
Science and the Healing of the World:

A Conversation with Tom McLeish, Part Two

Tom McLeish FRS, physicist and Emeritus Professor of Natural Philosophy in the Department of Physics at the University of York, UK, in conversation with Dr. Samuel Loncar, Editor-in-Chief of The Marginalia Review of Books.

TOM MCLEISH

If you want to change the metaphor: the great flowing Amazon River that we now call science has tributaries, traceable tributaries, that go right back to highlands in prehistoric times; certainly, there are two big ones: one Greek, the other (less-recognized one) Hebrew.

And even the story as I was told had a slight flaw to it, in that we were introduced, of course, to the great ancient Greek scientists: the great Eudoxus, the wonderful Aristarchus, Hipparchus, the great astronomers like Ptolemy. And then we get this painful and ghastly, dreadful, ignorant narrative that even great public communicators like Carl Sagan bought into, tragically. Neil deGrasse Tyson, in our own time, is someone else who trots out this garbage about the Dark Ages. The only dark thing about them is our own willful ignorance of the subtlety and progress that were made by just a few people in small populations but were being made throughout the first thousand years of the Christian era. We also have the development of Aristotelian science in the Islamic and Arab milieu and its translation into Europe and the Latin West.

Great Carolingians like Alcuin, who worked just down the road from me in York, was one of the greatest natural philosophers of the ninth century, Charlemagne's great natural philosopher. Mary Garrison, my colleague here in history at York, and I have been discovering and writing about Alcuin's late-eighth-century correspondence with Charlemagne on the retrograde motion of Mars. In a most subtle and intricate way it is the longest early medieval discussion of the retrograde motion of the planets. It all fits into a long story that was always embedded in the cultural and belief systems of the time. Science is a long story.

SAMUEL LONCAR

“Science is a long story.” This is a total challenge to the dominant view, right?

This narrative comes out of the Enlightenment, which creates this historiographical image of the Renaissance and the Dark Ages.

This is linked, as I see it in your work, to a very unusually comprehensive and developed anthropology of science. So, basically, it seems like you would agree with Aristotle: that science is as deeply human as anything can possibly be.

Aristotle starts the *Metaphysics* by saying, “All humans by nature desire to understand.” And you see in that desire to understand both a deeply human thing and also something that’s linked to even the possible healing of much of the pain that humans suffer. It’s a very beautiful but a very unusual view in the contemporary landscape, and that’s partly why I wanted to stress it and ask you more about it.

This view that science is very recent is linked to the view that science is in some sort of deathly conflict with religion, which, of course, we know is absolutely false for anyone who cares to just read the scholarship. On the one hand, we think we need a greater public understanding of science; we want people to engage more with science. On the other hand, we ignore what we know about science is based on the broader science of what you call the cultural history of science.

So in your view, why is it that we are so committed to a type of ignorance about this practice? Why do we think about science the way we do given that as you show—and you draw on so many other scholars—science is as old as our species? But why are we hung up on this story?

Why Are We Committed to A Type of Ignorance?

TOM MCLEISH

I think we’re hung up on it because it’s played into too many people’s interests and too many power games’ interests to push this Enlightenment view of science, a Kantian view of science, however untenable that is. We think of fake news being a symptom of our own times. It’s really been around for a very, very long time. I think there are several aspects to this.

One is, of course, that there was in the Latin West and we still are in the Latin West (nobody speaks it anymore, but we are)—there was a regrettable pretense of a clean cut in the seventeenth century. This is Francis Bacon and others, although doing wonderful things in terms of putting experimental science on a firm foundation, which itself is a vital tale to tell. I mean, the very existence of experimental science is demonstratively arrived at through an imaginative metaphysical leap, fueled by

the Christian doctrine of grace. Now, there are readers who are going to shake their heads and say, “He’s gone off his rocker saying that,” but that’s not a niche opinion.

But, nonetheless, the great medieval strides made in astronomy, medicine, materials-theory, and color were metaphorically a palimpsest. They were wiped clean by the early moderns in some sort of pretense that they were starting all over. Aristotle was bad and wrong, and we were starting all over again. Medieval scholastics were wrong.

Now that played into their power game, but at the same time they are using everything that went before: philosophy, theology, and science. And then, of course, in the Europe of the eighteenth and nineteenth centuries, you have an educational system dominated by classical humanities, disciplines in which the sciences were elbowing for room and finding it hard to get. People like Huxley had to become very combative in their language to establish science education as normalized between the ancient universities of England, for example. So it became unnecessarily uncollegial.

Another ingredient, possibly the saddest of all, comes within the post-Reformation broken, and. fragmented church. You have a Reformation and a Counter Reformation, and a nineteenth century of extreme Protestant-Catholic tensions that were eventually fought out, as Peter Harrison’s colleague, James Ungureanu, has shown recently with his co-author, my colleague, David Hutchings, in their book *Of Popes & Unicorns*. The conflict narrative reaches its final articulation in Andrew Dickson White and John William Draper—the Draper-White thesis. Most people who read this won’t have heard of Draper and White, yet their books with titles like *A History of the Warfare of Science with Theology in Christendom* were reprinted and translated into dozens of languages; they sold tens of thousands of copies in the latter half of the nineteenth century. They were the texts that got the discipline of the history of science going, but it was founded not on historical academic methods, but on anti-Catholic Protestant polemic. It’s a tragedy: the idea that one could tar Catholicism with a brush of being anti-science if one invented a bit of history and read the Galileo affair in a particular non-historical way and told lies about how the medieval church taught that the earth was flat. No, they didn’t. No one (apart from one or two ideosyncratic individuals in late antiquity) ever thought the earth was flat. It’s only in our own time that people think that, ironically and distressingly. The medievals knew exactly that the earth was round, how we know it was round, how big it was, how anyone could tell why it was round—north, south, east, and west—and it’s in all the thirteenth-century books, by the way. Very impressive. Oh, and why God wants you to know this and work it out yourself.

All these strands come together. And then, of course, in that milieu in come new ways of reading the Bible, which are really old ways of reading the Bible, as you

know. I've been reading Robert Grosseteste, one of the greatest thirteenth-century polymaths. He invents a big-bang theory of the medieval cosmos and reads scripture in a much more authoritative way, but not a scientific way. He knows that if we are to describe the physics of the formation of the early cosmos, then that's what we do with God's gift of natural philosophy to us. We don't read it off the page of Scripture. It's only in the twentieth century that we began to think that, and this comes from a sort of eugenics twisting of Darwin.

So it's a perfect storm in the mid-nineteenth century of social, ecclesiastical, as well as academic and educational tensions, in which different factional parties found it for a while convenient to peddle a myth of the conflict, the historical conflict, between science and religion, and we're still trying to unpack this now. And it's vital that we do, because I don't want to meet another young person, who is

someone of faith and loves science and is taught at their university about the glorious richness and structures of life involving evolution and all this, and then when they go to church on Sundays hear "this evolution is evil" stuff. No wonder it leads to poor mental health. That is just one flag that we've got to stop this

nonsense, and people from evangelical preachers right the way through to Jerry Coyne, who is an evangelical preacher at the other end of the spectrum (if I may say so)—all this fundamentalist thinking is very much to blame. That's my sermon.

SAMUEL LONCAR

It's wonderful, and I want more of the sermon. One of the great ironies that comes out of the work that you're summarizing is that the history of science wasn't scientific; the history of science was, ironically, itself a fruit of inter-Christian religious conflict.

And one of the great dangers of our so-called secular culture is that whatever people's personal beliefs are, we've got to know the history of our context if we're going to understand why we're framing these things. It's significant to realize that we are only very recently coming to have a historical understanding of what we call science.

There are deep concerns you mentioned [in Part 1] about eugenics, the twisting of Darwinism, that get into really hard issues in science. At the time, for example, eugenics was presented as science, and what we call social Darwinism wasn't called social Darwinism. It was just Darwinism, and it was presented as the truth of biology from many leading authorities in the scientific community.

In America, as I am sure you know, progressive religious leaders were some of the main architects at places like Harvard and Yale, for example, of pushing eugenics.

So eugenics was advocated as a scientific doctrine. It was given a great deal of energy by the elite religious establishment and partly under this guise. So that, I think, raises this difficulty: fundamentalists are often thrown under the bus for understandable intellectual reasons. But if we historicize the context of their concerns, it was conservative religious people that we would now view as anti-scientific who were in general hostile to eugenics.

I want to ask about the deeper theological concerns underlying this, about the fact that science has under that name, even in the past one hundred years, presented itself as the justification for a program which led, for example, to the forced sterilization of people in America, which the Nazis then imitated.

Much of their policy on eugenics, as I'm sure you may know, came out of an imitation and study of the American progressive eugenics movement. So I do think the issue of science's embeddedness in culture and its embeddedness in theology is difficult.

How do you think we should think about the fact that science has not only gotten science wrong, as you mentioned, but that Science isn't science because it's always right?

You say maybe it's a more productive way to think about a history of error (*pace* Karl Popper), but science has also presented itself in a way that has almost justifiably generated a counter reaction. We could say, well, the reaction is no longer justified, but how would you speak to people who are in those communities now? Can you help people think about that?

What Is Science For?

TOM MCLEISH

I'm not an expert on that aspect of science history, though I do know about it, and it gives even more force to the urgency of giving science a healthy social and cultural embedding. So, of course, science is going to be wrong. It has repeatedly been wrong in the past. But as for any really difficult, edgy thing—you end up making mistakes. We know you're going to do that, whatever you're trying to do.

You're trying to build a car, you get it wrong ten times; you put things together the wrong way. It's through the mistakes that you learn the path ahead. You're navigating your way through a complex mountain landscape; you might have a map, but if you don't have a map, you're definitely going to get it wrong: you're exploring new territory—which science is. So understanding that means that checks and balances are all important, and understanding what science is anthropologically

or even theologically (I know we're going to go there, and I think now is the time to go there) is therefore vital, because you need to be able to blow the whistle. We can't do nothing. We know that we've got to explore with this amazing gift. We know we've got to understand new territory. We know that is going to be difficult; we're going to make mistakes, but there are ways in which we can make fewer mistakes and see the wrong turnings earlier.

But we can't do that—or we risk not spotting when things are going wrong—when science is put in a big shiny box on the shelf marked “For experts only.” They know what they're talking about. You don't. They're clever. You're not. They possess erudite methods and wear white coats and carry clipboards. But that's not the point because they know how to do science. That is where we currently are in science.

That's why, by the way, I'm working with my friend and colleague—Dame Ottoline Leyser, who's currently Chief Executive Officer of the UK Research Innovation (she's really important now in the UK) in the Royal Society—on a

project called “Reimagining Science.” And post-COVID it has become all the more important that, as she puts, we take science out of its “shiny box” and that people engage with science in a similar way that they might—I don't know—follow a football club. In other words, think about football and music—or whatever your national sport is. It's not saying that there aren't people we need who are really, really good at this and much better than we are, people who play for the professional teams or who lead the violins in the orchestra we go and listen to or play in the rock

band that we pay unbelievable amounts of money to get our ears blown out at—whatever your taste. However, the point is, we go and watch, and we watch critically, and we might play for an amateur team or play for an amateur orchestra or sing in an amateur choir. There's this continuous ladder of engagement that constructively criticizes and supports something all the way through. And with science, it's as if we've knocked out the middle rungs of that ladder, and we have those of us who watch the programs (“Oh, we now know this about the galaxy”), but we don't think critically about it, and that's very dangerous. It's very important to think critically about it.

And one of the organizations best placed to think ethically, critically, and discursively about science is the Church. Now, I know this is true because David Wilkinson—the Revd. Dr. Wilkinson, a former astronomer, now principal of the theological college at Durham—and I have run this project for seven years called “Equipping Christian Leadership in an Age of Science,” where we get Christian leaders and churches engaged in science, give them resources to do this, and find that the two fit hand in glove. During the COVID pandemic, for example, it's through the churches that we've been able to counter anti-vaccine false narratives.

In so many ways, a science-embedded church is rediscovering itself, just as in that lovely conversation we were referring to a moment ago [in Part 1] between Gregory of Nyssa and Macrina, talking in the fourth century about experiments to do with water and air and astronomy and observing the moon—a common human experience. And in one way, they were also doing this in a lovely local interpersonal experience. I forgot to mention that she was on her deathbed, and this discussion is her generous giving as a dying woman to her distraught brother to help him through his grieving process, which has already started.

So science as a therapeutic, contemplative good that can heal at the micro level is symbolic and indicative of its process when properly and healthily maintained to heal something at the larger social and political level.

I'm very fond of quoting the literary scholar George Steiner, who wrote a wonderful book about what he thought of as the diseased in art and humanities in the postmodern world. He has a rather rosy-tinted view of sciences, by the way—or had. He died a couple of years ago. And I remember reading this sentence about art; he says, “Only art can go some way towards making accessible, towards waking into some measure of communicability, the sheer inhuman otherness of matter.”

This sentence bowled me over because it told me two things. It told me what I could have read, of course, in the *Phenomenology*—or in Aristotle and Cicero, for that matter. But one aspect of the human condition is that we're fish out of water; we don't understand. We're frightened by—and we have, at best, a dislocated experience of—the material world around us—unlike all the other creatures that seem perfectly at ease in their environment. So there's a broken relationship that needs healing.

And then, of course, Steiner goes on to say, well, this is what art is for, to talk about purpose, to talk teleologically about a human activity. Likewise, he has a Jewish background, but he's no believer: he's a post-Holocaust, Jewish atheist. But oh, by the way, he finds himself calling on the Christian story—the Friday, Saturday, Sunday story of despair and death, waiting and resurrection—as the emblematic metaphor for human existence. That's interesting, too. But then I'm thinking reading this: “Professor Steiner, yes, art; but what else is science for than to render into some measure of communicability the sheer inhuman otherness of matter?” That is what we do.

Now, let me follow this path. Understanding and instantiating a properly supported social understanding of our responsibility to steer and critically support science in a framework in which it is understood to be a toolkit for healing our relationship with nature and those that have to do with nature is a profoundly important

realization, one whose absence in future might well set science down the wrong road. That is what I have to say about that. It doesn't excuse anything that's gone before. Far from it. But it points out the urgency of understanding what science humanly is for, now and in the future.

SAMUEL LONCAR

It's a profound vision; it's also a summary of what you do in the book, *Faith and Wisdom in Science*. You challenge the presentation of science and theology by doing both in the book. You give the reader a way of understanding, just as you've been doing in this conversation, and then you argue that part of how we need to heal what's gone wrong in science is by having a much better scientific culture that embraces all of us as humans, that doesn't have this contemptuous negative image of the scientific priesthood as the experts who know everything.

Instead, we need to engage science, and you're doing this fascinating and valuable work in the UK with churches. How would you respond to someone who says: *Why do we need a theology of science?* If a person, for example, isn't religious, and they say, *Well, why do we need a theology of science?*

How do you think about building buy-in or creating a culture of understanding?

In the UK—even though I know the statistics about Europe and the UK generally being much more secular in one sense—I think that by having the church as part of the culture, by having bishops in the House of Lords, there's still a degree of integration where what you're doing makes sense, which I think is so valuable.

It's an important thing, the idea that we can use churches and organizations as places to encourage science, but for people who aren't there yet, or it's just so foreign to them culturally, how do you help us understand? Do we really need a

theology of science? Obviously, you have the facts on your side. But why do we need this beautiful vision? You could say it's beautiful and maybe that's good enough. How do we think about this in a really divided context?

A Theology of Science in A Divided World

TOM MCLEISH

We're the nation with the established church where it's perfectly possible to elect an atheist Member of Parliament, and you're the absolute secular state, where it's

impossible to elect to the Senate anyone who declares themselves an atheist. And in America you have “In God We Trust” on your banknotes. I can’t help you there. I’m sorry, I’m mystified.

But what I say to my secular colleagues is that, like it or not—whether the idea of purpose and teleology is academically kosher or not—we all feel it; we all know it. That’s what drives us. And the academic discipline that has maintained the critical tools to discuss teleology and purpose is theology. So it’s useful. Even if you run a secular university, I would advise you, Mr. President, to have a theology department for that reason, if none other. Religious Studies is a good idea to have in any case, but for purpose. So that’s why I like to mine theology, because I always want to know: what is science for?

In fact, the reason that I eventually wrote *Faith and Wisdom in Science* is that for years, I was asked the question: “How do you reconcile your science—your physics—and your Christian belief? How do you do that?” And, for years, I thought that that was a question. But as we’ve discussed, that’s not the question. That’s a non-question. That’s like asking, “Have you stopped beating your wife yet?” What do I say, no or yes? That question buys into a world that—fortunately for my wife’s case and mine—is not the world we live in, empirically.

So I realized that all our apologetics have been on the backfoot for years by buying into the belief that “How do you reconcile science and religion?” is an meaningful question. It buys into a past which, as we’ve already discussed, is a polemical past, not a historical past, and a philosophy which is at best a partial philosophy, not a

balanced, evidence-based one. So instead, you ask a new question. I want to know what I’m doing this for. I want to know what this is for. Is it just some personal delight? Am I just intellectually gratifying myself with understanding another molecular fact? I want it to be more than that. I want it to be a gift for others. And that was where Steiner’s deeply theological insight actually came to my aid, because there’s a job of healing to do.

I’ve always been impressed by the way St. Paul can capture this new post-resurrection, Christian, creative world of the early church in a soundbite, and I love when he writes to the Colossians (this is like the Steiner quote, something else that

hits me). St. Paul says, Christ was in the world reconciling the world to himself. Actually, the Greek is *kosmos*: reconciling the *kosmos* to himself. And so we have the ministry of reconciliation. That’s his little soundbite. I think he was giving a media interview. He was asked: “Paul, are you zealots? Are you terrorists? Are you weird philosophers? Are you a part of Judaism? What is this Christian thing? What do they call you? The Way?” And he says, “I’ll tell you. We’re just simply in the

business of healing broken relationships. That’s what we do.” He could say that without even drawing on Abraham or Moses or the Hebrew Bible or even on Jesus of Nazareth, who wouldn’t have been broadly known across the ancient world at that point. He can say we’re in the business of healing. And we all know what that is. We all need that.

And then the other—the third—ingredient, which I’m going to have to mention (no one escapes this conversation until we’ve visited briefly): the book of Job. So I remember again—as a young scientist, a fairly recent Christian—doing my read through the Old Testament and coming across the book of Job. And again, for the third time—we’ve had Paul, we’ve had Steiner, and now we have Job—falling off my chair in absolute delight. Why aren’t people singing about this book from the rooftops? Why wasn’t I taught this as a kid?

This beautiful poetry of anguish against the world, the chaotic, harmful, frightening world of floods and earthquakes and lightning and storms and the harm they do, and the suffering of the flesh of this poor man, and his friends’ simplistic theology—the fact that simplistic theologies are criticized, as such, in the heart of the Bible ought to be more widely known. And then when God finally speaks, when he finally answers Job out of the very whirlwind that Job critiques as being the out-of-control cosmos, comes this poem. The UC Berkeley Hebrew scholar Robert Alter tells us it is the highest poetry in any ancient Hebrew literature. Job itself is the highest poetry, and the best of Job is the Lord’s answer: Job chapters 38 to 40. It is a poem about the natural world in which every stanza is a question, and there I am, as a young scientist, encouraging people to realize that science is about openness and imagination.

And one way you can articulate that is to say—and many have—that science is more about questions than answers, and that the critical imaginative move in science is to conceive of the creative question, not to parrot the next answer. I know the answers are what get you to be a scientist because that’s what you do in school and college. But we should train kids to ask questions more, because that’s what science consists of. Do you know the storehouses of the snow? Do you know where hail comes from? Do you know where the Pleiades are clustered together? Where Orion’s stars are cast apart? These are all real questions. And I’m amazed. The Bible’s central passage concerning the broken human relationship with the physical world is this poem, where God the Creator invites Job to gaze upon the world as God the Creator gazes, in love and the willingness to make it fruitful and to heal it.

Now, by the way, the secondary literature on Job is largely a disaster area in my view on this one. I know it sounds appalling. How can a scientist say this? I mean,

it's an appalling thing to say. But I've learned this in interdisciplinary work: when I work with humanities scholars on medieval science, often they have the best, freshest scientific insights. So it's all free and fair game here. Listen, no Hebrew ever used a question as a put-down. Yet in the critical tradition of the Christian Latin West, we've come to think that the Lord's answer to Job is some sort of put-down, but I'm sorry, it's not persuasive, and we've got to stop reading it that way. It's invitational, it's engaging, it's reconciliatory. It's healing, it's decentralizing. It's full of love for creation, and it's full of the openness of the question.

So take Job, on the one hand, in the Old Testament, and Colossians, on the other—or Romans—and out comes a theology of participating in a deeply holy work: insofar as God makes our world and loves us and heals it, what might the image of God do theologically but to make an image of the world? Well, that's what we do. That's the best description of what science is. It's the image of God, the image of the creator, creating an image of the world. It doesn't get more theological than that. But it doesn't get more faithful to scientific practice and praxis and the felt experience of everyday of a scientist's life. So when theology starts to mirror back in terms that no other discipline can—can match the felt daily, real earthy experience of science—I think we should listen to theology, and why not in partnership with philosophy?

What characterizes a relationship gone sour? Well, the first thing is ignorance. We don't know each other. That's why we don't help each other. Secondly, fear. I'm worried what you're going to do to me next, and you're worried what I'm going to do to you. And out of ignorance and fear can come only harm.

Now, look, if you want a better analysis of our current relationship state with our own planet, I don't think there is one. We've been ignorant of what causes climate change and our effects on it, but we're learning as fast as we can. And we've got to learn quickly. Bushfires wipe out cities: is Los Angeles going to be next? Great

floods on the coastal flood plains, as the sea level rises. It's terrifying and harmful. There's nature harming us. But we now know that we can harm nature, too, in our own century. So what do you do with a classic broken relationship, whether it's between two people, or between the whole human race and their planet? You replace ignorance with knowledge; that's the first scientific step. That's why Paul talks about the ministry of reconciliation having to do with knowledge and understanding. Then you replace fear with wisdom; that's the next step. That's why I called the book *Faith and Wisdom in Science*, because wisdom is how you use knowledge to be fruitful. That's the third stage: you replace mutual harm with mutual flourishing. Now, I can't think of anything more urgent than that. And if you don't like the fact that it's a theologically conceived social or political

embedding in science, well, too bad. It's a good one. Whoever you are, I hope you recognize that. So just take it as a gift. You don't have to look at where it comes

from, although I would invite you to look at where it comes from. So that's, I think, why this is so important, and why a theology of science, not the battle between theology and science, is so critical for our time. It's not just about making science more democratic than it is. It's not just about helping science avoid those dreadful eugenic—and worse—experiments in the past that have been committed through its cult of expertise and hegemony. It's about saving the world. How about that?

Science and the Healing of the World

SAMUEL LONCAR

It's beautiful. And so the one last word to bring into that—which you discussed and mentioned. If people don't like the word “theology,” then let's just call it philosophy.

Philosophy is the love of wisdom, and love is at the heart of this. You say in the book, in the beautiful passage near the end: “we don't think of scientific practice and love as being very connected.” But in reality, as a leading natural philosopher, as a leading physicist, you're saying that they are connected, that this is *why* we do what we do.

They're doing what they do because they love things. They love their theories, so they nurture them. Even when they're young and immature, they're devoted to them—maybe superrationally or, to their opponents, irrationally. And so you make this compelling argument in the book that love is essential to the practice of the most rigorous domain we have in our culture to represent our love of wisdom and knowledge.

And you're saying that that this love is ultimately a love that's ordered towards the healing of the world. You point out every tradition has resources to bring this out. So if they don't like it, that's okay. You're saying: just take it as a gift.

But what you just did is so powerful, because the environmental narratives—and you get into this at the end of the book—they don't work. We have this incredibly bureaucratic, fear-based language. And what you're saying is we need to replace ignorance with knowledge. That's what we're trying to do in science. But we need wisdom about how to use that knowledge. So how do we cultivate a culture of love in science when we are afraid?

How do we cultivate a culture of love when people are terrified of climate change and so the narratives have been very fear based?

How would you encourage people? How do we create a culture of love for the natural world, and even a recognition that this love is what is binding us to even the most rigorous, maybe secular or atheistic-seeming practices?

We're all lovers. How do we build that into the understanding?

TOM MCLEISH

Of course, I'd love to be able to give you a full answer that, and if I could, I think we might be further down the track than we are. But I may tell you a few things.

So one is that we can just open up an understanding of the world. A problem understood is definitely a problem shared; it's a problem halved. So I think one of the problems with climate change is that people just don't understand. They just look at two sides arguing with each other. And as in the football analogy, it's possible to understand. I couldn't run down the field and take a pass and then cross it to the box and score to save my life, but I can see that's a clever move. There's a way of getting into what you love, even if you're not an expert. And I think that understanding how it is that we know what we know and what the uncertainties are—we as scientists are often frightened that if we admit the uncertainty in science, the science deniers will go the whole hog and just take the whole bite, and so when a bit uncertain, then we can just forget it.

But I think most people understand that life is like that. We're not sure which company to invest in, but we've got to invest in something. We're not sure whether to try to have another child or not. It might turn out well, it might not. We've got to make decisions. We can't make non-decisions. And we have to move forward. Everyone understands this, and we make evidence-based decisions all the time, partly on a hunch and partly on partial evidence. We nearly called the Royal Society project "Everyone's a scientist," but some people thought that was a bit of an over-claim. But what we meant was not that everyone should be a scientist, or everyone does science, but actually, people can be caught out doing little scientific things more than they realize they are. That's one thing.

And just to follow climate science with vaccine science: the love and the dedication with which the virologists knew back in early January 2020 that there would have to be a vaccine – the one I know about is the Oxford AstraZeneca one. They actually had the vaccine by the end of February or early March of that year, and then—it was just brilliant—they had to make decisions about which technology to use and

what the vector was going to be, and to pull all this together and then how they're going to parallelize all the testing. I mean, it's beautiful, and people who are worried about it would be less worried about it if they heard the scientists explain just more of the story. Jim Al-Khalili's wonderful BBC Radio 4 broadcast '*The Life Scientific*,' where he just talks to scientists, is a lovely one on exactly this topic. Science is full of just one long, lovely human story. We can tell our stories now. That's something we could do.

The other thing we can do is to take some action. Now, one known way of getting over a fear barrier is to start doing something. One known problem about climate

change is that people freeze; the reason that people freeze is this narrative: "Well, I can't do anything by myself. Nothing that I do will ever make a difference." Although if everybody said, "I'm going to do a little something," there would be a huge difference, so actually, even the premise isn't true. Everyone does make a bit of difference. But nonetheless, we know that local projects, in which several people come together to make a local climate difference—it could be decarbonizing the building or street or just sharing a common practice or working on how to save money by together as a community investing in renewable energy or working on carshare or whatever it is. And local organizations that have been extremely effective at doing this—churches, too, for all the reasons I gave—they can be fueled by the theology.

My favorite project started off life in California with some friends of mine. We formed a partnership with them through the ECLAS Project I mentioned before between York and Durham. And they've been offering to churches a theological underpinning of environmental care, together with resources and support for practical projects. It's been extremely effective, not only at making really positive local change, but also taking out the sting of this fear that comes from the feeling "I can't do anything, and I don't know what to do; I don't know what to make of it." Learn the theology and learn the science and learn the practice and enjoy doing it together. This is a model for how this huge project of healing that we talked about as biblically defined by Paul can be cashed out in small local ways, which is exactly what he would have encouraged his local churches to have done in the first century and what little local churches can do now.

Of course, we can also act politically as well. But that's also more powerful when it comes from small groups. And here's something else that the church can do, something that has really paralyzed our debates on climate change in our political action is the tense, reactionary, and adversarial nature of the debates, the

deployment of a lack of respect, of fear tactics, and of course, of lies. So the political and media debates are characterized by these things. Now, take the value of a

church community. What would you say were high up on the list of values in the way we should practice our interpersonal discussions, whatever their goals are? Well, pretty high on the list might be respect. Truth. Oh, and we don't let fear through the door. It's an all-too-common preacher's point—and I've used it many times—but what's the most commonly repeated commandment in Holy Scripture? It's not one of the ten; it's "do not be afraid." Almost every epiphany has it. Don't be afraid. Jesus to his disciples, the Lord to Moses, and so forth. A church doesn't have to take a side on an issue in order to support a public conversation, which holds truth high, holds mutual respect high, and replaces fear with wisdom, as we discussed before. And I've seen this happen.

We actually held an earth-science workshop for bishops as part of this project, and we brought the earth scientists into our practical discussion. It was around fracking technology. It turned out that some of these senior clergy had previously worked in

the oil industry and were quite pro-fracking. Others were community leaders for strongly anti-fracking movements. This is back in the day when a bit less was known about it. It doesn't matter what the end of the discussion was. What matters was that I witnessed the most respectful, the most loving, the most deeply pursuant-of-science, and therefore the most productive debate on this issue, even though we had people of opposite convictions and strong feelings in the same room at the same time. Now, if that's not the gift the church can give to public life, the gift of scientifically and technologically linked urgent questions, I don't know what a better one is. So there are a few ways—practical ways, I hope—in which we can move on.

SAMUEL LONCAR

That's extremely helpful. I just want to mention to our readers, since we didn't even get to it, you have a recent book that just came out in paperback called *The Poetry and Music of Science*, comparing creativity in science and art, and I hope we can talk about that. What are some of the other books that you're reading now? Or just things you're reading that you're excited about or that you're working on?

TOM MCLEISH

I'm always reading far too many books at the same time. I like to have something theological on the go. Something poetic on the go. Something science-y on the go. And so I'm actually reading Stephon Alexander. He's a jazz-playing theoretical physicist, and he wrote a book called *The Jazz of Physics*. I'm reading that at the moment because I've gotten interested in aesthetics again, and the tortured question of the relationship between truth and beauty in science. I've also been reading Sabine Hossenfelder's book *Lost in Math*. So those two make an interesting pair

actually. Does the beauty of the equations lead us to truth? And the answer is maybe. That's a current reading project of mine.

On the history of science right now I'm reading anything I can lay my hands on about the eighteenth century astronomers William and Caroline Herschel, because in a month, less than a month's time now, I'm being asked to give a lecture on William Herschel and the discovery of the planet Uranus—a musician and astronomer under George the Third. He, like George the Third, have both an English and Hanoverian descent. And he brought music and astronomy together in the most extraordinary way. The more I go on, the more fascinated I am with the deep, deep-line connections between music and science.

There's a chapter on that in the book you just mentioned, which we will have to talk about another time because that's about another divorce, which is part of the problem. Actually, we could have drawn that as another string to our bow today: the loss of discussion of imagination within science as an essential path to knowledge and the appropriation of imagination by the arts and perhaps the humanities, and rationality by the sciences. That's another divorce, another conflict,

which is artificial and wrong, and we need to bring that back together as well. But that's all for another time.

SAMUEL LONCAR

Thank you so much, Tom McLeish, for your time and for sharing your incredible expertise and the beautiful integration that you bring to everything that you do—and the beauty that you show is just part of the life of a scientist and a natural philosopher. It's a real privilege and a delight. I thank you for it.

Tom McLeish FRS, is a physicist, academic interdisciplinary leader, and writer. He is Professor of Natural Philosophy (Emeritus) in the Department of Physics at the University of York, UK. He has won awards in the UK, USA and EU for his interdisciplinary research in soft matter and biological physics, and also works across science and humanities on medieval science, and the theology, sociology, and philosophy of science. He is a licensed lay preacher in the Church of England, and is currently Canon Scientist at St. Albans Cathedral. As well as over 200 specialist articles, he is also the author of *Faith and*

Wisdom in Science (OUP 2014), *The Poetry and Music of Science* (OUP 2019) and *Soft Matter – A Very Short Introduction* (OUP 2020). He regularly appears on BBC radio, including the morning prime-time religious reflection of current affairs, Thought for the Day.

Samuel Loncar is a philosopher and writer, the Editor of the *Marginalia Review of Books*, the creator of the Becoming Human Project, and the Director of the Meanings of Science Project at *Marginalia*. His work focuses on integrating separated spaces, including philosophy, science and religion, and the academic-public divide. Learn more about Samuel's writing, speaking, and teaching at www.samuelloncar.com. Tweets @samuelloncar