Science and Metaphysics: A Family Quarrel?

Iain McGilchrist

Psychiatrist, neuroscience researcher, philosopher and literary scholar.
Fellow of the Royal College of Psychiatrists and Fellow of the Royal Society of Arts.

In the lecture series given in Cambridge in 1951 that formed the basis of his book *Science & Humanism*, the physicist Erwin Schrödinger observed:

> it seems plain and self-evident, yet it needs to be said: the isolated knowledge obtained by a group of specialists in a narrow field has in itself no value whatsoever, but only in its synthesis with all the rest of knowledge and only inasmuch as it really contributes in this synthesis toward answering the demand, τίνες δὲ ἡμεῖς*; 'Who are we?'*

Schrödinger is recalling the words of the third-century Greek philosopher Plotinus; but his point is of a contemporary relevance that it is impossible to overstate. It is reinforced by the words of the neurosurgeon Wilder Penfield, whose work on mapping the brain is renowned: 'The problem of neurology is to understand man himself.'

Philosophy and science alike take as their ultimate aim to enlarge our understanding of ourselves, the world and our place within it. Science means simply knowledge, and what we now call science used to be called 'natural philosophy'. The dominant sense in ordinary use nowadays, restricted to the study of the phenomena of the material universe, first arose in the mid-nineteenth century (as did the word 'scientist'). Science and philosophy are part of one and the same endeavour: to understand the world. They should never be considered,

as seems often to be the case nowadays, wholly separate – even worse, as if opposed to one another. In Alfred North Whitehead's words, 'the antagonism between science and metaphysics has, like all family quarrels, been disastrous'; indeed, as RG Collingwood put it, 'science and metaphysics are inextricably united, and stand or fall together'.

Why is This the Case?

To take science first, new facts, new data, do not on their own contribute to our understanding of what we are dealing with. They may inform us how to *use* whatever it is we are engaged in examining–to intervene in it, or to manipulate it–-but can tell us nothing of its fundamental nature. Information is not knowledge, but a constituent of knowledge; and knowledge, in turn, is not the same as understanding.

Turning to philosophy, ideas on their own have no purchase on reality unless they are tested on the bedrock of experience; the empirical data offered by science form part of that bedrock (the bedrock may shift, as bedrock does, but remains, in this sense, bedrock.) With apologies to Kant, one might say that 'science without understanding is empty; understanding without science is blind'. Science can inform philosophy: philosophy can transform science.

Philosophy, like the air we breathe, is there whether we are aware of it or not. There is no such thing as having no philosophical position: those scientists that think they have none have simply adopted the default philosophy of the era, which today means reductionist materialism. If we recognise our philosophy, we are in a better position to examine it, shape it or change it. If we don't, we take whatever comes most readily to hand for granted, with all its constraints; it then shapes and changes us.

For the rest of this short paper, I want to draw attention to attention itself, both how it inevitably influences how we understand science, and in turn how that understanding of science cannot avoid informing philosophy.

The Neurology of Hemisphere Differences: An Ultra-brief Guide

Attention is a moral act. The nature of our attention changes what we find in the world; and in its absence we may overlook aspects of reality altogether. Moreover the nature of that attention changes our nature – we who do the attending. This is a matter of everyday experience, if we stop to reflect on it, and its implications are far reaching.

In what follows I will necessarily make what appear to be bold general statements unsecured by evidence. Those who are interested in the detail of the argument, however, and the very extensive body of evidence may find them in a recent book by the author called *The Matter with Things* (2021).

All neural networks we know of, going back 700 million years, are asymmetrical; and all brains we know of are divided into two asymmetrical neural networks, which in humans have evolved to become the two cerebral hemispheres. Why should the brain, the power of which exists precisely in the connexions it can make, be divided? And why asymmetrical? This otherwise puzzling state of affairs must serve some evolutionary goal; and indeed it serves a goal of the greatest importance.

We know that the differences between the human brain hemispheres lies not in what they do, as used to be supposed, but in how (the 'manner-in-which') they do it. In both animals and humans, each brain hemisphere attends to the world in a different way. Every animal, in order to survive, has to solve a conundrum: how to eat without being eaten. It has to pay precisely focused, narrow-beam attention that is already committed to whatever is of interest to it, so as to exploit the world for food and shelter. Put at its simplest, a bird must be able to distinguish a seed from the background of gravel on which it lies, and pick it up swiftly and accurately; similarly, with a twig to build a nest. Yet, if the bird is to survive, it must also, at one and the same time, pay another kind of attention to the world, which is the precise opposite of the first: broad, open, sustained, vigilant attention, on the lookout for

predators or for conspecifics, for friend or foe; but also, crucially, open to the appearance of the utterly unfamiliar—whatever may exist in the world of which it had no previous knowledge.

It is the left hemisphere which pays the narrow-beam, precisely focused, piecemeal attention, aimed at a particular object of interest. This is the kind paid by an animal locking onto its prey. In humans the left hemisphere is designed for grasping, controls the right hand with which we grasp (as well as those aspects of language which enable us to say we have 'grasped' something – pinned it down) and helps us manipulate, rather than understand, the world. It sees little, but what it does see has clarity. It is overconfident, tends to be black and white in its judgments, and jumps to conclusions. Since it is serving the predator in us, it has to if it is to succeed. It sees a linear relationship between the doer and the 'done to', between arrow and target.

By contrast, the wide-open, vigilant, sustained attention of the right hemisphere, without preconception as to what it may find, is designed to look out for all the rest – whatever else might be going on in the world while we are busy grasping. Its purpose is to help us understand, rather than manipulate the world: to see the whole and how we relate to it. It is more exploratory, less certain: it is more interested in making discriminations, in shades of meaning. Since it is serving the survival instinct and the social animal in us, it has to be if it is to succeed. All relationships in this hemisphere's world are complex and 'reverberative', changing both parties, and there is no simple linear cause and effect. Its attention, one might say, is not so much linear as in the round.

In humans, these two types of attention yield widely differing 'takes' on reality. How might one characterise, as a whole, each hemisphere's vision of the world?

The left hemisphere's view is of a world composed of static, isolated, fragmentary elements that can be manipulated easily, are decontextualised, abstracted, detached, disembodied, mechanical,

relatively uncomplicated by issues of beauty and morality (except in a consequentialist sense) and relatively untroubled by the complexity of empathy, emotion and human significance. They are put together, like brick on brick to build a wall, so as to reach conclusions that are taken to be unimpeachable. It is an inanimate universe – and a bureaucrat's dream. There is an excess of confidence and a lack of insight. This world is useful for purposes of manipulation, but is not a helpful guide to understanding the nature of what it encounters. Like a map in relation to the world that is mapped, its value lies in what it leaves out of the picture. Its use is local and for the short term.

In the right hemisphere's view, as in the world the map represents, and in the world revealed to us by physics, by poetry, and simply by the business of living, things are almost infinitely more complex. Nothing is clearly the same as anything else. All is flowing and changing, provisional, and complexly interconnected with everything else. Nothing is ever static, detached from our awareness of it, or disembodied; and everything needs to be understood in context, where, if it is not to be denatured, it must remain implicit. Here, wholes are different from the sum of the parts, and beauty and morality, along with empathy and emotional depth, help us to intuit meaning that lies beyond the banality of the familiar and everyday. It is an animate universe – and a bureaucrat's nightmare. This is a world from which we cannot detach ourselves, since we are part of it and affect it by our relationship with it. The overall timbre is sober and tentative. This world is truer to what is, but is harder to comprehend and to express in language, and less useful for practical issues that are local and short-term. On the other hand, for a broader or longer-term understanding the right hemisphere's view is essential.

Implications for Philosophy

The findings of science have implications for philosophy, including the philosophy of science. Long before we had anything other than the most rudimentary knowledge of hemisphere difference, a number of philosophers—Pascal, Spinoza, Kant, Goethe, Schopenhauer,

Nietzsche, Bergson and Scheler among them—were able to intuit that there are two fundamentally distinct ways in which we approach the world, what Bergson called 'two different orders of reality'. If we are faced, then, with choosing between two phenomenological worlds, each of which has divergent qualities, which world should we prefer?

Let's look at this first from the point of view of philosophy in general, and then come to the philosophy of science.

Philosophy abounds in paradoxes. One way of looking at paradox is as an indicator that we are dealing with two apparently valid world-pictures, yet which do not concur. I suggest (and argue at length in *The Matter with Things*) that these arise because of a conflict between the two ways of looking at the world favoured by either hemisphere. I suggest that many of the great questions of philosophy in fact turn on which mode of attending to the world we choose. What is more, in examining some thirty paradoxes well-known to philosophers, I suggest that it is in every case the more left hemisphere-dependent mode of attending that leads to the conclusion that we know to be absurd: Achilles does, after all, handsomely beat the tortoise.

This is in keeping with what we find by direct examination of brain function. In the first approximately 400 pages of *The Matter with Things*, I examine the main portals whereby we might gain knowledge of the world – attention, perception, judgement (formed on the basis of attention and perception), emotional and social intelligence, cognitive intelligence and creativity – and show that each is better served by the right hemisphere than the left (as a concomitant of this, delusions and hallucinations derive much more frequently from damage to the right hemisphere). The only area in which the left hemisphere is clearly superior is that of what one might call apprehension, rather than comprehension – the power to seize hold of the world so as to represent it in language and utilise it to maximum effect.

Some conclusions logically follow from these findings. First, the right hemisphere proves to be a more veridical reporter on reality. Second,

we can recognise the signs and symptoms of overdependence on the left hemisphere's view of the world – its 'signature'. This implies that when we are in search of truth, weighing up conflicting ways of looking at the world, we can go beyond merely stating that different views exist: we can recognise the provenance of each, and this in turn can offer possible grounds for preferring one view to another.

Implications for the Philosophy of Science

Whenever we say we understand something, what we mean is that we see it is like something else of which we are prepared already to say that we understand it. Everything is understood by its relations to something else we believe we understand. There is always a model, even if the model is not explicit. Since the choice of models used to explore the world changes both *what* we see and *how* we see it, how should we discriminate between differing models? These are questions we cannot simply side-step. They are at the core of the scientific enterprise.

Surely, it may be objected, science does no more than build on unimpeachable observations of the real, experiential world? Observations, however, are not as simple as they are conceived to be. It has been said that to a man with a hammer, everything looks like a nail. It is true that our theories depend on empirical observations; but, as Einstein pointed out, 'whether you can observe a thing or not depends on the theory which you use'. Our theory dictates the type of attention we pay, and the type of attention we pay dictates what we are able to see.

On this, a further point is made by philosopher of science Norwood Hanson. A theory may not only blind us to something altogether; but the theory we espouse may change the meaning even of what is unequivocally observed. Even if one person's senses register the very same data as another, the observers may differ as to its meaning—and in that sense, as to what they actually see. Hanson points to the example of Tycho Brahe and Johannes Kepler registering the same sense-data

on seeing the sun rise, but seeing something quite different—since Brahe, unlike Kepler, believed the position of the earth was fixed. Competing theories lead to differing observations as much as differing observations lead to competing theories.

The model we choose in science has the power to reveal or obscure findings; and to change the meaning and interpretation of such findings as we make.

The Machine Model in Biology

Physicists have become used to that fact that they cannot practise their science without confronting profound philosophical questions, such as the relation between consciousness and matter. They moved on from the mechanical model at least a hundred years ago, since they found that the reality they observed behaved nothing like a machine. Biologists, however, remain apparently untroubled by this advance, and prefer to continue to hold to the mid-Victorian 'hydraulic' model. As the evolutionary biologist and palaeontologist George Gaylord Simpson remarked, 'not many biologists are given to exploring the philosophical implications of their science.' More trenchantly, the theoretical biologist and philosopher Joseph Henry Woodger wrote in 1929 that

> physiologists in general never trouble themselves about such things because they suppose themselves to be above 'metaphysics' when in fact they are only a very little above it – being up to the neck in it.

As David Bohm commented in the 1960s, it is an odd fact that, just when physics was moving away from mechanism, biology and psychology were moving closer to it. 'If the trend continues', he wrote, 'scientists will be regarding living and intelligent beings as mechanical, while they suppose that inanimate matter is too complex and subtle to fit into the limited categories of mechanism.' He was not mistaken.

Nonetheless the language used by biology suggests elements that would be quite out of place in physics. I would suggest that there are broadly six features that stand out in the language inevitably used by biologists, rather than by physicists or chemists, time and time again, year after year, decade after decade, century after century – language used to describe what they actually see, but which stands in blatant contradiction to the metaphor of the machine.

As Whitehead pointed out, 'it is notable that no biological science has been able to express itself apart from phraseology which is meaningless unless it refers to ideals proper to the organism in question.' It will no doubt be said by some that such language is just a *façon de parler*, such as when I say that my car engine 'labours', or 'struggles' to get up the hill in third gear. But that is not an adequate response to the sheer ubiquity, scope and inescapability of such language – or, more significantly, the nature of the phenomena it is called on to describe. What language do I have in mind?

References to (1) *actively co-ordinated processes*, expressing a sense of (2) *wholeness*, inextricably linked with (3) *values*, (4) *meaning* and (5) *purpose* – each leading separately and together, to the phenomenon of (6) *self-realisation.* None of these get to be applied to my car.

Let me give some examples. First, 'actively co-ordinated processes'. Apart from, directly, 'co-ordinating' functions, processes, developments, and so on, elements of the organism are said to 'regulate', 'control', 'guide', 'induce', 'impose' order on, and at times 'disorder', 'arrange', 'restructure themselves', 'develop', 'adapt', 'respond', 'attempt', 'instigate', 'stimulate', 'inhibit', 'suppress', 'transmit', and 'receive' or 'extract' information from other elements of the whole.

Then 'wholeness'. References to 'rhythm' and 'harmony' aside, elements of the organism are said to 'inherit' information, modes of action or modes of expression, from other organisms from which they are neither structurally nor functionally wholly distinct; they are said to

'exhibit plasticity', involving transformation not of a part or parts, but of the whole; they 'modify themselves', 'integrate', 'unify', 'co-ordinate', 'organise', and 'interpret' *contextually*, that is to say, with regard to the whole organism, not just a part.

Or 'values'. Organisms are normative. They exhibit what is termed 'normal', or 'proper', development; they may exhibit 'errors' or 'mishaps'; 'suffer injury'; engage in 'healing'; attempt 'correction', or instigate 'repair'; perform actions in a 'timely' fashion (or not); exhibit 'aberrant' or 'corrective' reactions; promote 'health', suffer 'disease' and eventually die.

What about 'meaning'? How else to understand the talk of 'giving and receiving information', the 'recognising' and 'interpreting' of signals, the 'distinguishing' of 'relevant' from 'irrelevant' information, the 'adoption', 'erasing' or 'extraction' of a code, the ability to 'communicate', 'respond', exhibit 'intention', or 'directed activity', and the ability to – in some way we do not understand – 'sense' that something, some disturbance, say, is present. For example, an influential paper refers, not inappropriately, to 'decision-making' by single cell bacteria. I will come onto such decision-making by single cells in due course.

And 'purpose'? However you may toss her out with a pitchfork, as Horace said, nature hurries back in by the door; and it is impossible to describe the living world at any level without references to aims, purposes or drives. Biological molecular interactions have 'targets', 'recruit' other molecules for an end, 'assist' in processes, 'aim' at certain outcomes, have 'goals' and 'achieve tasks': they act 'in order to' secure certain ends by certain means. Single cells are constantly described as 'behaving' in certain ways.

Each of these five characteristics singly – and *a fortiori* together – suggests the sixth: a process of 'self-realisation'. The organism *as a whole* acts in a *co-ordinated* fashion to create and respond to *meaning* in the pursuit of *value-laden goals*, whereby it is fully realised and

fulfilled as an organism. ‘Living cells do not operate blindly’, writes James Shapiro, professor in the Department of Biochemistry and Molecular Biology at the University of Chicago: ‘life requires cognition at all levels.’

We humans, obviously, exhibit these same qualities, behaviours and purposes. It is conventionally assumed that when we describe them in non-human organisms, we are simply projecting our own onto them. But why? Even in our case, it almost all goes on effortlessly outside of awareness: being aware consciously is not a requirement at any point. The array of descriptors I have just outlined is the same as those we would use in describing a dog’s behaviour at every level, and that includes those of which it is and is not aware, those under its conscious control and those that are not, those in its brain and those in its tail. And the same, *mutatis mutandis*, operates in the case of a frog or a bird. When we see cells within the bird – or the frog or the dog – exhibit the same characteristics as the creature as a whole, why should we make an arbitrary distinction at some level? On what principle and at what point?

I suggest that the model or metaphor of the machine is inappropriate in biology for a number of reasons.

1. A machine is static until switched on, and may be switched off without ceasing to exist. An organism is more like a flame, a tornado or a waterfall: it has no off switch. It is a process, more than a thing: and once it stops moving and changing, it is gone.

2. What has to be explained about a machine is how it changes at all. This is because it is a system that exists close to dynamic equilibrium. When power is applied, one otherwise static and self-contained component transmits energy to another static and self-contained component, and so on, in a linear chain. Then it is switched off, and it returns to equilibrium, where it can remain indefinitely. In an organism, by contrast, what has to be explained is, not how it changes, but how it *remains stable*, despite constant change on an unimaginable scale. The stable

continuance of a stream is owed to change. It depends on the flow of water molecules through it, entering and passing on elsewhere, and if the water ever stopped steadily flowing and replacing itself the stream would cease to exist.

3. A serious problem for adherents to the machine model is that, while they are obliged by the model to explain organisms from the bottom up only, the deeper they go the less of anything remotely machine-like can be found. The scarcely material entities that physicists have grappled with over the last hundred years offer little reassurance that, if only we go to a more basic level, we are going to find a mechanism. As the biologists try to account for mind in purely material terms, physicists have increasingly been inclined to account for matter by appealing to mind. However, long before we get down to the quantum level, things show no signs of getting simpler: they remain stubbornly as complex and animate as we go down in scale.

   In a classical mechanism, causation is linear and can be clearly outlined. However, in biological systems, causation tends to follow not straight lines, but spirals, involving recursive loops, and multiple causes leading to multiple effects across a network, with sometimes competing factors cross-regulating one another, reciprocally interacting, and in ways we do not understand *taking information from the whole.*

4. In organisms there is never just action without both *inter*action and *mutual construction*. Cause and effect in organisms, if it can safely be applied, is never unidirectional, but reciprocal. The orthodoxy is that DNA affects the fate of the cell, the cell affects the organism, and the organism the environment. This is the bottom-up view. At least as true is the top-down view: that the environment affects the organism, the organism accordingly restructures the cell, and the cell makes appropriate use of DNA in doing so.

5. The ‘parts’ in organism are themselves constantly changing. A machine is made of parts that do not typically alter with their context. A tappet, a widget or a gasket continues its existence effectively unaltered wherever it is put. In an organism, unlike a machine, the ‘parts’ are continually engaged in changing themselves, sometimes radically, depending on context. Ultimately, even what we conceive to be the ‘solid’ parts of cells are actually flows. The living cell is mainly fluid, principally water. Even surfaces, cell membranes, the cytoskeleton, and the various fibre systems, that look relatively solid, are subject to more or less continuous dissolution and reconstitution.

6. While a machine has clearly defined parts, this is not the case in an organism. A process arguably has no parts and is, in reality, an indivisible unity. As Scott Turner puts it, ‘integrity and seamlessness seem to be the essence of an organism’. To the extent that one can speak of an organism as having ‘parts’ at all, we find them by dismantling the whole in an inevitably somewhat arbitrary fashion. They are ultimately a product of human attention, a function of the way we choose to attend to the organism for a particular end of our own, and the parts we choose to define change depending on our focus of interest at the time. The ‘parts’ are unlike machine parts – and not just because they constantly change. For such parts do not, as those of a machine do, exist prior to the whole that they make up, but come about *at the same time* as the making of the whole. They are further examples of ‘mutual constitution’. They are not pre-existing entities put together, but instead distinguish themselves in the process of self-differentiation of a living whole.

7. A machine has clear boundaries; a natural system does not. The machine model involves being able to identify viably distinct, stable things as parts, and a viably distinct, stable thing – the machine – as the product of their combination. Processes, by contrast, can overlap in a way that ‘things’ typically do not.

8. Organisms 'bootstrap' themselves into existence. Even in a computer, the software is separate from the hardware: the hardware has to be finished, before the software can be extrinsically inserted into it. The code for making the machine is not being simultaneously written by the machine *in the very process of beginning to form itself as a computer*.

In the face of these difficulties, how is it that the machine model has proved so tenacious? One reason is its simplicity: we understand machines and want organisms to be constructed in the same way. Also, regular and reliable patterns of behaviour in an organism are unreflectively assumed to demonstrate mechanisms. But regularities do not always mean there is a mechanism; nor do they imply determinism. Living things superficially exhibit some of the reliability and stability we associate with clockwork, though nothing about them in any way resembles clockwork, and they are, by many orders of magnitude, both much *less* stable, and at the same time much *more* reliable, than any machine.

I imagine some readers are thinking that, for all it may be a fiction, the machine model has persisted precisely because it has proved a very successful one. That is true enough. But that it can prove spectacularly useful for some purposes does not mean it is accurate. It may help us manipulate – the left hemisphere's *raison d'être* – but at the expense of a true understanding of what we are dealing with. In daily life, and even for most engineering purposes, we find it practical to assume that the earth is flat. If, however, we want not just to build a new garage, but to navigate the seas, the flat earth model is going to prove a serious handicap.

In a complex system it is possible, by taking a detail from the whole unimaginably complex, and intrinsically unpredictable, whole, to isolate what behaves like a linear chain. An intervention in that chain at that point can lead to a largely predictable effect; but what is true of the detail is not true of the whole.

The left hemisphere's serial, analytic approach is better equipped to deal with a system that is closed, static, linear and predictable – like a machine; not one that is open, constantly flowing, becoming and changing, and ultimately complex and indeterminate – like life. In the left hemisphere's vision, things take priority over processes. It is good at understanding linear cause and effect, not so much reciprocal interaction, let alone a process of co-creation. It understands a whole as simply the assemblage of parts, and causation as from bottom up only, not from many directions at once within the whole. It is at home when it can follow procedures step by step; less so when it comes to recognising new processes, new forms, or fields, at work. It prefers what is clearly defined, to what has imprecise boundaries. It doesn't see *Gestalten*, of which life everywhere provides the pre-eminent examples.

The words for Nature in Chinese, *tzu-jan* (*ziran*), and in Japanese, *shizen*, mean whatever is 'of itself', exists 'spontaneously', is 'just what it is'. They are, in origin, adverbs, not nouns – ways of being, not things. If there is anything in this ancient perception, and I believe there is great wisdom in it, a vision of the natural world as a thing, and a mechanical one at that, is bound to restrict our understanding of what we are dealing with to a certain rather alienating perspective. A machine implies existence of an external creating force with its own purpose: Nature delights in her own.

Can I suggest a better model than the machine? Trying the 'stream of life' model would be worth it, just to see what it revealed, even if it didn't look like a much closer fit – as it seems to me it clearly does. The stream of life model is more capacious than, and is able to accommodate, the strengths of the machine model for what it is worth, where it helps: it maintains what John Dupré, who with Daniel Nicholson co-edited a book called *Everything Flows: Towards a Processual Philosophy of Biology* (OUP 2018), calls 'as much analytical sharpness as reality allows', while giving full acknowledgment to fluidity and flexibility.

But seeing life as a stream is also a model, just as the seventeenth-century Cartesian machine is. And a model is only truer than another if it explains more of the phenomena we see – or have *failed* to see, because of the tyranny of the formerly ruling model. The new model, too, can be jettisoned, when the time comes, once it has done its work. But to judge it fairly does require deploying it, and mentally inhabiting it for long enough to see what difference it makes to the observed world. In other words, you won't even be in a position to see what it has to offer without first making a leap of imagination. Dismissing it just because it isn't the model you now hold is senseless. In a well-known formulation, 'you don't see something until you have the right metaphor to perceive it'.

Conclusion

Science requires an understanding of philosophy: philosophy requires an understanding of science. What I intended in this short paper was to suggest more specifically that the science of brain structure and function has consequences for philosophy; and that, not just in physics, but also in the life sciences, philosophy has consequences for science. It can help us see things anew; and thus get closer to answering the question of Plotinus's, posed a millennium and a half later by Schrödinger: 'but we – who *are* we*?'*

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End Notes

Some passages in this paper are taken from the author's book *The Matter with Things: Our Brains, Our Delusions and the Unmaking of the World* (Perspectiva 2021), to which the reader is referred for an understanding of the argument in context, and for references to the philosophical and scientific literature.

Iain McGilchrist is a former Fellow of All Souls College, Oxford, an associate Fellow of Green Templeton College, Oxford, a Fellow of the Royal College of Psychiatrists, a Fellow of the Royal Society of Arts, a Consultant Emeritus of the Bethlem and Maudsley Hospital, London, a former research Fellow in Neuroimaging at Johns Hopkins University Medical School, Baltimore, and a former Fellow of the Institute of Advanced Studies in Stellenbosch. He now lives on the Isle of Skye, off the coast of North West Scotland, where he continues to write, and lectures worldwide.

He is committed to the idea that the mind and brain can be understood only by seeing them in the broadest possible context, that of the whole of our physical and spiritual existence, and of the wider human culture in which they arise – the culture which helps to mould, and in turn is moulded by, our minds and brains.

He was a late entrant to medicine. After a scholarship to Winchester College, he was awarded a scholarship to New College, Oxford, where he read English. He won the Chancellor's English Essay Prize and the Charles Oldham Shakespeare Prize in 1974 and graduated (with congratulated 1st Class Hons) in 1975 (MA 1979). He was awarded a Prize Fellowship of All Souls College, Oxford in 1975, teaching English literature and pursuing interests in philosophy and psychology, in particular the mind-body relationship, between 1975 and 1982. As a result he went on to train in medicine, and during this period All Souls re-elected him to a further Fellowship (1984-1991), and again in 2002 (to 2004).

He was formerly a Consultant Psychiatrist of the Bethlem Royal and Maudsley NHS Trust in London, where he was Clinical Director of their southern sector Acute Mental Health Services. He trained at the Maudsley Hospital in London, working on specialist units including the Neuropsychiatry and Epilepsy Unit, the Children's Unit and the Forensic Unit, as well as, at Senior Registrar level, the National Psychosis Referral Unit and the National Eating Disorder Unit. During this period he also worked as a Research Fellow in neuroimaging at the Johns Hopkins Hospital in Baltimore, USA. His clinical experience has been broad-based, and he has run a busy Community Mental Health Team in an ethnically diverse and socially deprived area of south London.

He has published original research on neuroimaging in schizophrenia, the phenomenology of schizophrenia, and other topics, and contributed chapters to books on a wide range of subjects, as well as original articles in papers and journals, including the *British Journal of Psychiatry, American Journal of Psychiatry, Philosophy, Psychiatry & Psychology, Religion, Brain and Behavior*

[a special issue on his work], Dialogues in Clinical Neuroscience, The BMJ, The Lancet, The TLS, The London Review of Books, The LA Review of Books, The Listener, The Literary Review, Essays in Criticism, The Modern Language Review, The English Historical Review, The Wall Street Journal, The Sunday Telegraph and Sunday Times on topics in literature, medicine, psychiatry and philosophy. He has taken part in many radio and TV programmes and documentaries, including the BBC's *The Moral Maze, Start the Week,* and *Today*, as well as their series *In Doubt We Trust*, NPR's *The Hidden Brain, WNYC's The Leonard Lopate Show, ABC's All in the Mind,* TVO's *The Agenda,* the BBC's *Soul Searching* by David Malone, and his *Heart vs Mind*, Angel TV's *Animate Earth,* Pat Collins's *What We Leave In Our Wake,* the feature film *Innsaei – The Sea Within* by Hrund Gunnsteinsdóttir, Bruce Parry's feature film, *Tawai: A Voice from the Forest*, and recently a Canadian full-length feature film about his work, *The Divided Brain*. He has numerous podcasts, and interviews on YouTube, among them dialogues with Jordan Peterson, Sam Harris, David Fuller of *Rebel Wisdom*, Rowan Williams, John Cleese and philosopher Tim Freke, as well as lectures, seminars and commentaries.

His books include *Against Criticism* (Faber), *The Master and his Emissary: The Divided Brain and the Making of the Western World* (Yale UP), *The Divided Brain and the Search for Meaning; Why Are We So Unhappy*? (Yale UP), and *Ways of Attending* (Routledge).

His latest publication is the two-volume work, *The Matter with Things* which was published in November 2021 by Perspectiva Press. This is a sustained critique of reductive materialism, and concerns such questions as 'Who are we? What is the world? What is the nature of time and space? What do we mean by purpose, value and the divine? And how do we most reliably set about finding out?' He has also been commissioned by Oxford University Press to write a book of reflections on the humanities and sciences; and plans to write a critique of contemporary society and culture from the standpoint of neuropsychology, as well as a study of what is revealed by the paintings of subjects with psychotic illnesses.