IAIN McGILCHRIST



From the author of
The Master and his Emissary

THE DIVIDED BRAIN AND THE SEARCH FOR MEANING

Why Are We So Unhappy?

Iain McGilchrist is a former Consultant Psychiatrist and Clinical Director at the Bethlem Royal & Maudsley Hospital, London, and has researched in neuroimaging at Johns Hopkins University Hospital, Baltimore. He taught English at Oxford University, where he has been three times elected a Fellow of All Souls College. He works privately in London and otherwise lives on the Isle of Skye. He is the author of *The Master and His Emissary: The Divided Brain and the Making of the Western World* (2009).

Praise for *The Master and His Emissary*:

‘A seminal book’–Professor Ervin László, *Huffington Post*

‘A landmark new book…it tells a story you need to hear, of where we live now’–Bryan Appleyard, *Sunday Times*

‘A fascinating book…[McGilchrist] is a subtle and clever thinker, and unusually qualified to range with such authority over so many different domains of knowledge'—Harry Eyres, *Financial Times*

‘McGilchrist's careful analysis of how brains work is a veritable *tour de force*, gradually and skilfully revealed. I know of no better exposition of the current state of functional brain neuroscience’–Professor W.F. Bynum, *Times Literary Supplement*

‘This is a very remarkable book…McGilchrist, who is both an experienced psychiatrist and a shrewd philosopher, looks at the relation between our two brain-hemispheres in a new light, not just as an interesting neurological problem but as a crucial shaping factor in our culture…clear, penetrating, lively, thorough and fascinating…splendidly thought-provoking’–Professor Mary Midgley, *Guardian*

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EDITOR'S NOTE

Iain McGilchrist's *The Master and His Emissary: The Divided Brain and the Making of the Western World* was published in 2009, to worldwide acclaim. Clearly *The Master and His Emissary*'s combination of fascinating neurological research with a deep knowledge of Western culture and a profound insight into what it is to be human struck a chord, and, ever since, Iain has been deluged with follow-up questions and suggestions, and invitations to speak at events and conferences.

Inevitably, one of those questions has been, 'When are you going to write another book?', but, given that *The Master and His Emissary* draws on more than twenty years of research, a new full-length book would be a significant undertaking. Instead, to coincide with the new paperback edition of *The Master and His Emissary*, Yale invited Iain to write one of the first in a new series of short, lively e-books by some of our most popular authors, in which he draws on his research into the role of the right and left hemispheres to address the crucial question: just why are modern Westerners so unhappy? We hope you enjoy it.

Phoebe Clapham
Editor, Yale University Press

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> How is it that the more able man becomes to manipulate the world to his advantage, the less he can perceive any meaning in it? This is a paradox that has often been noted, and has sometimes been attributed to a fundamental perversity, a sort of ‘pure cussedness’, in human nature.

The world has changed since the philosopher Owen Barfield wrote those words thirty-five years ago. But the paradox, as he calls it, has got no nearer being resolved, while the evidence has continued to accumulate that his hunch was right. Our increasing ability to manipulate the world does indeed appear somehow connected with its loss of meaning for us. Why? And does it even matter?

An influential strand in contemporary thinking suggests that the quest for meaning is itself meaningless. Nowadays, it is said, we see things more clearly than was hitherto possible. The world has become comprehensible in ways that offer new possibilities for freedom and the exercise of human ingenuity. Instead of resorting to myths to explain what we cannot understand, we now know that it is only a matter of time before science will offer us the answers. Concepts such as the sacred or spiritual, which we invented in an attempt to find meaning in the world, are obviously outmoded, the product of misplaced guilt and primitive animism, and have no place in the lives of mature human beings in the twenty-first century. In fact the whole idea that there might be meaning in life, like the idea that we have something called ‘consciousness’, emerged during evolution in order to dupe us into performing better. The beliefs, habits and customs of our ancestors are just fragments of superstition and the sooner they are forgotten the better, since they stand in the way of progress, and obstruct our ability to remould the world according to a rational assessment of our needs.

Our intuitions may be uneasy about some of this, but then is there really a place for intuition any longer? It is often demonstrably misguided, as is bound to be the case, being no more than the relic of an instinctual existence which has outlived its usefulness now that we are able to break free of the world of myth.

Ultimately, we have come to believe that, whatever I or anyone else may say – *really* – when the chips are down, when the rhetoric fades, and we

have stopped trying to cheer ourselves up by believing in sentimental ideas such as virtue, love and courage, the possibility of truly unselfish behaviour, or a realm of spiritual value – *really*, we are nothing but blind mechanisms, the dupes of our equally blind genes, with no choice but to play out the sorry farce that the force of evolution, so much bigger and greater than we are, dictates. But at least now we have the dignity of knowing that we are not deceiving ourselves.

So far, so familiar. Nonetheless, I want to suggest to you that this vision is less compelling than it looks. Logically, scientifically, less compelling. I think there is in fact evidence that it may itself be a cruel deception, one that we have been far too gullible in swallowing. And I think the explanation may have something to do with the evolution of our brains.

We are right to be wary when we are offered the brain and its workings as an explanation of experience. A lot of nonsense is talked about the brain and its ability to explain this and that. People got terribly excited a while ago when they found what they took to be the 'neural circuitry' that lights up when you fall in love. *So?* What did they expect? That your brain would be a blank when you fell in love? Something lights up in my brain when I eat a cheese sandwich. It doesn't taste of cheddar. We were being asked to believe palpable nonsense: that love was 'nothing but' an overexcitement in the ventral pallidum. However it never was, nor ever will be. Enough of this nothing-buttery. I am not asking you to listen to what I have to say about the brain on such flimsy pretexts. I am asking you to consider the facts: that what we experience is mediated by neural tissue, a lot of it in the brain, and that that neural tissue inevitably governs the nature of, indeed places *constraints* upon, what it is we are able to find in the world, in predictable ways. That's all. It doesn't tell us what we are – or how, or why, we are what we are: but it may tell us what we are missing.

It would be crazy to suppose that our brains were so perfectly constructed that they could understand and make us aware of everything in the universe. Such a belief (though it is implied by scientism, with its dogma that we can in principle understand everything, given time and a bit more research) is irrational. We believe we understand so much more than other animals because our brains have evolved. Why suppose this moment in evolution to have offered us everything that could be needed to understand the world? The fact that it may look that way to us now does not prove anything,

except the impossibility of conceiving what it is that one cannot conceive. If a squirrel could reflect, it would look that way to a squirrel.

So let me go back to the brain, but with a degree of scepticism. My aim will be to illuminate not so much what we are, which no brain can tell us, but what we, and the world we create, are not – which it can. It gives us tangible evidence of what might shape our thinking. Looking at the brain may, funnily enough, even help us get a clearer view of the folly of trying to reduce mind to matter. It may show us that only half our brains would think that way.

If we take a look at the brain, lying there on the pathologist's slab [fig 1], the first thing that will strike us is that, despite millions of years of evolution, it has remained deeply divided. And that is odd, since the whole purpose of the brain as we understand it is to make connections. How can this be? Evolution would never have sacrificed the apparent advantages of massively greater interconnectivity, unless there were a commanding advantage in, at the same time, keeping some things apart.

In conceiving and writing a book called *The Master and his Emissary: The Divided Brain and the Making of the Western World*, I spent twenty years amassing, studying and reflecting on whatever research I could find that concerned the difference between the brain hemispheres. This was not an easy task. The first problem was one of prejudice. In the early days after the first split-brain operations carried out for the control of intractable epilepsy by Sperry and Bogen in California in the 1960s, it seemed that we were onto something big. The left hemisphere, we learnt, was rational and linguistic, while the right hemisphere was pink and

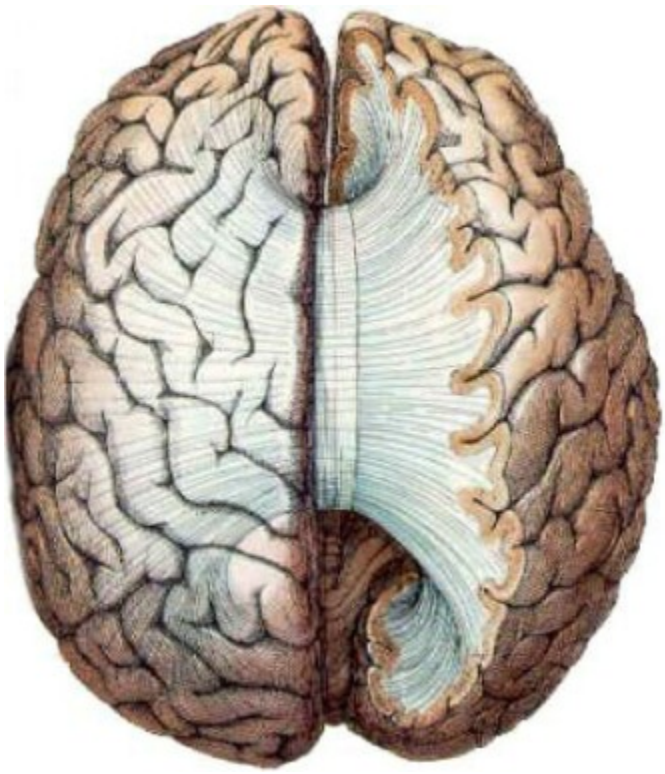


Fig. 1 The brain viewed from above, with right hemisphere displaced to reveal the corpus callosum.

fluffy, emotional, creative, vague and given to painting pictures. So this – the story went – was why we often seemed in conflict over how to see, and how to respond to, the world. But the excitement waned as we found that the story was more complicated. Gradually, with unfolding research, it became obvious that both hemispheres seemed to contribute to language, both to visuospatial imagery: both were involved in reason and both in emotion, which were inextricably involved with one another. In fact it didn't matter what it was our brains were engaged in doing, both hemispheres were in it up to the neck (or whatever a hemisphere has for a neck). Then there was a Volvo ad about the car for your right brain. That did it. From then on, no self-respecting scientist could be found to touch the topic.

There developed, in reaction to this, a dogma that it was not worth looking at the issue, because there simply was no difference between the two hemispheres. A dogma is not too strong a word: even now you will sometimes hear the emphatic, confident, dismissive tones in the pronouncements of those who have never bothered to look. The enquiry was closed down. And this, too, is fascinating – particularly in the light of

what I want to come onto shortly. Because this belief has nothing to do with observable facts – indeed it flies right in the face of them. It is purely an article of faith, one that leads us to turn away from a truly scientific approach. Because the brain is not only profoundly divided, but profoundly asymmetrical. There are clear, subtle but significant, observable differences at every level. The two hemispheres are different sizes, shapes, and weights (the right hemisphere is bigger and heavier in all social mammals); have different gyral conformations on the surface, and in places different cytoarchitecture – that is to say the arrangement of the cells; different proportions of grey matter to white, different sensitivity to neuroendocrine influences, and rely on different preponderances of neurotransmitters. And in psychometric testing they consistently yield different results, which is in keeping with something any clinician could tell you: when there is damage to one hemisphere or the other, through injury, tumour or stroke, there are consistent differences in what happens to the subject and his world depending on which hemisphere suffers the lesion.

Right at the core of our being, staring us in the face, is a massive fact or set of facts, which science should have been investigating, not denying. How had this strange dogma, this strange case of denial, come about?

I think it can be attributed to adopting the wrong model in our attempts to understand what we were looking at. We can only ever understand anything by comparing it with something else that we think we already understand better. All understanding is in this sense provisional, a matter of observing similarities and differences with something we already think we know. We had modelled the brain as part of a machine, the hemispheres as mechanical parts of a mechanical body. There are, of course, only two possible models: seeing it as part of a machine or as part of a person. So we had a 50 per cent chance of getting it right. But we managed to make the wrong choice. Because if instead we had seen it as part of a person, we would immediately have noticed that we were asking the wrong question. Instead of asking, as of a machine, *what it does* – does it ‘do’ reason, emotion, language, imagery? – we should have asked – as of a person – *what's he or she like*? How, in other words – with what values, goals, interests, in what manner and in what way – did it do what it did.

If we ask this question – what sort of a way of engaging with the world, each hemisphere has, and thus what sort of a world each hemisphere

engages with – we find a pervasive pattern, giving rise to an entirely coherent picture.

I should say that I do not adopt the naïve realist view of scientific materialism that there just is a world ‘out there’ unaltered by our experience of it, which like so many Geiger counters or photosensitive plates we can do no more than register. For one thing, whatever we know, we cannot know what it would be like in the absence of our knowing it, and different people find different things in the world. Even the same person finds different things on different occasions, when the context or the type of attention changes. That does not mean, of course, that everything that exists owes its nature and existence solely to us. But it does mean that, whether we are scientists or not, we can only know the world as we have inevitably shaped it by the nature of our attention.

More than that, physics teaches us that, at the most fundamental level of existence, there simply are no discrete pieces of inert matter. Instead there are clusters of interrelated probabilistic events that change their nature when observed. In the words of the great physicist Richard Feynman, quantum mechanics deals with ‘nature as she is – absurd’, that is she presents the left hemisphere with what it would call a set of ‘paradoxes’. (More of that later.) Matter is precisely as hard to explain as consciousness, so that trying to reduce one to the other would not help, even if it were not a strictly meaningless exercise. In fact for more than a hundred years physicists have understood that matter is not separable from consciousness. The mechanical universe is dead, in both senses. Strangely, practitioners of the ‘life’ sciences, many of whom are very vocal about the mechanistic nature of life, consciousness and our selves, carry on as if nothing had happened since the mid-nineteenth century, when such views were last sustainable.

On the other hand I am just as sceptical of the naïve idealist view, espoused by some post-modernists, that reality is all in our heads – we make it all up. For one thing there would be no point in my writing this, since you don't exist to read it. I take it that we bring about a world in consciousness that is partly what is given, and partly what we bring, something that comes into being through this particular conjunction and no other. And the key to this is the kind of attention we pay to the world.

Of course what we find will govern what kind of attention we deem it appropriate to pay. But just as importantly, how we attend to the world in the first place governs what it is that we find. We make the world we live in by attending to it in a certain way, by our disposition towards it. Having done so, our experience of it then determines how we attend, and so on. There is no royal road to certainty about what the world is, or what it is like. We all, whether we are poets or scientists, or just going about the business of daily life, have to begin somewhere, by a leap of intuition, as to what kind of thing it might be we are dealing with – not just any leap, of course, always a guided one, but nonetheless fallible and uncertain. Depending on where and how we leap is what we find. And depending on what we find is what we *will* find in due course, since it begins the process of hardening things up into what we call a certainty. What we do not expect to find, we just will not see: much elegant research demonstrates that we are essentially blind to what we do not think is there.

What does this have to do with the division of the brain? Birds and animals – for they, too, all have divided brains – have to solve a conundrum every moment of their waking lives. In order to make use of the world, to manipulate it to their own ends, they need to pay narrowly focussed attention to what they have already prioritised as of significance to them. A bird needs to be able, for example, to pick out a seed against the background of grit on which it lies, to pick up a particular twig to build a nest, and so on. But if that is the only attention it is paying, it will soon end up as someone else's lunch while it is getting its own, because it needs at the same time to pay a quite different type of attention to the world – a broad, open, sustained vigilance, without any preconception of what it is that may be found, be it predator or mate, foe or friend. How to pay such contrary types of attention to the world at once? It is like patting your head and rubbing your stomach at the same time – but worse, because one consciousness can't be committed to two kinds of attention simultaneously.

The solution appears to have been the brain's separate hemispheres. Each of these neuronal masses is sufficient in itself and on its own to sustain consciousness. And since attention is an aspect of consciousness (a machine can carry out tasks, but it cannot attend) each can therefore attend to the world in a different way. What we call our consciousness moves back and forth between them seamlessly, drawing on each as required, and often very

rapidly. For in humans, too, it turns out, the hemispheres pay different types of attention to the world – reach out a hand towards it (for that is what the word ‘attention’ means, the reaching out of a hand) in a different way or with a different set of priorities and values: to grasp and take for our own use, or to forge a connection and explore. The left hemisphere, as in birds and animals, pays the narrow-beam, precisely focussed, attention which enables us to get and grasp: it is the left hemisphere that controls the right hand with which we grasp something, and controls the aspects of language (not all language) by virtue of which we say we have ‘grasped’ the meaning – made it certain and pinned it down. The right hemisphere underwrites sustained attention and vigilance for whatever may be, without preconception. Its attention is not in the service of manipulation, but in the service of connection, exploration and relation. That is, after all another reason why we reach out a hand – to connect, to create, to share in another's fate, or to explore the world for what it is.

I am not here going to attempt a summary of the differences in the kind of world that each hemisphere brings about. The list is very extensive, as must be the case, since each hemisphere plays a part in everything we experience. We would need to cover differences in the ways of conceiving and construing knowledge itself, what we mean by newness, by wholeness, by types and aspects of reason and emotion, types and aspects of language, music, space, depth and time, as well as morality and the self. Here I can present only some conclusions. To see all the evidence and the argument laid out in comprehensive detail, you'll need to go to *The Master and His Emissary* where there is space and time enough to show exactly why, and on the basis of what evidence, those conclusions are reached.

What are the key distinctions? One way of looking at the difference would be to say that while the left hemisphere's *raison d'être* is to narrow things down to a certainty, the right hemisphere's is to open them up into possibility. In life we need both. In fact for practical purposes, narrowing things down to a certainty, so that we can grasp them, is more helpful. But it is also illusory, since certainty itself is an illusion – albeit, as I say, a useful one.

There is no certainty. The more closely one pins down one measure (such as the position of a particle), the less precise another measurement pertaining to the same particle (such as its momentum) must become. It is

not possible to know the values of all of the properties of the system at the same time. Mechanical systems, even at their simplest, are likely to produce highly complex outcomes. Not infrequently their behaviour is intrinsically unpredictable and unknowable (the simple double pendulum – one pendulum attached to the bottom of another – is a classical example of ‘chaotic dynamics'). The old, fallacious belief that the behaviour of all systems was fundamentally predictable arose because the systems studied were abstracted from their real world complexity and studied very close to equilibrium, where the parts had settled into a balanced state. It goes without saying that most of the real world is operating far from equilibrium. Elements of matter are neither isolated nor certain, but interconnected and probabilistic. Particles separated by a universe exhibit entanglement. Even the fact of our observation alters the behaviour of matter.

I sometimes think of the right hemisphere as what enables Schrödinger's cat to remain on reprieve, and the left hemisphere as what makes it either alive or dead when you open the box. It collapses the infinite web of interconnected possibilities into a point-like certainty for the purposes of our interaction with the world.

Although ‘seeing clearly’ is an image of grasping the truth, there is no such thing. At what level of magnification, at what level of description can you be said to have seen something clearly? Is a book seen clearly when it is seen as a whole in your hand, or when you read it, or when you take a magnifying glass to the paper and see the hills and dales of the paper, or when you go further and see the filamentous threads of which the paper is composed, or under electron microscopy, or when it finally resolves into probabilities of the presence of subatomic particles, and reveals itself to be mostly – nothing at all? When we say we see something clearly, we are not talking about perception but about a special kind of knowledge: when we can say we know that it is one of *those*. We have placed it.

An important consequence of this narrow-focus attention, aiming for certainty, is that it renders everything explicit. Just as a joke is robbed of power when it has to be explained, metaphors and symbols lose their power when rendered explicit. And metaphor is not a decorative turn, applied on top of the serious business of language in order to entertain: all thinking, most obviously philosophical and scientific thinking, is at bottom metaphorical in nature, though we are so familiar with the metaphors that

we don't notice their existence. It is the metaphors which provide the ‘something else’ which we know more intimately from our embodied, preconceptual experience, and to which we are, in every word we use, properly understood, making a comparison. It is metaphors that carry us across (that is what the word ‘metaphor’ means) the implied gap between language and the world, and make what would otherwise be a hermetically sealed system of signs capable of meaning something in terms of embodied experience. They are how we understand everything. It follows that limiting the possible meaning of language by rendering it explicit also limits the possible meaning that could be found in the world.

Explicitness kills, renders lifeless. An act of sexual love, or an act of worship, reveal little of their true selves in the lab, seen through an observation window. But neither would a football match, a meal with friends, or a comedy show. I first wrestled with this when I was involved with the study and teaching of literature. The meaning and the structure are not like a body and its clothes. Once you have taken the apparent ‘message’ out of its context, and examined the language of a poem like a cast-off coat, you are left with a handful of tatters.

> Only a man harrowing clods
> In a slow silent walk
> With an old horse that stumbles and nods
> Half asleep as they stalk…

A poem of Hardy, which, if it had not existed could never have been imagined, and which cannot be substituted by anything else in the universe, is reduced to a heap of general sentiments I could have found anywhere else a hundred times over, apparently clothed in language that is clunky, quirky and far from properly polished. And yet when understood and experienced implicitly, his poetry inescapably alters your life.

Another way of thinking of the difference between the hemispheres is to see the left hemisphere's world as tending towards fixity, whereas that of the right tends towards flow. All systems in nature, from particles to the greater universe, from the world of cellular processes to that of all living things, depend on a necessary balance of the forces for stasis with the forces for flow. All existing things could be thought of as the product of this fruitful

tension. But again, stasis itself is an illusion, helpful though it is in grasping the world on the wing. There is an intriguing condition called palinopsia, which follows damage to the right hemisphere. Here vision becomes atomised, broken down like the successive stills of a juddering cine film, a series of static moments, rather than a seamless flow.

The left hemisphere's take on things comes from assessing thousands of points of information in turn and trying to reach a conclusion about the whole picture that way. This has the profoundest consequences for the way it sees the world, when contrasted with the take of the right hemisphere, which sees things as a whole, never as isolated particles independent of a context. Of course we do not actually build things up in the way that the left hemisphere imagines. That illusion comes from the fact that when we ask ourselves, after the event, how we understood something, our linear-processing left hemisphere comes up with the only way it knows, the way it would have had to do it if asked. But fortunately we don't often ask it. We grasp the whole and only later choose to survey such particular parts as we prioritise for their interest or relevance. By seeing isolated points, the left hemisphere imagines that there are atomistically distinct entities, rather than seeing everything embedded in its context, which radically changes its nature: part of a web of interconnections.

This partwise method of understanding, and resistance to the idea of things flowing and changing, together go some way to explain the left hemisphere's affinity for what is mechanical or inanimate. Only the left hemisphere encodes tools and machines – you will remember that the purpose of the left hemisphere is to allow us to manipulate the world, not to understand it. Six separate studies have examined the issue, and each has found this to be the case. One found a complete divide, animate in the right, inanimate in the left. So marked is this effect that even the left-hander, who in daily life is using his or her right hemisphere to manipulate tools and machines, nonetheless encodes them in the left.

In the past we would naturally model the world according to organic metaphors – the tree, the river, the family. Now we model everything the left hemisphere's way, mechanically. Once again no-one could pretend that this is more true to the world; it is just a handy shortcut, which enables us to model very well some aspects of its behaviour for practical purposes, but radically excludes others.

This way of thinking brings us to a further related issue: differences over the unique and the general, quality versus quantity. The right hemisphere seems to be involved more with new experience, new events, things, ideas, words, skills or music, or whatever it may be, while they are still fresh, original and unique, and so to speak present, to the mind. The right hemisphere's world is present – or more precisely ‘presences’ to us, as Heidegger puts it. By contrast the left hemisphere's world takes over once whatever it is is represented – literally ‘re-presented’ after the fact: once it is familiar and known, as an instance of something, a concept. You can actually see this process happening using brain imaging. The left hemisphere abstracts and generalises, where the right hemisphere's world remains truer to each embodied instance, and appreciates the unique. As things are present in all their particularity, with all their individual, incarnate qualities, they are mediated by the right hemisphere: as they become general, abstract quantities, they are mediated by the left. Of course these abstractions and categories are once again less true to the world of experience, where no two things at all are ever the same, fixed, certain, or equal to anything else. But the process is a rough and ready take on the world, a way of helping us interact with the world swiftly and efficiently. The neuroscientist V.S. Ramachandran calls the right hemisphere the devil's advocate, because it is always interested in the particular, upsetting the left hemisphere's tendency to collapse unlike into like, and see only what it is expecting to see.

The left hemisphere's world is a representation only. It is like a map, useful precisely because almost all the information about the land to which it refers has been left out. For some purposes less is more. If I am travelling from London to Edinburgh, I really don't need to know all about the houses along the way, and what the people there like for supper, and how they treat their dogs, and what sort of plants they have in their gardens. This is vital for an understanding of the real world, the *terrain*, but not good for mastering the *territory*. It's no use for making a road trip.

To give you some idea of what I mean in practical terms, take a look at these pictures. Here [fig 2] you see in turn a tree as conceived by both hemispheres, by the left hemisphere alone, and then by the right. You will notice that, compared

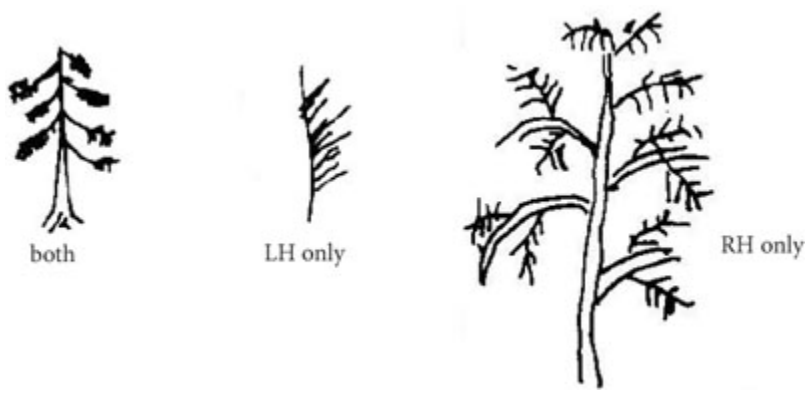


Fig. 2 Tree drawn by the same subject: under normal conditions; with the right hemiphere inactivated; and with the left hemisphere inactivated.

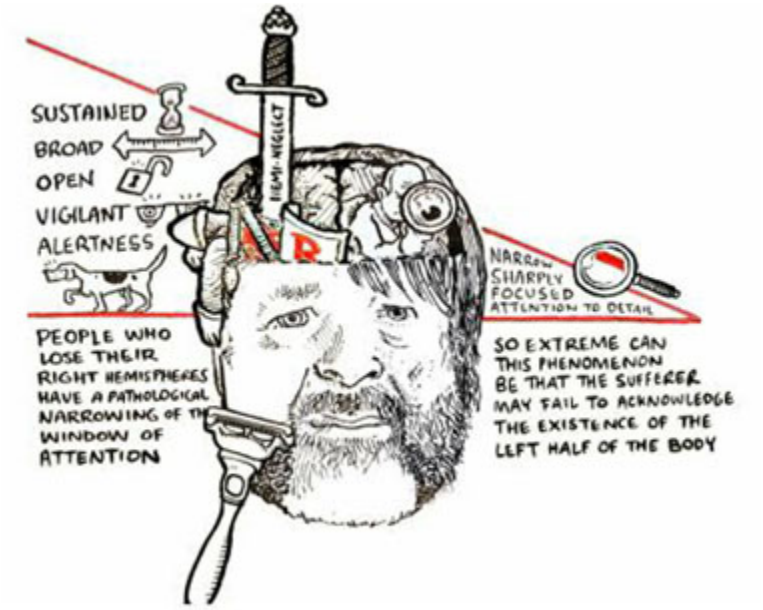


Fig. 3 The author as if suffering from hemineglect, from an animation by Cognitive Media for the RSA: see http://www.youtube.com/watch?v=dFs9WO2B8ul

with the flowing form of the right hemisphere's tree, seen whole and alive, the left hemisphere's tree is a fairly shrunken affair. And I want you to notice two features. In the first place, it is more like an icon of a tree, a token or representation of a tree, than a tree in the world as we know it. But this picture reveals another feature of the left hemisphere's world, which becomes particularly clear after a right-hemisphere stroke. Under such circumstances one has only the left hemisphere to go on, and, true to its

proper function, it is interested only in the part of space that is of use to it, the right half of space. It is not interested in understanding the world as a whole, only with having control of the bit it manipulates. You can see this remarkable phenomenon on almost any general medical ward. Following a right-hemisphere stroke, the patient may cease to attend to anything on the left, whether it be a person, the left-hand page of a book, or the left half of the page, and in extreme circumstances may forget to dress or shave the left half of the body [fig 3]. This has nothing to do with blindness – the visual system is intact. And it doesn't happen the other way round: following a left hemisphere stroke, the right hemisphere delivers a complete world, not a half-world.

If you look at these representations of a flower [fig 4], you see that in the left hemisphere it has been reduced to a stereotyped, geometric symbol of a flower. Look at these [fig 5], all this time produced by the left hemisphere: again the

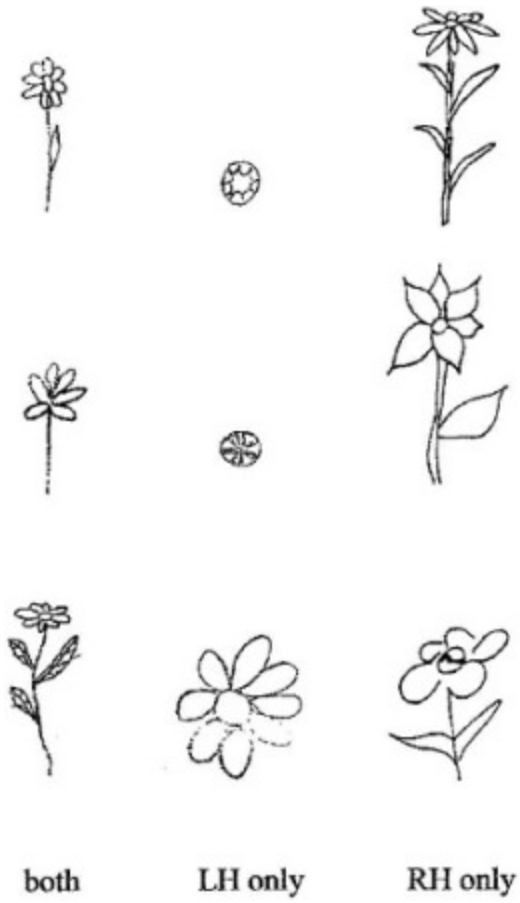


Fig. 4 Flower as drawn by the same subjects: in normal conditions; with right hemisphere inactivated; and with left hemisphere inactivated.

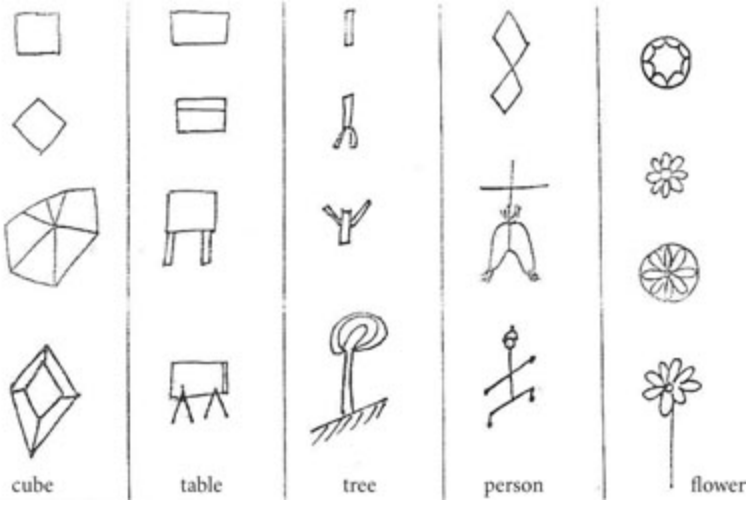


Fig. 5 Everyday objects drawn ‘according to the left hemisphere’, with right hemisphere inactivated.

complexity of the living world is reduced to a set of simple geometric figures. Take a look at the column that shows a ‘person’. I am reminded of Emerson's pessimism about what was happening to human beings in the modern world. ‘Man’, he wrote, ‘is a dwarf of himself.’ In the world of the left hemisphere, this is true. The left hemisphere is not in touch with reality but with its representation of reality, which turns out to be a remarkably self-enclosed, self-referring system of tokens.

I'd say the defining quality of the right hemisphere's world is that it is all in relations, what I call ‘betweenness’. This starts with its having a relationship with the world at large, not seeing it as a separate object, ripe for manipulation. What do I mean by ‘betweenness'? Think about the nature of music. Music does not exist in one particular note – which is in itself meaningless; or in a lot of such single notes, each in itself meaningless. I am tempted to say it exists more in the spaces than in the notes: the spaces between successive notes in pitch that creates the melody, the spaces between simultaneously sounding notes, that is the harmony, the spaces in time between the beats, that makes the rhythm. But that too is wrong, because the spaces are just silence, apparently nothing. It is not in the spaces *or* the notes, but in the spaces and the notes together, *plus* whatever it is that comes about from their union: much as electricity isn't in the positive pole, or the negative pole, or for that matter just in the space between them, or the *sum* of all those, but in the whole taken together. This is what I mean by betweenness, and it is also what mathematics consists in as much as music. It is what physics, too, tells us the world is made of – not a universe of billiard balls pinging off one another in predictable ways. And it is what the human world, rightly understood is made of, too. We are not atoms, nor mixtures, but compounds with rich emergent properties, nowhere dreamed of in the single human heart.

Some people have thought I might be subtly decrying reason or exalting emotion. But I should remind you that both hemispheres are involved in reasoning and in emotion. The left hemisphere is especially good at voluntary and social expressions of emotion and one of the most clearly lateralised emotional registers is that of anger, which lateralises to the left hemisphere. Deeper and more complex expressions of emotion, and the reading of faces, are best dealt with, however, by the right hemisphere. As far as reason goes, the left hemisphere is better at carrying out certain

procedures that involve manipulating numbers, but has less of a grasp than the right hemisphere of what those numbers *mean*. Much of mathematics is dependent on the *right* hemisphere: most of its great discoveries were perceived as complex patterns of relationships, and only later, often much later, translated painstakingly into linear sets of propositions. Deductive logic, it turns out, depends on the right hemisphere.

Reason is, after all, a complex concept. Some kinds of rationality can be unreasonable. Rationality, the schematic carrying out of algorithmic procedures in the way that a machine would, is better done by the left hemisphere, it is true. But other kinds of reason, including the reason that tells you the limits of reason, depends on the right hemisphere. There is a kind of reasoning, and an extent of reasoning, that is in many circumstances not only irrational, but actually one of the signs of madness. And as Aristotle emphasised, there are different kinds of reasoning, different kinds of knowledge, and different modes of understanding *appropriate to different areas of life*. We do not understand a poem as a doctor understands a patient, and that, in turn, is different from how an accountant understands a business plan. This is not a flaw in poetry, or medical practice, that could be remedied if only it were all rationalised mechanically. The arts and humanities need to remember this: they don't have to feel inferior to science, and try to model themselves on them. Like physicists, but in a quite different way, they are in the ultimately important business of understanding the world and making sense of it, not just learning how to manipulate it.

But the most curious aspect of the story of the left hemisphere is yet to come. It turns on how a self-consistent system of signs, such as the left hemisphere's world, can come to seem more real than the lived world itself.

The first evidence of this comes from about the fourth century BC – just as Greek culture was beginning to pass its peak. For the first time in Western civilisation the left hemisphere's take on the world started to dominate. Until that point, from the sixth century BC onwards, we had seen an almost unparalleled flowering of science and the arts based on the best of what both right and left hemispheres in conjunction can offer. From the right hemisphere came careful observation of the natural world (the pre-Socratic philosopher Thales correctly predicted an eclipse of the sun); a sense of the uniqueness of the individual, with interests that needed to be

harmonised with those of the community, which itself was seen as a living, changing entity that was more than the sum of its parts; and there arose, for the first time, wonderful, expressive depictions of the human face, narratives of human lives, and poetry rich in metaphor. It gave rise to the phenomenon of drama, whereby we see ourselves more clearly at a distance, but not in some detached and lifeless way – able more than ever to empathise. There was a keen sense of what needed to remain implicit, an understanding of the all-important conjunction of opposites, and, perhaps most strikingly, a sense of proportion and a sense of humour. From the left hemisphere came the working out of the fruits of natural observation into useful predictions of behaviour of natural bodies, the codification of laws, the creation of maps, the development of some aspects of mathematics, the introduction of monetary currency, the further evolution of written language (at this point starting for the first time to be written, as now in the West only, from left to right), and in general the systematisation of knowledge.

But gradually, with the rise of the Law of Non-Contradiction, which limited our ability to appreciate important truths that are not necessarily mutually compatible, the way of seeing the world characteristic of the left hemisphere began to obtrude. The ideal, theoretical world began to triumph over that of experience. We find Plato saying that the right way to do astronomy is not to look at the stars, but to look inside ourselves. And suddenly there is a flurry of interest in what was called paradox – when our theories about the world, our ways of thinking, come face to face with reality and show themselves to be inadequate to understanding the world.

You may know the ‘Ship of Theseus’ paradox, also known as the ‘Growing Paradox’, because it arises in the case of all living things. It goes like this: the ship in which Theseus returned to Athens from his exploits in Crete was preserved there in the harbour as a memorial. With time the timbers perished one by one and were replaced, so that after thirty years none of the original timbers remained. Was this still the Ship of Theseus? This is an analogue of the problem that few of the cells in my body were there a year ago – so is it still my body? To anyone seeing the whole, and who realises that everything flows, the answer is clearly ‘yes’. As Novalis remarked, our body is a moulded river. However, to someone who sees only parts and believes that permanence is stasis, the answer is ‘no’.

Or take the paradox called ‘The Division’. It reduces flow to a series of still frames. It is similar to Achilles and the tortoise, only it goes one step further. It states that movement is impossible, because before I go from here to the door, I must first go half the way, and before half, I must go a quarter, and before a quarter, an eighth and…this is an infinite series. So I am condemned to sit here for ever. What is fascinating is the rationalistic left hemisphere's conclusion: not that this kind of logic has its limits in understanding the world, but that the experiential world somehow doesn't measure up to logic. The real world isn't the way we think it is *because logic says so*, and, in reality, Achilles can, apparently, never overtake the tortoise. Beautifully designed experimental research, which I detail in *The Master and His Emissary*, shows that the left hemisphere sees truth as internal coherence of the system, not correspondence with the reality we experience. Again there is always a tension between these perspectives, and we need to be able to learn from either of them, but there is a serious problem when we begin to see truth as being, in the words of one of the experimental subjects with her right hemisphere inactivated, just ‘what it says here on this piece of paper’.

I am constantly reminded, as I go about life in the modern Western world, of a story by Yuri Tynyanov, called *Lieutenant Kizhe*. Published in 1927, the story concerns an error of transcription in an official list of the Imperial army, whereby the word *poruchiki*, lieutenants, gets conflated with a subsequent syllable *zhe*, seeming to refer to a certain *poruchik* Kizhe, a Lieutenant Kizhe – who never existed. Despite this apparent drawback, Lieutenant Kizhe plays a starring role in subsequent military reports, rises through the ranks, where he never gets into trouble and is known for his dependability, marries, fathers a child, is decorated for bravery, and finally finds himself promoted by the Tsar to the rank of General. Mysteriously, when the Tsar demands to meet this human paragon, he cannot be found. The Tsar, in despair, mutters ‘*Sic transit gloria mundi*’, and accords him a state funeral. Meanwhile a Lieutenant Sinyukhaev, who was years ago wrongly recorded as dead, struggles fruitlessly to assert that, contrary to received opinion, he is very much alive, and ends up a vagabond on the highways of Russia, relying on the charity of strangers.

In the contemporary world, where I fear we are currently in thrall to the left hemisphere's way of thinking, this problem, that the piece of paper has

become more important than the reality that it refers to, is endemic. Surgeons have a saying that is, I sometimes think, only half-facetious: ‘the operation was a success, but the patient died’. At least there was an operation. Nowadays the operation is scarcely required, as long as the box was ticked. That way success is assured, because ‘that's what it says on this sheet of paper’.

In life we need the contributions of both hemispheres. As Kant memorably put it, concepts without intuitions are empty, intuitions without concepts are blind. We need the contributions of both, but for different purposes. An uncritical following of intuition can lead us astray, but so can an uncritical following of logic. The reasoning of those who have spent their lives attending wisely to their intuitions is better than that of those who have never done so, and the intuitions of someone who has spent a life attending to reason will be better than those of someone who has not. Here again we come up against one of the defining differences between the two hemispheres: the right hemisphere is perfectly happy with ‘both/and’ – sees in fact how necessary that is in understanding the world. The left hemisphere, by contrast, says: ‘What's the matter? Can't you make up your mind?’ It has to be ‘either/or’, black or white, never a life within the full colour spectrum.

Do we just have to shrug our shoulders and say: ‘there are these two views of the world, choose which one suits you best?’ That would be at least a step forward, because at the moment, we are increasingly discounting one of these world views, that of the right hemisphere, altogether, and, as they say, half a loaf is better than no bread. Fortunately we don't have to choose: there is something of supreme value which each contributes to our experience of the world. But as far as understanding the world goes, I think we can go further. For the relationship between the two hemispheres is not symmetrical. They are not symmetrically anything, so why would they be symmetrically wise? Of the two, one is of greater importance when it comes, not to manipulating the world, but to understanding it, and living in it, and with it. The right hemisphere, the so-called minor hemisphere, is in fact the one that knows, and more importantly the one that understands, more.

I want to suggest that there is a kind of madness associated with slavish following of procedures and rules, and with imagining that life follows a

sort of mechanical logic. I am not, of course, in favour of abandoning logic, or attention to facts, or clear expression. In fact, as is often pointed out to me, making the case I have put forward in *The Master and His Emissary* depended on each of these. But it is, in any case, the *right* hemisphere, not the left, which is more attentive to reality, to the facts, and, as mentioned above, the right hemisphere is an important contributor to logic and language. Some elegant research into gesture and speech reveals that thought begins and ends in the right hemisphere, passing through the necessary staging post of the left hemisphere, where it is put into serial sentences. This follows a typical pattern in the way the hemispheres relate: the origins and the end lie in the right hemisphere's world, but it is greatly enriched by what the left hemisphere can 'unpack' along the way. That middle stage, of making the parts temporarily explicit, before they are once more reintegrated into the whole, is crucial. Yet it cannot be the endpoint. It is like learning a piece of music: first you are drawn to play it as a whole; then you break it down into bits and practice certain passages, and analyse harmonic transitions, and so on; but in the performance all that must once again be set ruthlessly aside, or the results will be disastrous.

So the meaning of an utterance begins in the right hemisphere, is made explicit (literally folded out, or unfolded) in the left, and then the whole utterance needs to be 'returned' to the right hemisphere, where it is reintegrated with all that is implicit – tone, irony, metaphor, humour, and so on, as well as a feel of the context in which the utterance is to be understood. To achieve meaning in the world requires what linguists call the business of pragmatics, which comes from the right hemisphere. If I say 'it is hot in here', your right hemisphere knows that what I mean is 'please open the window', while your left hemisphere thinks I am offering helpful meteorological data. The left hemisphere is adept at procedures, but sees them as ends in themselves. In fact, in the presence of right hemisphere brain damage, or abnormal left hemisphere activation, the left hemisphere may produce a sort of meaningless logorrhoea. This is a parallel to the processing of numerical data that I referred to above: the procedure is better carried out by the left hemisphere, but the meaning is better appreciated by the right.

Again it is more the left than the right hemisphere that furnishes our quick and dirty reactions to the world – rough and ready approximations

that help us get by, but will not do when the situation involves new information, or something that is not accounted for within its own formal system. It is the right hemisphere that is the devil's advocate. Newtonian mechanics is a good approximation in the everyday world, but not a guide to how matter actually operates outside that framework. It seduces us with its plausibility. We start to believe the world is predictable, because in certain circumscribed circumstances it seems to be so. But this is a delusion: the flap of a butterfly's wings in Barbados can cause a storm in China. This is the real world, not the apparently predictable one of the model.

The left hemisphere doesn't realise its own limitations. Neither does logic if unassisted. It doesn't know what it is that it doesn't know. Well, let me qualify that. If taken far enough, it will demonstrate its own limitations. As Pascal wrote, ‘The ultimate achievement of reason is to recognize that there are an infinity of things which surpass it. It is indeed feeble if it can't get as far as understanding that.’ Almost three hundred years later, Gödel proved that this is necessarily so, not accidental but essential truth. But to see this takes genius. Most people are completely and unreflectively seduced by the rhetoric of reason. And incidentally, some recent influential work in evolutionary theory suggests that this may be the whole purpose of logic – not to *understand*, but to persuade, to seduce, others and win a competitive argument.

Narrow logic, once given foundations, can carry on operating as long as you like. But it cannot ground itself. It cannot provide either its own first assumptions in any argument, nor, in more general terms, its own worth as a tool in reaching the truth. That depends on an intuition in its favour based on experience. And, of course, it is a hugely valuable tool. It just cannot tell you how to apply logic to the real world. For that it needs once more to go back to a sense of the whole picture.

Is it logical, or just a matter of faith, to believe that logic has no limits? Is it logical to rule out the possibility, understood for millennia, that there was a difference between the sort of knowledge that is available to *logos* and the sort that is available to *mythos*? Is it logical, or an assertion of faith, to assign reality to only one of these kinds of knowledge? Is it logical, or just a dogma, to assume that all will be understood, as long as we only carry on applying the model of the machine? Is there a cost to this approach, which,

though it makes us powerful manipulators, puts us out of touch with so much that gives life value?

Let me begin to sum up, before making some concluding remarks about where we are now. It used to be said, according to the popular cliché, that though the left hemisphere might lack charm, it was solid, down to earth, realistic and a sure path to the truth. But this is not at all the case. The left hemisphere is *not* in touch with the world. It is demonstrably self-deceiving, and confabulates – makes up a story, when it cannot understand something, and tells it with conviction. Michael Gazzaniga first demonstrated this in split-brain patients. Subsequent research shows that, unlike the right hemisphere, which tends toward self-doubt, it takes a distinctly flattering view of its own capabilities. And when, as in the case of a paralysed limb, it is confronted with evidence that all is not well, it refuses to recognise the problem. If forced to do so, it disowns it – won't take responsibility: the paralysed limb belongs to the person in the next bed.

It is *not* reasonable. It is angry when challenged, dismisses evidence it doesn't like or can't understand, and is unreasonably sure of its own rightness. It is *not* good at understanding the world. Its attention is narrow, its vision myopic, and it can't see how the parts fit together. It is good for only one thing – manipulating the world. Its world is a representation, a virtual world, only. It neglects the incarnate nature of human beings, reducing them to the equivalent of brains in a vat. It reduces the living to the mechanical. It prioritises the procedure, without a grasp of its meaning or purpose. And it requires certainty where none can be found.

Because the left hemisphere is not equipped to understand, but instead to manipulate, I have argued that the world is not ultimately the way the left hemisphere sees it, though that model has uses in the everyday world. But in fact the everyday world is not like the left hemisphere's models, either. The financial collapse was a perfect example of the following of algorithms that had been ‘proved’ to work in the abstract, and was repeatedly marked by self-referential loops of reasoning that cut it off from the real world outside the window. We kid ourselves that doctors, teachers, policemen are there to develop a ‘product’ which we can then ‘get’ or consume. But this is nonsense. We don't know beforehand what it is we are to go after and ‘get’, because it varies in every single case, and is dependent on a relationship between individuals. It is also not put into, but drawn out from, human

individuals. A doctor, a teacher or a policeman – or for that matter a shop assistant, a therapist, an artist, an actor, a librarian, a priest, a musician, a social worker or a potter – is, unlike a machine, not necessarily better for doing more, doing it faster and doing it according to a standard specification. In fact each of these machine-driven demands is almost certain to make things palpably, miserably worse – as we all have a chance to discover when we do the simplest things, including, God help us, ring up our bank.

Doctors are less popular now than they were in the days when my grandfather practised, when there were quite literally only six treatments that worked. But they gave time to a relationship and understood its power to bring healing: which meant that they were often to be found at the deathbed, useless though this might now seem.

In the world of research, we now have to be able to say in advance what we are going to find, and no one will fund a project unless it looks like having a chance of turning up a ‘positive’ finding, which in reality means that it must be something pretty close to what we already know. We are not prepared to trust; we feel we must micro-control. The aim is to increase efficiency by avoiding what are conceptualised as waste or error, but it assures only one thing: mediocrity. Sadly many of those doing the most interesting work in any field are increasingly having to do so outside the mainstream.

The left hemisphere tells us that the quest for meaning is meaningless, because it is not equipped to deal in meaning or understanding, but manipulating and processing. It scorns such questions because it can conceive only of the sort of clear, explicit answer that it rightly (from its own perspective) dismisses as unverifiable. This has consequences, of course, one being that we are fobbed off with the idea that successful manipulation of the world is all that matters. But both intuition and experience tell us that it isn't.

Despite the brittle optimism constantly proclaimed by advertising, and not infrequently by government spokesmen, the defining mood of the modern era is one of disappointment. That is not just my opinion: it's as near a fact as such things can be. People are measurably less happy today than they were fifty years ago, when we first started measuring, despite staggering improvements in material well-being. There is much to feel

proud of, of course, advances in conquering disease being just one example, and we live longer – but prompting the question, for what?

We know so much, we can make so much happen, and we certainly invest much in the attempt to control our destinies. And yet, if we are honest, we feel as though it ought somehow to have added up to – more than this. Meanwhile, around us we can scarcely fail to see the evident global degradation and destruction of what we now call ‘the environment’, but which is nothing less than the living world; the breaking up of complex, close-knit communities, and their ways of living in harmony with nature, that took at least centuries, if not millennia, to form; the substitution of a way of life that we have already determined in the West to be lacking in meaning, often aesthetically barren, driven by commercialism and morally bankrupt, devoted to the pursuit of pleasure and happiness, but delivering anxiety and systemic dissatisfaction; the erosion, and in some cases the trashing, of ancient artistic and spiritual traditions; and the loss of the sense of uniqueness as everything becomes abstracted, generalised, categorised, mechanised, represented and rendered merely virtual.

More generally, despite apparently having at least secured ourselves some leisure (for what, by the way?), we now find ourselves slaves of the machine that was to liberate us, working longer hours and longer years, while the work itself gets less intrinsically rewarding: more controlled, less skill-dependent, lacking an obvious purpose other than the accumulation of more wealth.

If I am right that we are living in the West in a culture dominated by the take on the world of the left hemisphere, how did this come about? Surely, you may say, it's because it has proved itself more successful than any of the alternatives. Well, that all depends on what you mean by success. It is, I repeat, a culture that is very good at using the world, as if it were just a heap of resource to further our plans. But are our plans necessarily wise?

I think its success can be attributed to several things. First, it makes you powerful, and power is very seductive. Second, it offers very simple explanations, that are in their own terms convincing, because what doesn't fit the plan is simply declared to be meaningless. For example, to declare talk of ‘consciousness’ a delusion or a linguistic error has the virtue of simplicity. It may not, however, satisfy the more sceptical among us, those who are not in thrall to our left hemisphere's way of thinking. If what does

not fit the model is just discarded we will never learn, never sophisticate our model of reality, and our understanding will come to a standstill where it is. Third, the left hemisphere is also, as I suggest in the book, the Berlusconi of the brain – the political heavyweight that controls the media. It does the speaking, constructs the arguments in its own favour. And finally, since the Industrial Revolution, we have constructed a world around us externally that is the image of the world the left hemisphere has made internally. Appeals to the natural world, to the history of a culture, to art, to the body, and to spirituality, routes that used to lead out of the hall of mirrors have been cut off, undercut and ironised out of existence, and when we look out of the window – we see more of the world we had created in our minds extended in concrete all around us.

The left hemisphere's values are those of utility and pleasure. But meaning cannot come from this linear project, any more than happiness can be pursued. Happiness and fulfilment have to be the by-products of something else, of looking elsewhere. This was a point made by Viktor Frankl in his great book, *Man's Search for Meaning*. If we espouse the view of the left hemisphere we will never find meaning, because it cannot understand. It has no way to break out of the system of signs. It does not understand the power of metaphor, through which alone meaning would come about. It is not in touch. That is not its purpose, not what it evolved to help us do. It evolved to help us manipulate.

And here, finally, is I think an answer of a kind to Barfield's question of why, though we know more and more about how to manipulate, we have lost all sense of the meaning of our world. The left hemisphere's world is reflexive, refers us back internally, not outwards to the embodied world. It does not care to turn its attention to the world outside the window, where, whatever it says on the piece of paper, Lieutenant Kizhe is a fraud.

Our problem is not that we have failed to find an answer to the question of the meaning of life that would satisfy the left hemisphere – in the nature of things, no such answer could exist. Our problem is that we have allowed ourselves to respond to this failure by deriding the question as meaningless. We shouldn't be trying to find a glib, explicit answer to it, since any such answer would be bound to be wrong. Meaning emerges from engagement with the world, not from abstract contemplation of it. It is no more to be contained in a statement or a proposition than when I say of my friend that

she means a lot to me, or that Schubert's C major Quintet means something that every living person should understand. It comes from the world as process, not from the world as a thing, and relies on patient and consistent attention to whatever might remind us of what meaning might be like. Whatever slight movement of recognition ensues might then begin to grow in and inform a mind not entirely closed to its existence.

Otherwise we invite the danger that what we might learn will be for ever lost, because we will no longer be capable of recognising it at all. We may, in terms of an image you will recognise, concentrate so much on getting our lunch, that we *become* the lunch. Only it is we that will have consumed ourselves.

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