, which helped you to make sense of it. And I think that the recovery of a sense of the transcendent dimensions of nature really is very, very important.

John Dickson (Studio)

This exact point was made beautifully on an earlier episode of *Undeceptions* - “Beautiful Science” - with Professors Ard Louis and Andrew Briggs.

Here’s a little clip from my chat with Ard about how mysteriously structured nature appears to be.

Ard Louis (Beautifil Science)

So if you look outside in my garden, you'll see various trees and, uh, I have a walnut tree and a birch tree, and they have very different shapes. Now, interestingly, that walnut tree shape is not encoded in like a blueprint in its dna. There's not like a little shape of the tree, put a leaf here, put a branch there.

Instead, the tree has an algorithm that basically makes, leaves a certain probability, branches a certain probability. And if you run that algorithm, then you get that shape comes out. The birch tree has a slightly different algorithm, which gives it a kind of more, more flowing birch shape. And so there's no, there's no blueprint in dna. It's actually an algorithm, an algorithm fancy word for like a computational program that's being run. And so now imagine that there is a mutation to the algorithm. Okay? You might, it might be that actually a small mutation to the algorithm changes you from wallet shape to burst shape really quickly. Or it may be that's really hard to go from wallet shape to bird shape. And so to understand that you shouldn't look at the shape of the trees, but rather try to understand the algorithms. Like a simple change with algorithm is, is for example, now double this process makes something twice as big, right?

That's one little line change and a huge outcome. If I randomly change that program, I might see very big changes happening in certain directions and very small changes happening in other directions. So what I'm saying is the mutations are random, but the outcomes are highly non-random. And big question then is if that's true, what direction are they not random. That's the question I'm thinking about.

So our idea that we've been developing over the last few years is that if you think about these algorithms, if you think about mutations at the genes really effectively being mutations of the algorithms, then what's gonna happen is if you need to evolve some kind of new, um, phenotype, let's say the, the wall tree needs to change into a more birch like shape because the weather changes or the, the, the, um, the climate changes, then what's gonna happen is it's gonna randomly tweak that algorithm. And the first algorithm that it finds that does the job roughly okay. Is the one that's going to pick. Now let's think about symmetry. So on my right here in my kitchen, you, you can see in the tiles on my floor, and they're regularly placed. So if I say to you, come please tile my kitchen, um, it's much easier for you to say, take this pattern and repeat it.

And times that's a short description. I could also tell my kitchen with every tile in a slightly different place. Okay. I'd have to like tell, give you a blueprint of every tile. That's a lot of information I need to give you. Now imagine that I am just randomly, um, making tile assembly programs to assemble the tiles in my kitchen. I'm much more likely to find a simple program because there's a few lines to describe that are long complicated program. So that's the argument. If I randomly search in the space of tiling algorithms, so tell me, tell me how to tile your floor. I'm much more likely to find the symmetric way of doing it than nons symmetric one. So we've looked, for example, at lots of properties in nature and seen those huge amount of symmetry there. And the question is, why is that symmetry there?

John Dickson (Studio)

I love that guy! Link in the show notes for the entire thing.

There's one more "crisis" Alister reckons Natural Philosophy can help with.

Alister McGrath: If I were to mention one more thing, which I think is very, very important it is this need to try and bridge the gaps between professional disciplines.

Because what I'm finding, um, in my own personal conversations here at Oxford, is that people are wonderfully informed about their own disciplines, but

don't really get to Others, and don't know how to talk, and can't make connections. And I think that if I could use the word interdisciplinarity It means in effect not simply knowing your own discipline, but being willing to step into other people's And saying, that's really interesting, I can see how it connects up with what I'm doing, but the knowledge investment levels are so high, that very few people are able to do it.

JD: What about psychologically, existentially? Do you think there would be benefits, uh, to the community if we took a more natural philosophy approach?

Alister McGrath: I think that's a very good question. I think the answer is yes. I mean -

JD: positive psychologists say that really meaning is the jackpot of happiness, human happiness. You know, the group, Martin Seligman, um, uh, Dan Gilbert, they're, they all. Atheists, but they nonetheless say that when a human thinks they're plugged into something higher, they can enjoy life even if they don't have much pleasure.

Alister McGrath: Well, I think that's a very important point. I mean, going back to Aristotle, he used this idea of eudaimonia, which is

sometimes known as happiness. It's not. It's almost flourishing and positive psychology has really helped us to recover this.

If you look at psychologists like, um, Crystal Park, um, a very good example, um, she will say that meaning is A really significant category, but it's very, very hard to define. What we know is if you have this, you flourish. If you don't have this, you wither, you know, and so it's really important. And the minute you're talking about meaning, you're going beyond the empirical. You're going, it's an interpretation of the world, not an observation.

You can observe that having this framework makes people flourish. But observation doesn't take you to the framework. It's something you have to construct on the basis of a belief system. And so very often you'll find that psychologists will say the key elements are number one, a sense of purpose. Number two, a sense of some bigger picture of what you are part.

And you can add to this. But basically it is so important. I think that's where psychology really has brought home to us that a purely empirical reading of nature is not enough. You want to have a bigger picture of reality and say, here is where I fit into this. And of course, Christianity does that extraordinarily well.

But natural philosophy, I think, does take you quite a long step in that right direction. By in effect saying, position yourself within this bigger picture of reality, and realize you have responsibilities, you have privileges, and you can exalt in the beauty of this world. So there's a good way ahead there.

John Dickson (Studio)

It might not be possible, or practical, to expect Renaissance Men and Women to re-emerge today, but maybe we can be Renaissance Kids – start taking baby steps toward the integration of knowledge.

Alister has four tips – really four lens through which we can begin to view reality more holistically.

JD: You talk about four lenses, uh, the natural philosopher. You know, puts on when viewing reality, the scientific, aesthetic, ethical, and spiritual.

Can you talk us through each one?

Alister McGrath: Well, it's really a way of trying to say, um, although each of us is a single individual, we can nevertheless bring together multiple perspectives, multiple ways of looking at things inside our heads.

And so, for example, a scientific approach, um, that's all about how things function, um, I just, you know, a leaf fall from a tree. And so, like I said, I actually give you quite a good account, scientifically, of how that happened. Um, and that, that's very helpful. And also, of course, as a scientist, you begin to appreciate the beauty of the mathematical representations you have of a natural world.

But also, you begin to realize that you are wrestling with the idea of the beauty of nature, an aesthetic quality. That's not objective. That's the way I feel, the way I respond to it. It might be grounded in something more complex. Maybe beauty is a placeholder for simplicity, I don't know. But nevertheless, it's an Integral part of, um, who we are as people, we respond to beauty.

And early natural philosophers saw beauty as a criterion to use. Um, for example, even in today's philosophy of science, beauty is a criterion for theory choice. The more beautiful a theory is, the more likely it is to be right.

John Dickson (Studio)

This is a fascinating rabbit hole.

A 1998 article in *American Scientist* posed the question “Is beauty a sign of scientific truth”?

The article quotes Sir Roger Penrose, mentioned earlier.

> *“It is a mysterious thing in fact how something which looks attractive may have a better chance of being true than something which looks ugly … so often, in fact, it turns out that the more attractive possibility is the true one.”*

It goes on to note that the famed Mathematician Paul Dirac was convinced of Einstein’s theory of relativity “on aesthetic grounds” - it was beautiful.

It’s debated what beauty even is–check out our Episode 70, *The Artist,* for more on that topic. Was that the ep I almost cried in or was that the music one!!??

Alister McGrath: Then, of course, we move on to the ethical side of things, which is, in effect, asking how on earth do we live properly?

Maybe we can learn from what we see around us. And that's something that's been airbrushed out of modern discussions. I think we need to bring that back in. And that means, is there a transcendent ground for ethics? Maybe there is. As a Christian, I would say transcendent ground. But actually, maybe the natural world might come into this picture somewhere. And then finally the spiritual side of things. I'm using the word spiritual because I want to include as many people as possible in this. Spiritual really is this deep, intuitive sense we are part of something bigger, we're connected. There's something, There's something there that is so much bigger than us, that transcends us.

And in a sense, trying to get in touch with it is really important. I think that's, a lot of people feel that way. which is why I think, you know, Christianity does give us a very good way of looking at this by saying, in effect, it's not an abstract entity, it's a named reality with a face that we can see and know.

So we can go in those directions as well. But I think the key point is, if you like, um, we can look at the same thing and we can look at it from different perspectives or different levels. Everything is there. The question is tuning in to what's already there and appreciating those multiple aspects.

John Dickson (Studio)

Alister reckons it's crucial to hold all these elements together - the ethical, philosophical, and so on.

But some might fear that this will get in the way of the 'facts only' approach science has become famous for. So, I put that to Alister as my closing question.

JD: Finally, Alistair, what would you say to the more sceptical listener, um, who worries that all this lovely sounding integration of knowledge under the rubric natural philosophy will spoil real science because it'll always be trying to do the mumbo jumbo, spiritual, ethical stuff alongside the unbiased pursuit of truth about the natural world?

Alister McGrath: I fully understand that problem. Um, here's what I would say.

Natural philosophy really is permissive. It's saying, look, you can do all these things. You don't have to. And what I'd want to say to the kind of

scientist you just described is, I appreciate exactly what you're saying. That's the bedrock of natural science.

Um, and I don't want in any way people to stop doing that. It's really, really important. I'm just saying you can add things onto that. You can kind of have connections, you can have conversations, you can perhaps see there's a bigger picture there which doesn't in any way detract from or distract from what you're doing.

It's simply saying maybe there is more, but it doesn't stop you doing what you're doing and saying it's really important. It's just saying maybe there is a bigger picture here and maybe that actually might be something worth discovering.
