
THE LITTLE BOOK OF BIG STUFF ABOUT THE BRAIN

The true story of your amazing brain

THIS BOOK
IS ABOUT
YOUR BRAIN!



Written and illustrated by
Andrew Curran Edited by Ian Gilbert



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Contents

<i>Foreword</i>	iii
Introduction - all it takes is love	1
Chapter 1 - where it all came from.....	5
Chapter 2 - a first look at the wiring.....	25
Chapter 3 - now we get down to the nitty-gritty.....	51
Chapter 4 - making those chemicals dance to a learning tune.....	73
Chapter 5 - the bits that do memory.....	85
Chapter 6 - why two halves make more than one whole	101
Chapter 7 - growing a brain.....	125
Chapter 8 - behave or else	135
<i>Reference list</i>	163
<i>Index</i>	175

Introduction

all it takes is love

This book is about the brain. I hope however it is mostly about who we all are, or at least how we arrived at being the person we are now. It is extraordinary to me how much understanding of myself and how much hope flows from my ongoing study of how the brain works. And perhaps the most surprising message for me from looking through billions of dollars of research is that the most important thing you can do for yourself and for others is to love yourself and others for who they are, because by doing that you maximise the brain's ability to learn and unlearn.

This book is about that understanding. It is a book about structure and function - and the immensely reassuring fact that there is nothing occult or sinister or hidden about our emotional selves - there is just a whole pile of circuitry that can be adjusted and changed and remodelled as required.

I like to take a simple approach to life and try to find easy ways to look at complex problems. And for us as humans our own brain is probably one of the most complex things we are ever going to encounter. So this book is about trying to make that unbelievably complex set of connections and interactions and cells and chemistry into something that can be understood at the most important

The Little Book of Big Stuff About the Brain

level of all - as a human being alive with potential and ready to change in the pursuit of growth.

The work underlying the hypotheses and ideas in this book started with a neurosurgical friend of mine in England about 12 years ago, and since then I have been adding (and subtracting) thoughts and concepts until the present book distilled itself out of the process. I have to say it is a work in evolution - ideas that I present in this book may very well be proven incorrect as further work appears from the many laboratories and theorists around the world who are so heavily involved in trying to understand our brains (with their own brains, which is a fascinating thought - the brain is the only organ in the body which we study with itself!).

In defence of this book however I would say that as I continue to read deeply within the scientific literature, I have yet to find anything that disagrees with the fundamental frameworks in this book. I am also encouraged by other sources of literature from outside hard-hatted science which also increasingly seem to support the most important message in this book - emotions and our emotional brains underpin everything we learn, and the more you have connected with another human being emotionally the more they can learn from you.

This is not a book about education in any narrow sense of that word. We are, in an absolutely fundamental way, an expression of how our brains are functioning. For every single one of us as human beings therefore to

Introduction: all it takes is love

understand how our brains work means we have taken another step towards understanding ourselves. There is also a wonderful sense of hope for me in understanding how our brains work. That comes from the fact that there is nothing about ourselves that we can't fundamentally change if we are prepared to do the work required. This means that no matter how deep the damage runs, there is still hope that it can (eventually) be unlearned - or at least diluted to a level where it no longer governs our lives. It is extraordinary to consider that we are, in every aspect of our humanity, from how we brush our hair to the deepest of our religious convictions, just sets of circuits firing to produce reactions in our bodies and minds. I say 'just', but of course this isn't a 'just'; this is a dance of unsurpassing beauty that chimes with the music of the heavens.

Let me just share with you a small piece of synchronicity that occurred while I was working on one of the original draft papers that represented the earliest stage of the ideas in this book. For quite a long time when I was preparing the draft, the title read 'How the Brian works'. It took me several months to spot the error - Microsoft Word spell checker of course does not recognise that the name Brian is not grammatically particularly useful in this sentence! The synchronicity was down to the fact that I have always been a huge Monty Python fan. If the supposition of this book is correct - that we all are the sum total of our brain in what we express as humans - then the seat of godhood is indeed, as so many religions

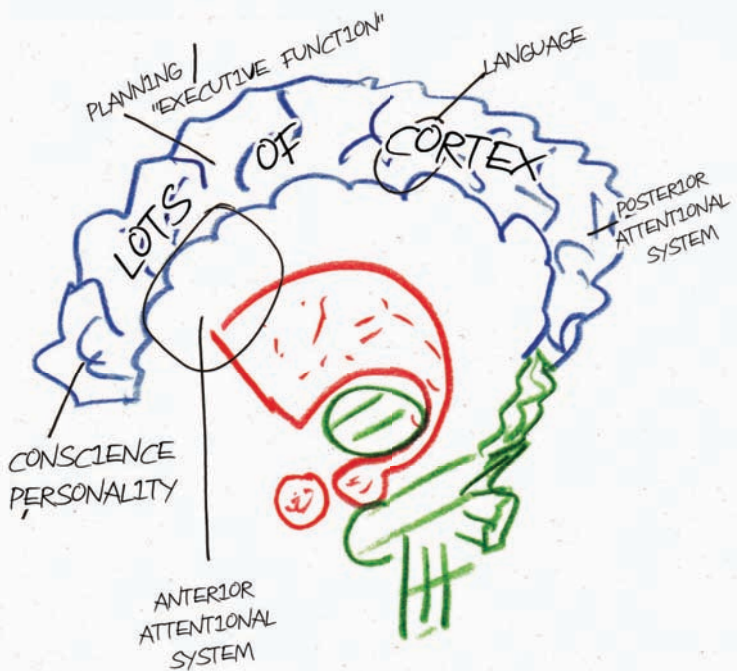
The Little Book of Big Stuff About the Brain

believe, within each and every one of us, waiting to be found as we progress through life.

I would also like to say at this stage that the model of global brain functioning that I am describing in this book is to describe the vessel and not the spirit. I personally see the spirit as being separate from our human existence and do not attempt to try to understand something that I believe to be beyond the compass of the human mind. I would also say that this discussion is describing the anatomy and chemistry - that it is not in any way supposed to be a comment on all the functions of the brain.

That being said I hope that you really enjoy this book. It is supposed to be a relatively light-hearted look at brain functioning, though it is based firmly in the literature. As you will notice I have included a complete bibliography with this work and these papers and books would be available to everyone either through the Internet (where they will mostly be paid for) or through your local library.

Thank you for reading this.



- ☑ = REPTILIAN BRAIN
- ☒ = LIMBIC BRAIN
- ☐ = NEOMAMMALIAN BRAIN

THE TRIUNE BRAIN WITH
DETAILS OF NEOMAMMALIAN FUNCTIONS

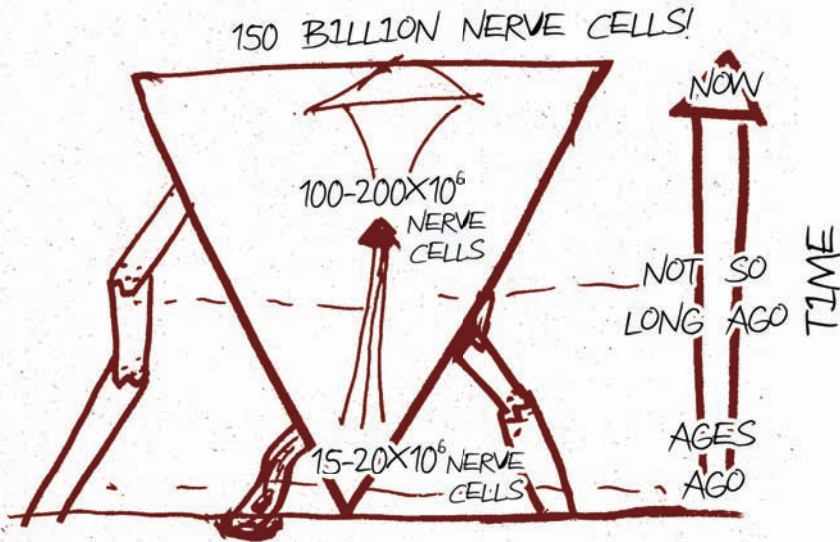
Figure 8

These very early ancestors of ours had developed a new higher centre in their brains.

The Little Book of Big Stuff About the Brain

new neomammalian brain brought with it was stupendous (Figure 9). Whilst completely accurate numbers are not really known the reptilian brain probably has 15 to 20 million nerve cells, the limbic brain in the region of 100 million nerve cells and the present best guess for the number of nerve cells in a developed human brain is probably in the region of 150 billion. (This is your brain I am talking about. Reach up and feel your skull - in there is your brain - and that brain has 150 billion nerve cells in it! How extraordinary is that!) These numbers also throw into relief the massive steps forward that evolution took in increasingly shorter periods of time. The reptilian brain took probably two and a half billion years to reach its maximum development, the limbic brain took a further 200 million years and the new massive increase in cortex only took four million years! I find that absolutely extraordinary! Each step, despite meaning a massive increase in the number of neurones, took a shorter and shorter time to develop.

So now my story has reached what your brain is now: a deep lying, primitive reptilian brain, a much more complex emotional limbic brain and now this extraordinarily complex *neocortex* (meaning, very simply, 'new cortex') all working together as an integrated whole (Figure 1). So what difference did this massive increase in nerve cells make? The answer is that once again it increased the number of complex behaviours that our early ancestors and finally ourselves could perform (remember, the more nerve cells you have the more complex your behaviours can be).



AN IRISH* PYRAMID DEMONSTRATING
THE MASSIVE INCREASE IN NERVE
CELLS.

* I'M IRISH. I SHOULD KNOW

Figure 9

The increase in the number of nerve cells that the new neomammalian brain brought with it was stupendous.

The Little Book of Big Stuff About the Brain

I mentioned earlier that the reptilian brain is capable of 27 different complex behaviours, and mammals are obviously capable of probably a hundred. Our brains however are capable of thousands of complex behaviours. Among these behaviours is the almost certainly unique human ability to be able to turn our thoughts inwards and observe ourselves and our own mental life. This is an extraordinarily powerful observation because it is only through this ability that you can understand your own emotions and hence the emotions of others. This is the central part to a great many of the techniques used in emotional healing. To quote P. D. MacLean, this evolutionary development made possible *'the insight required for the foresight to plan for the needs of others as well as the self - to use our knowledge to alleviate suffering everywhere'*².

And this gives the first inkling of how understanding brain function and structure can help us with healing ourselves from emotional damage. Evolution has provided you with a tool to untie your own and others' emotional knots. But to make further sense of that I want to explain how those knots got tied in the first place, and what 'tying an emotional knot' means at a structural level in your brain. I will deal with that whole concept later on. First let me finish the present discussion.

This ability to look inwards on your own thoughts is 'thinking about thinking' or *metacognition*, and we humans are probably unique in the living world in being able to do this. For the first time in evolutionary history your brain was consistently capable of introspection and all the

Chapter 1: where it all came from

unbelievably complex higher-level functioning that we take for granted. It is almost certainly these higher functions that made us first start to use tools and to develop a sense of past and future, which even the closest primates seem to have in only the most primitive forms.

So that is the story of how you ended up as the proud owner of the brain that you have within your skull. Understanding how these three different evolutionary parts of the brain work together is the job of the rest of this book. It is through understanding this that you can start to answer the questions that all this raises about emotional health. I believe that if we can understand the processes within the brain by which damage occurs, then all of us may be better equipped to heal that damage.

The first thing I want to do towards this deeper understanding of how your brain works is to answer the question that I have already brought up several times - why does increasing number of nerve cells equal increasingly complex behaviour? In the next chapter I will start to take this apart as we meet for the first time the concept of *templates* and *neural patterns*.

THE LITTLE BOOK OF BIG STUFF ABOUT THE BRAIN

is the user's manual that your brain didn't come with

What it is, how it works, what it looks like, where it came from – it's all here in this light-hearted and easy-to-read little book that will guarantee that you will never think about your own thinking in quite the same way ever again.

Whatever role you have in life, every action you undertake, every thought you entertain, every memory you hold, every hang up you possess, every quirk, foible, idiosyncrasy and knack, it's all the result of chemistry and electricity working across a network of squidgy organic matter that you have helped shape throughout your life.

So, enjoy this little book about your amazing brain, but remember, as someone once said, 'If our brains were simple enough to understand them, we would be too simple to understand them'.

Dr Andrew Curran is a practising paediatric neurologist in Liverpool who is also committed to using his extraordinary knowledge of the workings of the human brain to make a difference in the educational experience of all young people. He's involved with Manchester University's Department of Education in developing research ideas looking at the use of emotional literacy in our classrooms.



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