

Prelude

This book grew out of courses I have taught on mind-body science, half a lifetime spent doing research into the causes and consequences of stress and my passionate interest in the workings of the human mind and the experience of love.

It would never have been written had I not met Humberto Maturana and begun to study his work. His ‘biology of cognition’ opened the door to a new way of thinking about what it means to be human and inspired my work over the last 20 years, culminating in the writing of this book.

There are many ways of explaining the mind in the body, but Maturana left no doubt that his was strictly a biological explanation. So far-reaching were the implications of his ideas that others described him as a philosopher, but he always claimed to be purely a biologist for reasons that are explained in this book. My own experience of research into the physiology and behaviour of stress in animals and humans convinced me that his way of thinking was a crucial breakthrough in our attempts to understand the relationship between an organism and its environment. Yet his ideas have not become main stream in cognitive science even now. The sidelining of this revolutionary thinking in biology makes an interesting story in itself, which will be told in the margins of this book.

The way Maturana spoke and wrote about love seemed to puzzle some interpreters of his work and failed to arouse any interest in others. Some of his published writing on love is still not available in English. The centrality of love in any explanation of the human mind has never been in doubt for me and I remain beguiled by the aesthetic charm that love adds to the story of our mind.

Anyone who has previously dipped into these waters will know that ‘pure’ Maturana is not easy to read or digest because it is so incredibly meticulous and, in his words, ‘always impeccable.’ My explanation is intended to simplify and also to extend his thinking into many aspects of everyday life so I have taken some small liberties with his wording and coaxed his concepts to reach a little further than he probably intended. I sincerely trust I have not demeaned or confused his ideas in any way and I hope that whatever my book may lack in ‘impeccability’ is more than compensated for in reading enjoyment.

This is not a ‘new-age’ enchantment with vague ideas that make comforting conversation on a warm summer evening. I am aware that the over-generalisation of important new scientific concepts has not always been helpful; misrepresentation of the Gaia Hypothesis is an example. The biological principles of autopoiesis and structural coupling that Maturana referred to as ‘fundamentals’ of his explanations are unambiguous and quite stark in their implications, but when understood, they point towards the possibility at least of a more peaceful and satisfying coexistence for human beings.

Where to begin?

This is not a trivial question because the way we proceed will be influenced by where we begin; in fact the starting point is the essential difference between Maturana’s explanation and most other explanations of the human mind. An Australian neuroscientist, Pamela Lyons, drew a slightly dubious, but useful distinction between anthropogenic and biogenic theories of mind, which she defined by their methodology. The word,

anthropogenic, connotes human origin and all theories are man-made, of course, but what she called the anthropogenic type takes human experience as the starting point and works outwards towards a more generalised explanation of mind. The biogenic approach starts with the basic facts of biology and works upwards to the particular human case, thereby asking psychological questions as if they were biological questions. Maturana did not begin with the question: what is the human mind? He asked first: how did we end up with this marvelous human mind? In other words: what are its biological origins and the principles by which it operates?

These two approaches are not mutually exclusive and may complement each other, but Lyons considered that, despite some limitations, the biogenic approach was superior because it had fewer empirical constraints and could yield broader conclusions. It is not surprising, though, that the anthropogenic approach has been far more popular because people who are interested in the human mind do not really want to be thinking about single-celled organisms or other mammals or even our immediate primate ancestors. Anthropogenic thinkers argued that the introspective experience of the human mind is the best and possibly the only guide to understanding cognition, whereas Maturana said that cognition could only be understood in biological terms. He said that cognition is a distinction made by an observer, which requires the kind of thinking developed in second-order cybernetics - a new and powerful tool for taking the 'observer effect' into account and dealing with the circularity inherent in using our mind to study our mind. This is explained in the opening chapters of this book.

Amongst the difficulties that biological explanations of the mind encounter is a long-standing scientific concern about a concept known as vitalism, which is the idea of an invisible life force that is often given a metaphysical interpretation and contrasted with the scientific principle of mechanism. The biological explanation outlined here is essentially mechanistic in its scientific detail so it requires no belief in any particular metaphysical force, but at the same time it is far from a complete description of the human experience of mind. I have extended Maturana's explanation by drawing attention to the importance of what is not known about the human mind, thus leaving space for other kinds of thinking by which anyone can add to the science as required, but not contradict it in doing so. I think it is important to recognise the limitations as well as the strengths of the scientific method.

I agree with Lyons that Maturana's ideas were ahead of their time because they did not connect with contemporary thinking in a cognitive science that was essentially concerned with computationalism, an exciting and pervasive field of activity that offers so many possibilities for controlling our environment and one another. We live in an untrusting and fearful society where the need to control seems so important that an ecological approach offering harmony within ourselves as living systems and as part of a larger living system is only taken seriously by a minority of people. I hope this minority will prove to be influential enough to prevent the global calamity that is inevitable if we ignore the biological principles on which our long-term survival depends.

My starting point is the biogenic approach because I think it points the way most clearly to improving our health, wellbeing and satisfaction through better use of our wondrous human mind.

Telling the story

If you were to believe we human beings have reached the point in our evolution where we can enjoy our mind and body fully and coexist in complete harmony with our world then you would have no need or desire to read more about mind and love. If you think we could do better, as most of us do, there is much to be said and done. Domsday scenarios of ecological disaster and continuing human suffering, from workplace stress to genocide, are easy enough to create and might even provoke a few souls into action, but I think it is of far more value to understand and employ the remarkable, untapped potential of the human mind. As a biologist I see our mind as it works with our body as the pinnacle of evolution providing an extraordinary range of possibilities for each of us to live a beautiful life; not without stress and challenge, but coping with them well; not without pain and sorrow, but with much happiness and satisfaction.

What is it about our thinking and our doing that is not working as well as it could be? Answers to that question form the content of this book. Each of us is different and therefore my account of how the mind and body works is heavily influenced by my personal experience. As I studied the minds of animals and humans in my research and particularly as I incorporated Maturana's biology of cognition into my thinking, I discovered major blind spots in my understanding of the mind. Since then I have shared my experience with many others and found that the same blind spots existed for them. In the end I identified seven distinct aspects of knowing, each with a characteristic blind spot associated with it. These seven aspects do not correspond exactly with the normal categories of cognitive science, but they incorporate the major findings from this science to date and engage with key philosophical insights along the way.

Telling about these seven aspects of knowing takes the form of a story, albeit a scientific one. We have identified that there is a problem and it demands some resolution, but we also know the task will not be simple. The territory we will traverse is very varied; it ranges from brains to bar rooms and back again or from 'neurons to neighbourhoods' as a leading neuroscientist wrote recently. A story is told in language and the terminology often used in cognitive science can be unhelpful to the general reader so I have taken the simplest possible approach without misrepresenting the scientific explanations involved.

A note about terminology

Maturana's language that he used in such a precise scientific manner includes several terms that have a more general meaning in common usage (*e.g.* love, conversation, culture) and I will take care not to use them in a confusing way. Some of the most commonly used terms in this field will not receive the same prominence here as they do elsewhere because this is a fundamentally different approach.

Consciousness is a common term today, but you will find only occasional reference to it in this book. It is not that I am ignoring its importance; just that it has too many layers of complication to fit easily into this story, which is intended to be simple and direct. Knowing is the term I use most in relation to our mind and I hope its meaning will grow in you as you read about it. Defining terms too early stultifies thinking about them and I am certain the human mind prefers a story that unfolds. What it is to know in the sense of being human is the subject matter of Maturana's biology of cognition and of this book.

To a biologist even a single cell can know something in a certain way. As you look along the evolutionary ladder other terms arise such as sentience, which is ‘having sense perception or experiencing sensation;’ from *sentire*: to feel. This tends to be associated with the appearance of distinct sensory organs (antennae perhaps, certainly eyes and ears) and introduces a very broadly used term, perception. Perception carries several different meanings in popular usage. In this book am referring to the physiological processes of sensory perception, notably seeing and hearing, as they predispose to cognition or knowing in human beings.

The common distinction between learned behaviour and instinctive or innate behaviour is also not one I employ; I prefer to regard them as different forms of knowing. For the same reason the various kinds of conditioning and learning delineated in psychology are not considered here either. Later in the book I hope you will come to appreciate the different way I have defined knowledge and intelligence as particular attributes of the way we use our minds together. My use of the term, love, as a certain kind of knowing, would also be best left to develop its meaning gradually as the story unfolds. My hope is that the basic terminology used in this book will be understandable without the need for furrowed brows and will be meaningful for everyone without requiring any previous specialised knowledge.

A note about philosophy, science, religion, truth, experience . . .

The content of this book includes some philosophy as well as the science and there is an important distinction to be made between these two different ways of using one’s mind. Philosophers develop far-reaching concepts or ideas and then talk about how these apply to different situations we encounter in our experience. These are not the truth; they are a particular way of using the mind in which the principle is paramount and the experience either fits or does not fit with the principle.

Scientists do almost the opposite of this. They try to have a completely open mind about what the principle or law of nature might be and they frame hypotheses, carry out experiments to test the hypotheses and use this evidence to prove that a certain mechanism is operating in that situation. This is not the truth, either, because science keeps coming up with new hypotheses and new evidence to disprove previous ones and thus yield new explanations. In both cases these ways of using our mind are ‘works in progress.’

Whereas scientific and philosophical ‘truths’ are always provisional, a religious ‘truth’ is a matter of faith and is not subject to argument using the human mind. Our mind has to deal with what it does not know somehow and undoubtedly the most important way, both numerically and historically, that we have done this is through religion. While the importance of not knowing is highlighted in this book and religious experience is acknowledged alongside philosophical or scientific experience, the institutional practice of religion is not considered here.

In this book I do not worship philosophy, science or religion. My highest regard will be for the concrete nature of your experience and mine. I will suggest that what we experience is ‘true’ in the sense that, if it is real for you or me, it cannot be denied by someone else just because they have not experienced it. We will see as we unravel different aspects of the mind that what we are explaining is always our experience and we

have only our experience with which to explain it. This is a maxim of Maturana's biological explanation of the mind. It is the essence of our knowing and what we do arises out of what we know.

. . . and music

Much as I have always loved science, I have loved music with an equal passion all my life. I never subscribed to the view that the arts and science had to be 'two cultures' or that a scientist could not enjoy and explore musical experience together with the meticulous explanation of how things work. Despite a lack of formal training in this regard, I have sung, played and composed music from an early age and my personal interpretation of Maturana's biology in this book is interspersed with the songs and melodies that I use in my teaching, which I believe enrich the scientific concepts because they contribute to our knowing. There is more to knowing than regurgitating someone else's language; you need to be able to 'hum their tune' as well.

Several recent books have discussed the neurobiology of the human obsession with music and its importance in the evolution of our mind. My story here includes many references to music because I have found that the best way to study the mind, experientially, is to talk about it a lot and sing about it sometimes as well.

The story outline

My first consideration and an underlying theme throughout this book is the way our mind affects our quality of life, which is the satisfaction, pleasure and contentment that life provides for us. This is introduced in Chapter 1, which also opens the way for the giddy task of exploring our mind with nothing but our mind to do so. Our inevitable blind spots and the importance of not knowing are introduced in Chapter 2 after which we investigate the process of perception, mainly as it involves our eyes and ears, in the next two Chapters. We will see that perception does not consist of passively receiving information that our brain will process like a computer; it is a very lively, looped connection that our mind must make with the world around us.

This physiology has consequences that we conveniently avoid when we go about the business of explaining something; and how we do love explaining things! The way we use language and the metaphorical structure of our knowing are explored in two more Chapters with a sojourn into the way the brain forms its neural nets, which become our patterns of connection.

At this point a metaphorical structure for my whole explanation is brought forth to guide the story as it wends its way from what is known towards the realm of mystery and unknowing – the far reaches of our imagination. In the same way that the seven chakras of the Eastern tradition of knowledge delineate a spectrum from the physical to the spiritual plane, the seven aspects of knowing I have identified from Western cognitive science provide some continuity between the known and the unknown. The human mind operates at the interface between the known and the unknown and dealing with uncertainty is our constant challenge in the modern world.

The explanation of our emotional mind is the heart of the book in more ways than one because it uncovers the story of our mind's progress from babyhood to old age and from

primate ancestors to humans of today. The nature of love, fear and other emotions forms an integral part of this story because it is now known that our human ability to think was created by our history of emotional interaction. The issue of trust and our need to live in present moments take us to another stage in this journey. The remaining aspects of knowing lead us into the realm of knowledge and wisdom and finally spiritual connection about which there is not a great deal a scientist can say.

In the final Chapters the practical benefits of this appreciation of our mind are discussed, particularly the insights it provides for managing stress, which is crucial for good quality of life. What has been covered in these Chapters is not the meaning of life, but it is intended to show how we can give life meaning.

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