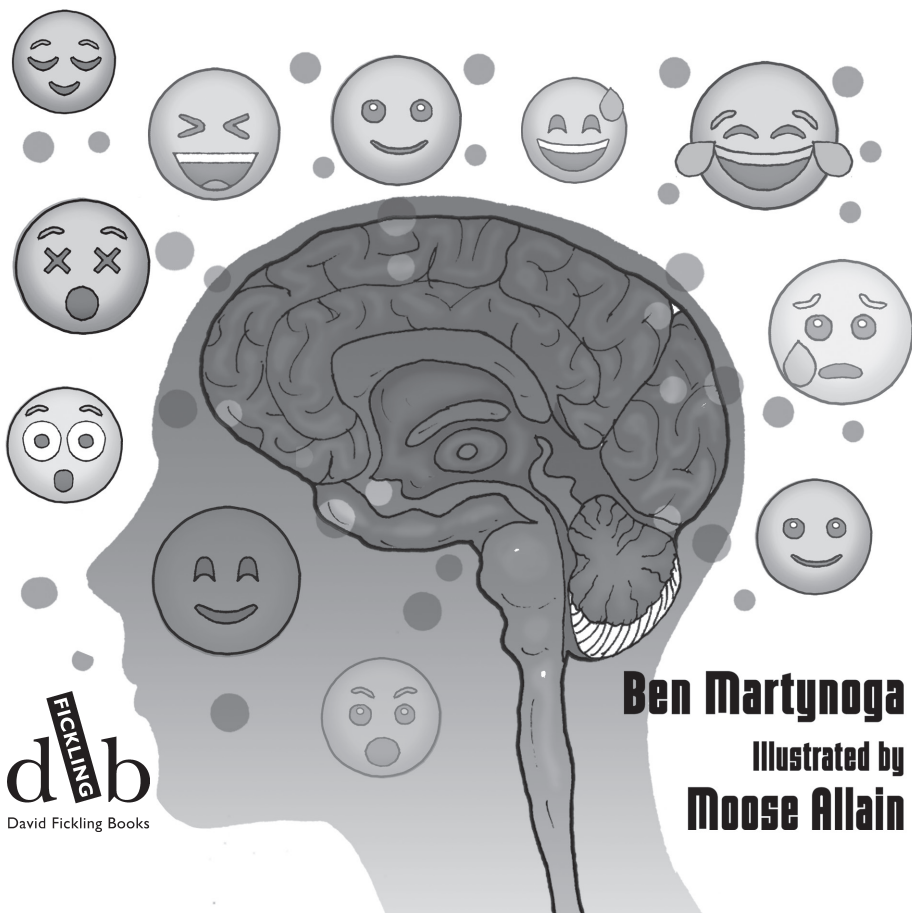


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THE BRAIN

What Goes On Inside Your Head?



FICKLING
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David Fickling Books

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Illustrated by

Moose Allain

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A Whole Universe Inside Your Skull

Picture the scene: you're finally knuckling down to finish the project you've been putting off all week, it's due in tomorrow, and you've just about got time to do a decent piece of work.

You open your laptop and start tapping away when – ‘bing’ – a message arrives.


It's from your friend Ash: ‘Amazing! Got returned tickets for the gig tonight! Come with us!!!’

Oh wow! You tried everything to see this band, but tickets sold out months ago.

. . . But . . . Why tonight?

It's decision time. Do you play it safe, stay home and study, or seize the moment and head to the concert?

Chances are you've now got a heated debate starting up inside your head, with different ‘voices’ yelling things like:



Woohoo! Of course you're going!

No way! The deadline is TOMORROW - and you need a good grade.

Stay up late and write the report after the gig!

Don't be daft. You need your sleep!

Hah! Imagine telling everyone at school tomorrow, though!

Yeah, but your parents are going to flip out if you get a bad report.

Besides, it's Tuesday. We never go out midweek.

But it'll be epic!

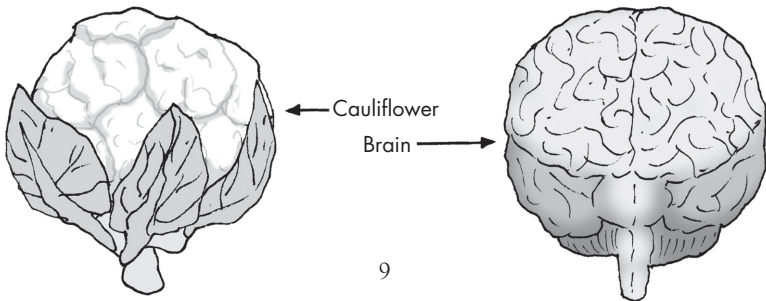
OK, OK, calm down everyone! Let's weigh up all the pros and cons.

It's noisy in there, right?! But where the heck do those vivid sensations and jabbering voices actually come from?

Your brain, of course. We'll return to this conversation later, to find out exactly how – and why – your brain can end up arguing with **itself**. But right now, the key thing you need to know is that your skull contains one of the most complicated, creative, awe-inspiring and bamboozlingly powerful objects in the universe!

That said, to be honest, the human brain is kind of unimpressive to look at. Roughly the size and shape of a large cauliflower, it's a dull greyish pink in colour. And if you jabbed it with your finger, it'd be like prodding a massive soft-boiled egg.

But, somehow, that fleshy-pink, bulging, slightly wibbly cauliflower is the most essential, irreplaceable part of your entire being! As we'll see, it's in control of almost every part of your body and practically everything you **think, feel** and **do**. It can make your mouth water at the thought of a biscuit. And, at the same time, thanks to its amazing powers of memory and imagination, your brain can turn itself into the best time-travel machine ever invented.



So if, for any reason, you're feeling a bit stupid or down, or you're just having a rubbish day, try to hang on to this fact: your brain is one of the brightest stars in the universe. In a way, it actually **contains** the entire the universe.

In fact, it was a poet called Emily Dickinson, not a brain scientist, who first pointed

Eh?



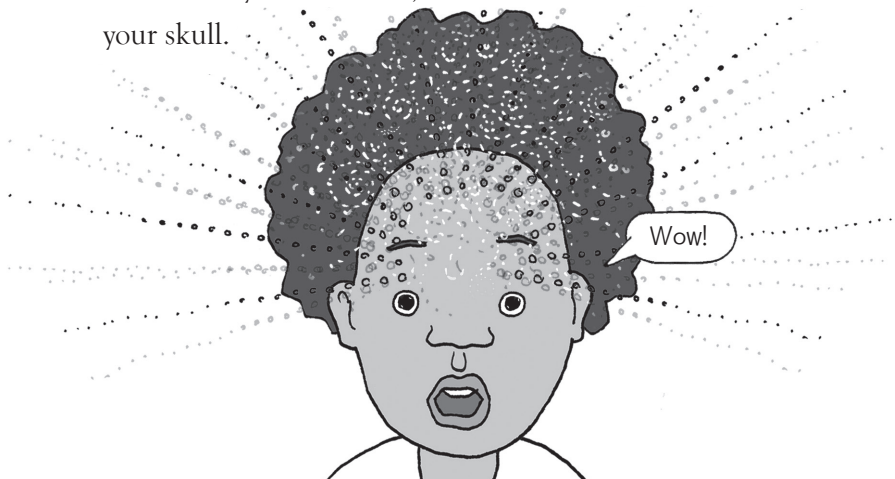
this out, way back in 1862:



*The Brain—is wider than the Sky—
For—put them side by side—
The one the other will contain
With ease—and You—beside*

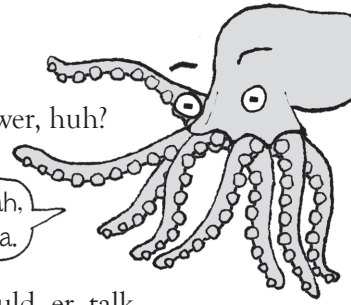
What she meant was that absolutely **anything** and **everything** that you can sense, feel or even just **imagine** must, somehow, exist **inside** your brain. And that includes the universe itself! Since you can **think** of it as a 'thing' - an almost unbelievably massive one, sure - it must be able to fit inside your skull.

Wow!



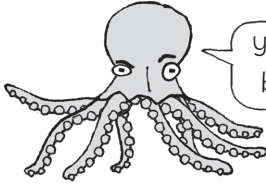
Not bad for a wibbly, greyish-pink cauliflower, huh?

Yeah, yeah, yeah. Blah, blah, blah. Yadda, yadda, yadda.



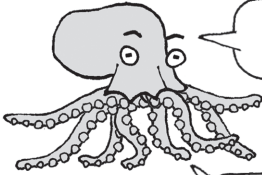
Um . . . hi, Octopus. Didn't realize you could, er, talk . . .

You lot aren't the only intelligent beings on this planet, you know.



We-ell, we do have the most complicated brains in the animal kingdom.

Whatever. You've only got one brain, though. We've got nine.



Really?!

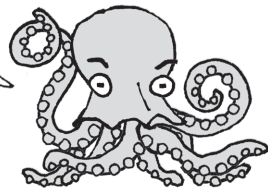
We use our brains for learning, communicating, using tools, cracking puzzles and generally having a blast, just like you.



Hmm. Got to admit, that does all fit with the latest brain science discoveries about octopuses. So, since you're such a smart creature, could you stick around and help us figure out how brains actually work?

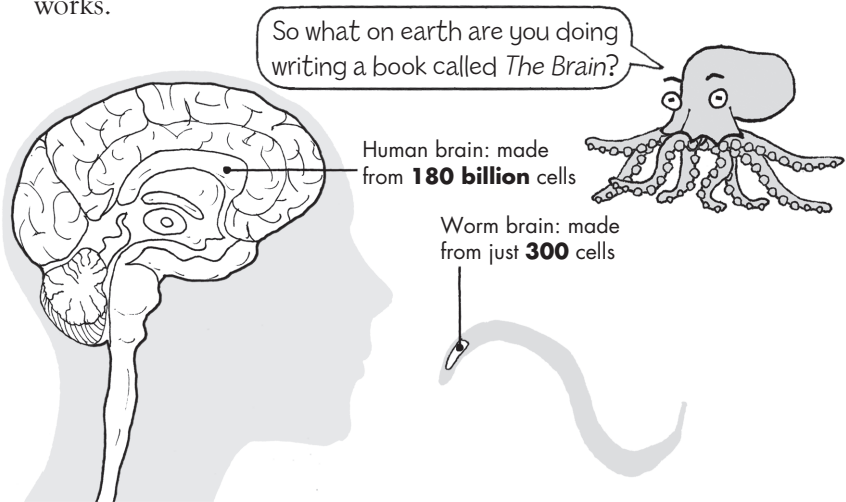
Sure . . . always happy to lend a hand - or eight - to a friend in need.

Great.



OK folks, before we plunge on in, there are two things you should know about brain science, or *neuroscience* – best to use its proper name since you’re going to hear a lot about it in this book:

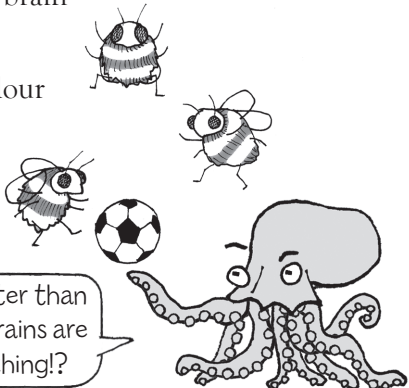
Number 1: Despite centuries of research, nobody truly understands how a human brain works. In fact, nobody’s even figured out precisely how the tiny, much simpler, worm brain works.



It’s not that *neuroscientists* are clueless. Far from it; they’ve made all kinds of amazing discoveries over the years – and more are coming thick and fast today. It’s just that the things we ‘know’ about the brain are still massively outnumbered by all the ‘unknowns’. But that’s exciting – much of the brain is a huge, mysterious world, just waiting to be explored.

Number 2: Some of the neuroscience discoveries you're going to encounter in this book might sound plain daft – for example:

- Your brain is stuck in the future.
- Your toes don't feel pain.
- A newborn baby has more brain *cells* than you do.
- Everyone might see the colour blue differently.
- Bees can play football.



And what could be dafter than the idea that human brains are always best at everything!?

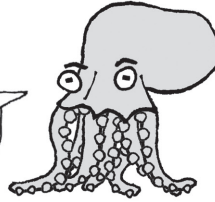
Ahem. Sure, we'll definitely be looking at some of our brains' weaknesses, as well as the astonishing powers of other kinds of brain – including yours, Octopus.

But if any of you find yourselves doubting anything you read in this book, that's great! You're thinking like a scientist. Because science isn't really about proving 'facts'. Doubts and mistakes are massively important – as we'll find out when we look at how brain research has progressed over the centuries.

And brain researchers all have one thing in common: intense curiosity. A characteristic it seems you share too. After all, your brain is curious enough to want to understand **itself**. Why else would it have instructed you to pick up this book?

All human brains have a raging hunger for learning and thinking. Each day your brain gorges, non-stop, on memories, feelings and ideas – and, believe it or not, every single one of them leaves a lasting imprint inside your head. And that means – just like faces and fingerprints – every human brain is truly, utterly, wonderfully unique.

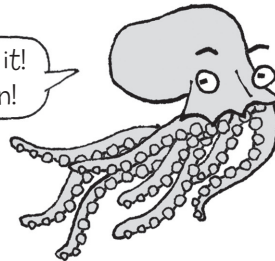
Uniquely weird and unpredictable, you mean!



You say that like it's bad thing, Octopus! And, it's true, our brains can cause us strife when we get anxious, depressed or suffer other *mental-health* challenges (we'll tackle these in Chapter 8). But maybe our brains' quirks and sudden shifts of emotion are part of what makes life worth living?!

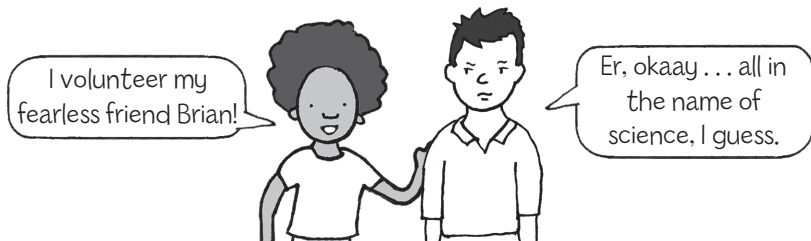
OK, if we need to get to grips with the massive, mysterious cauliflowers inside our heads, we've got a lot to cover. First up, we're going to get our hands on an actual brain, to see what it's made up of and how it all fits together. Then we'll get an even closer view of the nitty-gritty details by venturing inside it.

So, let's get on with it!
Catch me if you can!



CHAPTER 1
How the Brain Works
PART 1: GETTING TO KNOW BRIAN'S BRAIN

So, your brain looks a bit like a cauliflower. But what is it made from and how does it work? Anyone willing to let us take out their brain so we can have a proper look?



Great! And don't worry, you'll hardly notice it's gone.

