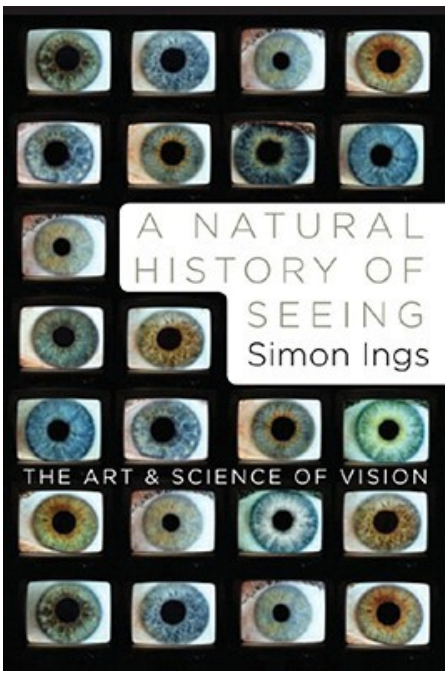

A Natural History of Seeing: The Art and Science of Vision

Simon Ings

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A Natural History of Seeing: The Art and Science of Vision Simon Ings
"Novelist and science writer Simon Ings sets out to solve mysteries of seeing, taking us through the 600-million-year history of the eye. With the help of a beguiling mix of illustrated optical illusions and puzzles, anecdotes, mathematics, and philosophy, Ings reveals age-old mysteries from how humans perceive color to Woody Allen's ability to raise the inner corners of his eyebrows." A Natural History of Seeing delves into both the evolution of sight and the evolution of our understanding of sight. It gives us the natural science - the physics of light and the biology of animals and humans alike - while also addressing Leonardo da Vinci's theories of perception in painting and Homer's confused and strangely limited sense of color. Panoramic in every sense, it reaches back to the first seers (and to ancient beliefs that vision is the product of mysterious optic rays) and forward to the promise of modern experiments in making robots that see.

A Natural History of Seeing: The Art and Science of Vision Details

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From Reader Review A Natural History of Seeing: The Art and Science of Vision for online ebook

Squishyent says

This book is a very fascinating and enjoyable read. The author covers a broad array of vision-related topics: how we see, what various other species can see, how vision evolved, how people figured out how eyes work, and so on. Interspersed with all that is a charming story about all the people involved, presented as real people. His explanations about how eyes develop in babies are told as the story of his daughter's growth. The various discoveries presented include enough humanizing details of the people behind them that you can relate to and even like them. This is far from a dry technical manual, or a list of names and dates. It's a tale of human curiosity at its best, driving discoveries over centuries to learn how our own senses function.

Abbi says

Favorite tidbits:

The occasional rapid eye movements that accompany our dreams have at least one very practical purpose: they feed the front of the eye.

Daylight on Earth is a million times stronger than dim starlight, and night rapidly follows day. Eyes must not only feed on light; they must respond to extremes of glut and starvation. ... Our pupils, evolved for daylight living, dilate to four times their constricted width when the light grows dim, granting a 16x increase in their light-gathering powers. ... Although we lack certain exotic adaptations that can aid nocturnal vision, we can still detect light that is a billionth the strength of daylight. This is sensitive enough that, in good conditions, we could see the flame of a single candle 17 miles away.

A camouflaged object in dappled light is immediately noticed by a color-blind person: its distinctive sheen gives it away.

The grass IS always greener on the other side of the fence, because individual blades of grass are more clearly seen from the side than from above.

The eye exists to detect movement. Any image, perfectly stabilized on the retina, vanishes. Our eyes cannot see stationary objects, and must tremble constantly to bring them into view. ... Just 1 degree away from the very center of my vision, I see things only 1/2 as well. 5 degrees off center, my "visual acuity" is quartered. Beyond that 5 degree radius, I can no longer be sure of what I am seeing. At 20 degrees from the foveal center, my visual acuity falls below the common legal standard for blindness. ... Were every photoreceptor connected to the brain by a nerve fiber, the optic nerve would be as thick as the eyeball, making it impossible to move. ... There are more than 40 different types of nerve cell in the retina, each with their own "field of view." There are cells which edit the responses of photoreceptors and bipolar cells that compress that information by factors of 12-1000, depending on the light level; no one knows how this adjustment is made. Bipolar cells pass their information on to the 6 layers of ganglion cells, each layer connected with the others by at least 30 different types of amacrine cell. There, the information is once again savagely edited, until only a million signals remain to be carried along the optic nerve to the brain. The lateral geniculate nucleus treats the information it receives much as the horseshoe crab's retina treats light. Contrast is everything. I

compares signals from cones & enhances the differences.

Evolution cannot un-invent. The basic building blocks of complex structures like the eye were available long before they were recruited for sophisticated tasks like vision. Human lenses are derived from proteins that protect bacteria from rapid rises in temperature. The flexible guanine mirrors which make a cat's eye glow in the dark also gas-proof the swim bladders of fish. The red & yellow pigments in the eyes of insects also color the wings of butterflies. ... And is it not ironic, that in 538 million years of natural selection, eyesight should evolve from a simple light-detecting cell, pass through numerous variations and generate countless different ways of seeing, and come at last to serve as the dominant sense of the planet's dominant species - an animal who sees only what it wants to see?

We are the products of editing rather than authorship.

Many women produce monsters: they just never know it. Human infants whose body plan is in disarray rarely make it out of the womb alive; really gross errors crop up so early in the development cycle that the fetus is spontaneously aborted long before the mother is aware of being pregnant. Over 1/2 of all pregnancies go disastrously wrong - we just never notice them.

The eyes of men converse as much as their tongues. ... How can we fail to shudder at an eye that cannot weep, turn, or even blink?

A hedgehog can attempt to seduce a toilet brush, and its long-term breeding chances are not much affected. For a human being, a mistake of this scale would be catastrophic. ... We are the moodiest animal on the planet, deploying, with great finesse and subtlety, every waking moment, behaviors that in other animals are crude, last-ditch, and above all, short-lived bursts of anomalous behavior.

Every light is a shade, compared to the higher lights, till you come to the sun; and every shade is a light, compared to the deeper shades, till you come to the night. ... The most isolated societies do little more than distinguish light from dark. As societies emerge into the wider world, red is the first "true" color they identify, followed by a greenish-yellow. Green & yellow are invariably distinguished before blue is distinguished from black. The rest follow in no particular order.

Ben says

So much fascinating stuff in here. Some of it was a bit too complex for me to follow, but at least I know why Bees bump into walls so much now. The writing style is fluid and easy to read but factual and authoritative at the same time, and with an infectious curiosity and fascination for the subject matter. Definitely up there with some of my favourite science writing.

Katherine says

This book probably deserves another star but I didn't "love" it so I gave it four instead. The reason I didn't love it, really can’t be blamed on Simon Ings. I think he has actually accomplished something quite amazing. The fault lay in my being not quite knowledgeable enough going in, so that bits of it were a bit of a slog. I will confess that some pages, I read twice and then just shrugged and moved on. Other bits, however, were

absolutely fascinating. I found the chapter on how we perceive colour particularly interesting.

This book is quite broad in scope, despite being entirely about the eye, so those looking for specific, in depth information in any one area will probably need to go elsewhere. If, however you are interested in evolutionary theory generally, the history of our knowledge of vision and the role that it plays in our lives (and the lives of other beasts as well) and want something meatier than your average pop science offering, then this is your book.

Ellen says

"When I look at the sculpture, I sense the presence of a three dimensional object. when Keller touches it, so does she...Keller can curl her fingers around the object, whereas, to perceive it from different angles, I have to move my body."

"Most animals care very little for the substance of things. They are much more interested in where things are going. If it moves, it matters. Moving targets may be threats, meals or mates."

"Our eyes interrogate the world, and through our eyes, the world announces itself."

"If everything we see is a representation of the world, then seeing becomes just a representation. If I cannot apprehend the world directly, but can only perceive representations of it, then where exactly am I, and where, exactly, is the world?"

"'Bodies do not produce sensations,' he wrote, 'but complexes of elements (complexes of sensations) make up bodies.'"

"Our bodies are not the same as they were yesterday."

"Only if we rob an object of all context can the eye be fooled. A full moon at night, lit by the sun we can no see, and suspended in the non-reflecting vacuum of space appears white - yet moon dust is black."

D?nnis says

This one sat long on my bookshelf until I had a heated argument with some friends regarding the proper color for fire-extinguishers. They insisted it should be only red, since this is the color majority of animals are primed to see best. However, in the absence of evidence I refused to take such claims at face value. Thus I reached out for the dusty tome… and found justification for my doubts. Besides this answer I found a boundless source of information about vision and eyes. The author possesses erudite knowledge of the topic, draws on numerous and very appropriate examples, and presents all these revelations in a very structured and digestible manner. A real eye-opener.

Cate says

A Natural History of Seeing
Cate Desens

As human beings, we rarely stop and think about how we experience the world around us. We're even less likely to ponder our senses: sight, hearing, touch, smell, and taste. And yet, that's exactly what Simon Ings does in his book A Natural History of Seeing. The book is a self-described combination of "the science, history, philosophy, and mythology of how and why we see the way we do." The unconventional layout of the book is what initially attracted me. He takes the reader on an in-depth whirlwind of sight, combining it with heady doses of my favorite subjects, so that it reads nothing like a regular nonfiction book. Ing's voice shines through his work- he is so obviously excited about his subject matter, and it was infectious, making me want to pick up the book and learn more.
My overall reaction to this book has been very positive. However, I would not recommend this book to all readers. It can be hard to follow, and at parts the writing gets very technical. But if you like nonfiction books- like me- then this book could be a great choice for you because it examines a fascinating question and it incorporates lots of bits of philosophy and prose. If you do decide to read A Natural History of Seeing, I would recommend you make sure you have a lot of free time set away because it takes a little bit longer to read than a traditional novel- but you'll be rewarded for your extra effort! The book was utterly absorbing. I would definitely read another one of Ing's books in the future.
Despite the cons of the book, I would say that it is far more absorbing than any traditional textbook. Ings brought to life what could have been a very dry subject matter. There were cool facts in nearly every chapter- everything from why Homer may have been color-blind to how Leonardo da Vinci developed his theories of perception. Ings incorporated emotion into his book, as well- this is clearly evident in his statement, "I have dedicated this book to my daughter. Her eyes inspired it…" (Ings 13.) Ings's book, A Natural History of Seeing, is a smashing success on two fronts: it relates pure scientific knowledge to the reader, and does so with surprising ease and charm.

Kathy Sebesta says

Seems I sent quotes from this book over and over, it was so full of things that made such sense, if you just thought about it that way. Wonderful and highly, highly recommended.

Just one excerpt:

"No big animal sees far into the ultraviolet. The larger the eye, the more light it can take in, and there must be a point at which the potential damage ultraviolet light can do when focused outweighs its usefulness. Many birds and insects have evolved to see ultraviolet wavelengths, but they live for only a short time, dying before the damage becomes significant. Large animals have much longer lives, and their exposure over years could destroy their eyes' photopigments and turn their lenses cloudy [cataracts]. ... The particular, and unique

defence evolved by primates, including human beings, involves a yellow pigment that absorbs ultraviolet light almost completely. This 'macular pigment' covers the whole fovea, which is why it turns a bright lemon-yellow when the retina is exposed to the air .... By far the most effective ultraviolet filter in the human eye is the lens. Our lenses are extremely efficient filters of ultraviolet light, reflecting our daylight habits, but with the lenses removed, human eyes can perceive ultraviolet wavelengths, something which, though barely wondered over, must have been apparent to ophthalmic patients for at least two thousand years. In the first century AD, Roman doctors routinely displaced and removed irreversibly swollen and clouded lenses from the eyes of their patients. The condition they were treating, cataract, is still with us, and still irreversible. Since 1947, it has been possible to replace the lens with a plastic substitue. Before artificial lenses were available, however, those who had their lenses removed by surgery found that they could see into the ultraviolet; blues were clearer and richer, and ultraviolet light, energetically triggering every photoreceptor it hit, was a blueish-white wash.

Todd Martin says

Eyes have independently evolved between 40 and 65 times along different evolutionary pathways. Solutions to the problem of sight has resulted in eyespots in simple organisms, compound eyes in insects and camera like eyes in vertebrates (like us!).

A Natural History of Seeing: The Art and Science of Vision examines the science and natural history of vision as well as the scientific theories and discoveries which led to our current understanding of the eye.

Ings spends a little too much time covering science history than I would have liked, but otherwise the book is interesting and informative.

Barney says

This is a book in two halves. The first half covers the evolution and development of the eye. The second covers how it is the eye functions and how animals see. I found the first half utterly fascinating from the beginning. The prologue covers the development in the womb of his unborn daughters eyes and vision, followed by a short description of how the eye ages. According to the author, when we hit 70 to 80 years of age we will have vision much like that of a 3-4 year old: blocky, fuzzy. That is if we do not fall victim to macular degeneration. The last 1/3 of the book did not hold my interest.

The book is full of fascinating tidbits. Here are the ones I thought most interesting
1. Rates of myopia (short-sightedness) are increasing in the developed world, because of the environment. Glasses have been in use since the 1280s. We use microscopes and telescopes. In 1996, 60% of people 23-34 in the US (this reporter just made the low end of that scale) were shortsighted.

2. Those "compound eyes" that bugs have got, what freak us out in bad B movies, are actually far inferior in design to ours. If humans had compound eyes, they would have to be roughly 3-4 feet tall. "If the eyes of a honeybee were much bigger, it would be too heavy to fly." So take that, you freakshows. However, insect eyes are optimized for flight.

3. The bloated sacks of 8-eyed ugly damnation that are spiders are greedy little beasts. Four of their eyes are high resolution orbs "that see as well as small rodents". This thought will keep me up for several weeks. The others "scan for movement on the sides." So this is why those little fuckers scuttle when you move. They are scared! Take that, you freakshows. Spiders can't fly (I hope they can't. Now that is going to keep me up for weeks) so they evolved non-compound eyes. Smart little buggers.

4. "Being human is a skill that is taught, and we do it first through our eyes." A baby spends more time looking at the eyes of their mother than any other part of the face. We learn to read other people's emotions (and manipulate them) through glances, looks and stares. Baboons do this as well; they are the masters of the old look-over-the-shoulder trick to make someone thing that something is behind them. Eyes are needed to express complex emotions.

5. We humans are pack animals, and this is why the eye is so expressive. "Primates watch each other all the time...and pick up visual cues from the dominant individuals." What makes a dominant individual? They are simply attention hogs. So, we primates have spent millions of years living in terror of what the dominant individuals are thinking. Terror keeps our eyes moving and our brains working.

What this means is that there is a bald, bespectacled professor living in 1770s Virginia who is quite happy in his schoolhouse where he can do his job and not be bothered. But, when the head of the school walks in, it is "yes sir" and "no sir" and "right away sir" or overdone laughter at bad jokes. Shit hasn't changed in 230 years. If Homo Habilis had glasses and was bald, he'd be a Homo Erectus. I was probably scared of my boss then, too. "How many rocks did we pick up today?... "We see you didn't make many flakes. Everything all right?"

Simon Ings is a technology writer, and admits he is not interested in "the consciousness of seeing". I was a little disappointed, because I wanted to know whether or not my cat actually "appreciates" looking out the window at small birds. What do cats think? I don't know. Neither does anybody else, which is good.

Khris Sellin says

This was a great read, and I really learned a lot. Though there was a lot of scientific/technical jargon in this book that was way beyond me, it really is amazing all that is involved in SEEING. It's a wonder things "go right" as often as they do.

And thank god, for dummies like me, there were lotsa pictures, diagrams, and optical illusion type tests.

I thought it was interesting that there was a time when scientists spent a lot of time (and money) studying optograms, which is a faint image stamped on the retina for a brief period after death. They really believed they could look at these as an aid in determining how someone died or what they experienced right before death. (Sounds like a movie I saw once...)

The last few pages I found most interesting, though, bc it was about studies conducted as to whether people only see what they want to see or what they've been trained/told to see or expect to see. One of the studies I had actually seen on TV a few years back, where they showed a film clip of two teams playing basketball - one team wearing white, one team wearing black. The viewers are told to watch to see which team passes the ball more often. OK, so you count. Then the viewer is told, OK, now this time, just sit back and watch the game and don't worry about counting anything. Do you see anything you didn't notice before? Well, YEAH,

someone in a gorilla suit wandering right through the middle of the game! And stopping and waving at the camera! Huh? How did we not see that the first time???

El says

I'm a dork for eyeballs. I like my eyes, I like other peoples' eyes. It's the "doorway to the soul" and all that jazz, and I really dig it. I like to contemplate whether or not the color green I see on the tree outside my house is the same color green that my boyfriend sees. Or is his color green more in line with the color I call blue? These sorts of things can keep a kid up at night. The anatomy of an eye has always intrigued me, in one of those "I'll never completely get it" sorts of ways. Like astronomy. Or why men can't seem to put the roll of toilet paper on the thingy the right way.

So when I saw this book in the clearance section of my local reading-hole I was pretty stoked. A book about eyes? Hellz yeah! I want to know why and how we see the way we do!

It's a good read, but at times still somewhat a bit out of my range of knowledge. And it's Canadian. Very Canadian, which makes me think that Canadians really do speak a different language than the rest of North America. I had to re-read some sentences more than once; I couldn't tell if I was having trouble understanding what Ings was saying, or if the sentence was riddled with typos. A few times I just gave up and moved along, hoping somewhere in the book Ings would tackle the subject of how someone can look at a sentence of familiar words and still not make sense of it. (Spoiler: He didn't.)

The most interesting part of the book was actually pretty brief. (I excell at finding some throwaway bit of information and totally getting stuck on it and wanting to know more about that one thing that apparently no one else cares about.) In one of the Goodreads group I'm a part of some people have been discussing Homer's The Odyssey and one or two members commented on how strange Homer's description of different colors were. The sea is always "wine-colored", etc. Interestingly enough, Ings touches on that in one of his chapters and says,

> Have special pity for anyone translating an ancient Greek text. So-called Greek 'colour words' have no direct English equivalents. Worse, they don't refer to colours, relating more to a texture, consistency and quality, with colour a small, often irrelevant, part of the whole meaning. The sea is the colour of wine, but so are sheep. Honey, sap and blood are all *chloros* which, as far as we can tell, is a sort of yellow-green.

And then later:

> William Ewart Gladstone (1809-1898), four times British Prime Minister under Queen Victoria, and a great classicist, was unequivocal in his criticism of Homer's colour palette: 'Although this writer has used light in various forms for his purposes with perhaps greater splendour and effect than any other poet, yet the colour adjectives and colour descriptions of the poems are not only imperfect but highly ambiguous and confused... we find that his sense of colour was not only narrow, but also vague, and wanting in description.'

Then, on the next page,

> Perhaps the Greeks - or Greek writers - did not consider colour very important. Seven hundred years after the composition of the Iliad, in the third century AD, Heliodoros managed to write a

> sixty-thousand word romance, the Aethiopica, without once using the words red, green or blue. This same lack of interest has been encountered recently; in 1971 a team of Danish anthropologists went to Polynesia to study colour perception among the islanders. But in one village, they were told, 'We don't talk much about colour here.'

As if "colour" is like "fight club" - something of which one does not speak. I love that. But as someone who is just as fascinated by the different colors in the world as I am about eyeballs, I wonder how any culture could not be interested in colors.

Mostly, though, I'm totally tripped out by the concept that the ancient Greeks were color-blind and/or their vision just hadn't evolved enough to be able to discern between the different colors. *That's* going to keep me up at night.

Someone else in the group brought up a different theory about the Greeks based on a book she read, Through the Language Glass: Why the World Looks Different in Other Languages, which also looks terribly interesting. The ancient Greeks rocked.

Oh - but I digress! Eyeballs!

The rest of the text is also interesting, and mainly focuses on the history of the *study* of vision and eyes, not so much the science of eyes (outside of how knowledge of the science of vision has changed over the years). There's plenty of biology for those of us who are also dorks about animals and the different anatomies across species.

Still, I felt Ings was just sort of repeating everything he learned from other people. While my To-Read list has grown exponentially since reading this book, I wish Ings had had more to say on his own. Though there's a bit in the first chapter about his daughter's eyesight that totally freaked me out. Eyeballs can be totally freakish and unstable.

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s says

This is a good one for giving you fun conversational facts about the eyeballs, like how the only remnant of our third eyelid is that pinkish membrane in the inside corner of your eye, and how blind people can see if you put a t-shirt with special vibrating thingamajigs on it that is wired up to a camera and somehow manages to transmit visual stimulus into a vibratory code, so that if you throw something at a blind person wearing said t-shirt, they will duck in the appropriate direction, etc. etc.

However it is not a properly scientific book, so the conversational nature of it ('oh yeah, did I mention this other cool thing about the eye?') means you find yourself asking questions all the time, some of them more annoying than others (e.g., what exactly does that term mean? how common is this type of complex eye really? and the like). So this is why I only give it three stars, because it should have had some footnotes, really, getting into some hard science or at least being more generally useful.

Trevor says

You ought to get hold of this book – it is one of those books that play with your mind in uncomfortable ways

– but I mean that in the best of all possible senses. A lot of what I've been reading lately has pointed out that we humans are anything but very good at this whole self-awareness thing. Bizarrely, despite vision appearing to be one of the most obvious of our 'talents', the closer we study it the clearer it becomes that it doesn't work in anything like the way we think it does.

When we look out about ourselves it seems that what we see is a bit like a motion picture. There is an objective reality out there and we have a pair of eyes and those eyes register what we see on the back of our retina, in much the same way a camera registers images on film. That is, there is, more or less, a one to one correspondence between what our eye sees and what is out there in the real world. This illusion is remarkably hard to shake – in fact, I think it is impossible to believe we don't see fully detailed representations in our minds of the passing world around us. That this can be comprehensibly shown to be an illusion is another of those things in modern science you have to just accept or 'believe' – as I am certain we never really can 'unfool' ourselves of this illusion.

This book is really brilliant – not only can this guy write, but he tells stories in ways that, even if you have heard them before, breathes new life into them while also nearly always having something new and fabulously interesting to add along the way. I loved this book – I've tormented the people around me with it since the first few pages, even reading bits to people (always a pretty sure sign a book is really good).

Now, having said that and having given it five stars, I'm going to complain a little bit. I wanted answers! The problem is that there probably aren't any answers to some of the questions this book throws up along the way. Let's start with the question that has worried me the most. Essentially, there appear to be two kinds of eyes you can have – an eye like ours or a compound eye, like a fly's. When these eyes were starting out as light sensitive patches of skin they could improve the image they created by either forming a little indent or dip (the first step towards making a human eye) or they could form a kind of little pimple – both improve the image obtained, but both have remarkably different long-term consequences.

If we had compound eyes we would need to look like this guy to have the same resolution of images that our eyes provide us with: http://www.eyedesignbook.com/ch2/fig2... A one metre round eye on top of our already seriously large heads might be somewhat inconvenient. What is interesting is that no animals bigger than insects have compound eyes – animals growing bigger ought not to be too much of a problem for evolution. The size animals can grow to might well be decided in some why by the type of eyes they have, with larger animals needing better resolution of images and that to achieve this is due to an accident of cell formation at the very origins of sight (cells going up instead of going down to improve focus) so that animals with compound eyes can never really get much bigger than rather small.

There is also speculation in the book that the reason for the Cambrian explosion (when suddenly life on earth seemed to get very, very creative) had to do with the evolution of sight. If you were unable to see then the chance of you bumping into something you might like to eat or that might have liked to have eaten you was pretty slim. But as soon as one creature developed sight the rules of the game changed. Now things could find you out and come looking for you. The Cambrian explosion is one of those mysteries of evolution that also messes with my mind. Suddenly, about half a billion years ago, animals that had been happy enough being tiny and worm-like for billions of years literally exploded. They became comparatively huge and developed shells and other defences and strange body shapes. The idea that perhaps all this was in response to predators that could suddenly see them is utterly fascinating.

There is another speculation in this book has likewise done odd things to my brain. That is, the speculation that the Ancient Greeks (and, in fact, most of the ancient world) were colour blind – at least by modern standards. When Newton was describing the spectrum (the rainbow, basically) he decided that it had seven

colours. He had reasons for this, none of them terribly good reasons, but at the time there were seven notes in the musical scale and seven planets in the sky, so why not seven colours in the rainbow? The problem ever since has been indigo – the colour he made up (both the name and the colour, if you see what I mean) to go between blue and violet to make up the seven – all the same, few people really have any idea what indigo looks like. There will be more on this over the next couple of days when I review Hallucinations by Sacks.

Anyway, if we can't see the seventh colour of the spectrum, we tend to have no trouble at all in seeing the other six. The rainbow clearly has red, orange, green, blue, purple and yellow – this is all as clear as day. Except that in the Iliad Homer says, with some confidence, that the rainbow only has three colours. If you want to know how bizarre this is, think about the Dark Side of the Moon album cover. What is really interesting is that Homer spends lots of time talking about how things glint – and this, apparently, is also a clear sign of colour blindness. Now, look, I know, Homer was supposed to be literally blind, but Homer's isn't the only ancient text referred to. The question I was most interested in was to wonder the extent to which colour is a socially conditioned response. I know that there are a number of cultures that effectively have two words for colours – dark and light – and others with four words – dark, light, red and green. I wonder if these limitations in linguistics are more pervasive than just not having enough words – if these literally change the ways we see colours or rather reflect socially conditioned colour vision. Some of Luria's research in his book Cognitive Development: Its Cultural and Social Foundations on sorting colours is also interesting in this context.

The graph on Page 227 of this book shows how the cells in our eyes respond to coloured light – effectively our red cones (the cells that identify red light) don't actually make it up to the red end of the spectrum at all - struggling to get passed yellow to orange. This is one of those little facts that Ings uses to blow one's mind. In so many ways sight seems the least problematic of our senses – we open our eyes and the world is just there – but that's not how it works at all. The fact our eyes aren't able to detect light at wavelengths for red really hurts my brain. Red is so vivid – to say that we can't really see it, and that it is a creation of our minds determined by the context of the colours around it is so contrary to experience it just sounds like some kind of a joke. Like I said, this book is one of those that is hard to read, as you find yourself thinking more about what your eyes are doing as you read that you suddenly find it is a struggle to read at all.

This book is overflowing with information on how eyes work and how we go about constructing images. I can't begin to tell you how interesting it is – and he is so good at bringing out all of the human in-fighting between researchers and various scientist along the way and at picking the most jaw-dropping story to illuminate his point – look, just read the damn thing, you really won't be sorry.

Pantscat says

This was a very enjoyable book. The book can be split into two rough halves; the first of which deals with the evolution of the eye, and the second of which deals with how the eye works, and how human understanding of how the eye works has advanced over time. I found the first half more interesting than the second. The second half of the book contained many arresting passages, but, every now and then, I would realise suddenly that I hadn't paid much attention for a page or two because my mind had taken me somewhere more captivating than the page. Nevertheless, this is an impressively broad-ranging take on a fascinating subject.
