10 In the beginning - Creation - the wonders

You created my inmost being; you knit me together in my mother's womb. I praise you because I am fearfully and wonderfully made; your works are wonderful, I know that full well.

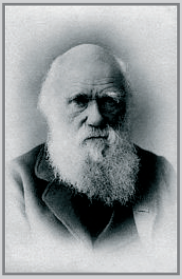
Psalm 139:13-14

Seeing is believing

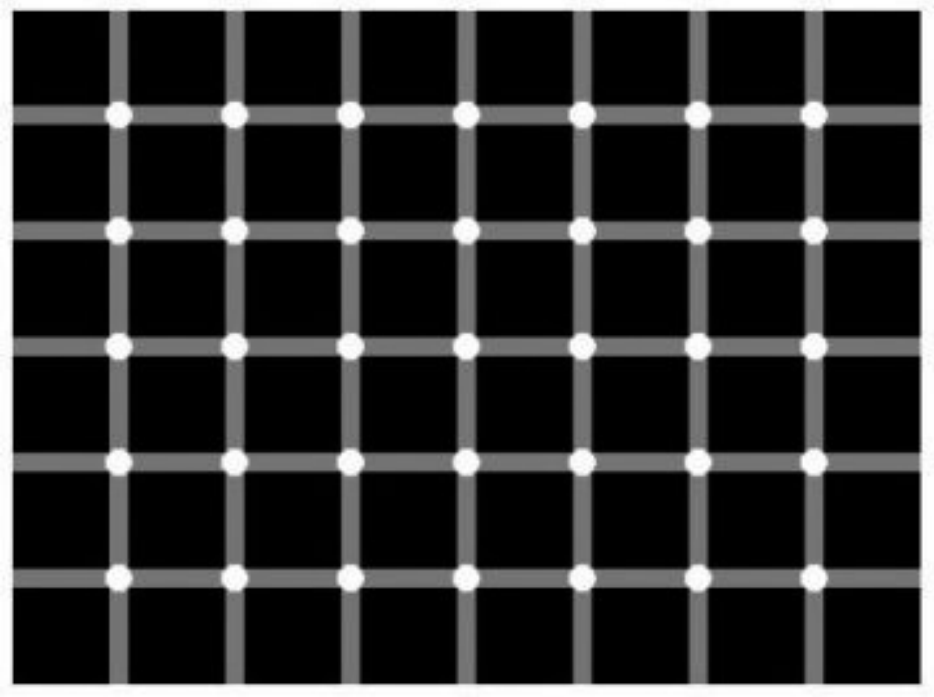
We are going to think about just one example of how wonderful God's creation is. Charles Darwin believed that our eyesight evolved, but he acknowledged that it seemed incredible.

'To suppose that the eye, with all its inimitable contrivances, could have been formed by natural selection seems, I freely confess, absurd in the highest degree'

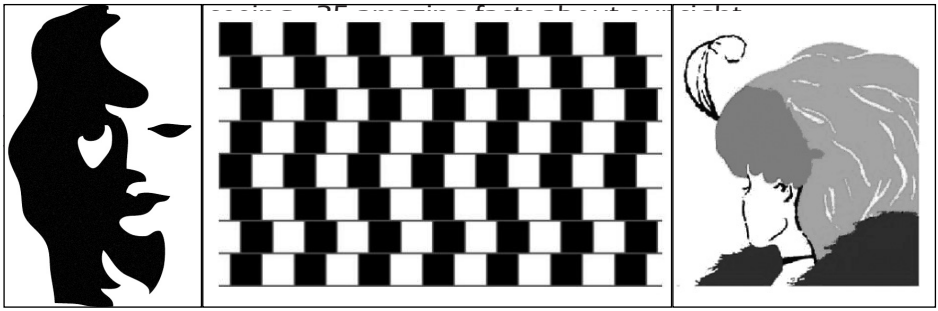
Charles Darwin, The Origin of Species



What do you see?



What do optical illusions like these tell us about the way we see things?

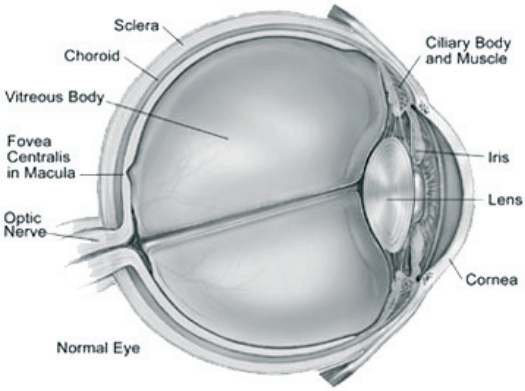


2. Tears are not just salty water. They have an oily outer film which lessens evaporation. They also contain a powerful enzyme which kills bacteria.

3. The sockets in our skull that hold our eyes are not just holes. Several bones meet around our eyes to give an extra strong protection.

4. The cornea is amazingly clear and transparent, but it is made of five layers of tissue which are reinforced with fibres which criss-cross each other to make it stronger.

5. The cornea cannot have a blood supply - that would make it red - but the aqueous humour behind it is like blood plasma, and the cornea gets its nutriment from there and, to some extent, from tears. The cornea also absorbs oxygen from the air, and contact lenses can prevent this from happening.



6. The iris adjusts itself to control the amount of light that enters the eye. If it didn't do this the back of our eye would be burned in just the same way as we burn a piece of paper using sunlight and a magnifying glass.

7. The lens is made of long elastic fibres. When we want to see things a long way away, the suspensory ligaments pull on the lens to flatten it; close to, they relax and it becomes rounder. This happens in an instant, without us having to think about it, yet the lens is incredibly accurate, and in most people there is no discernible distortion.

8. We have muscles attached to our eyes which rotate them in their sockets so that they point to the thing we want to see. This means that we can glance at something else in an instant without moving our heads (compare that with a camera).

9. Our eyes move between 30 and 70 times a second - if we are reading, for instance, they flick around the page to see the sentence we are reading and all the words around. Even if we are looking at one stationary thing they keep moving very slightly so that the same bit of our retina is not used all the time. If this did not happen our vision would fade.

10. Our eyes also rotate to track moving objects. If we want to catch a ball, for instance, we don't have to move our head - we can follow it with our eyes, and so the image of the ball will 'appear' in roughly the same place on the back of our retina. Despite this, we still know how fast the ball is moving because our brain knows how quickly our eyes are rotating and it uses that fact in calculating its speed.

11. When we move our heads, we don't suddenly imagine that the room is moving, even though our eyes see a changing image of the room. Our brain knows that our head is moving and uses one signal to cancel out the other.

12. The image that arrives at the back of our eye is upside down and reversed left to right, but our brain sorts it out so that we see the right thing.

13. At the back of each eye we have around 120 million rod-shaped cells, which are incredibly sensitive to light, but see only in black and white. After about 20 minutes in the dark, the retina adapts chemically so that the rods can perceive very tiny amounts of light.

14. At night we can see things out of the 'corner of our eye' that we cannot see when we are looking straight at them.

15. There are also around 6 million cone-shaped cells, which see in colour. These are clustered around the fovea, which is the place where our eye sees best. There are three different sets, for red, green and blue light - as in TV cameras.

16. Inside our fovea there are around 150,000 cones per square millimetre (that's smaller than a pinhead).

17. This means that our eyes see much more clearly than a television camera. One of the reasons that we see television so clearly is that our brains make up for the inadequacies of the picture!

18. Our brain automatically corrects the balance of colours. So at night, in the yellow light of a room, we see colours almost as well as in daylight.

19. Our eyes don't just send a 'photograph' to our brains. The signal from each rod or cone is analysed by the cells in front of them, which are effectively brain cells. Some cells detect changes in light and dark, for instance; some detect specific movements, or lines in particular directions.

20. Each eye has an optic nerve, which contains 800,000 fibres.

21. We have two eyes, and our brain combines the images from both to tell us about the distance of things we see, how fast they are travelling, and so on. We can manage with one, but God in his bounty has given us two (we also have two ears, but only one mouth!).

22. There are different parts of our brain which process what we see, ending up in the visual cortex, which is at the back of our heads. This is in two parts, one in each half of our brain.

23. Between our eyes and our brain some of the nerves cross over to the other side. So each half of the brain is seeing images from both eyes. If we lose an eye or if part of our brain is damaged our vision will be impaired, but we can still see.

24. Our eyes grow from nothing. All the cells turn up in the right place, with all the

connections to our visual cortex. That grows from nothing, too.

25. We would expect 'early' creatures to have basic eyes, and later animals to have more sophisticated sight, but this is not the case. For example, birds and most fish see in colour, whereas cats and dogs, among others, have very poor colour vision.

Evolution = Purposelessness

It is interesting to reflect how often scientists who believe in evolution find themselves using the language of design. They speak of nature 'doing' things, or of evolution 'arranging' something. Just two examples:

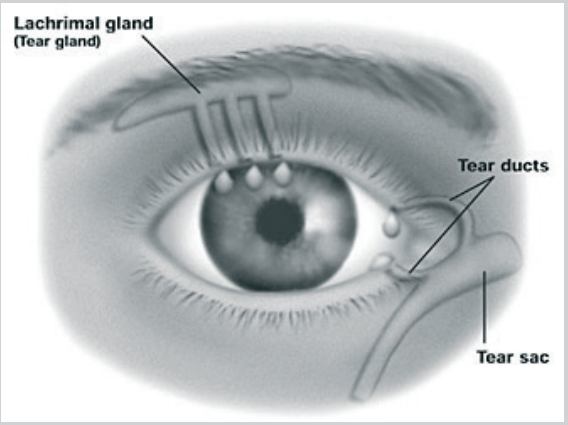
Of course, only an almighty creator can have a purpose with the universe and the power to bring it about. Think about this chilling paragraph from the introduction to the book of the BBC series 'Life on Earth', which makes exactly that point. Without God there is no purpose to anything.

Thankfully, we can reflect on wonders like our eyes and recognise that they tell us not only that the Almighty is a wonderful creator, but they show us something of what he is like.

To add to all this, you may like to think about the following extract from a booklet 'Creation and Evolution' by David Pearce, available from the Christadelphian Office.

> Why should evolution go to the trouble of building up such curious entities as centre-surround receptive fields?
>
> *David Hubel, Eye, Brain and Vision, WH Freeman, 1988*
>
> Nature has evolved truly startling visual organs … each animal has been given the very optical tools it needs to do the work it must in order to survive.
>
> *A.S.Freese, The Miracle of Vision, Harper and Row, 1977*

> This, however, risks imposing an appearance of purpose on the animal kingdom that does not exist in reality. Darwin demonstrated that the driving force of evolution comes from the accumulation, over countless generations, of chance genetical changes sifted by the rigours of natural selection. In describing the consequences of this process it is only too easy to use a form of words that suggests that the animals themselves were striving to bring about change in a purposeful way - that fish *wanted* to climb on to dry land and to modify their fins into legs, that reptiles *wished* to fly, strove to change their scales into feathers and so ultimately became birds. There is no objective evidence of anything of the kind and I have endeavoured, while describing these processes in a reasonably succinct way, not to use any phrases that might suggest otherwise.
>
> *David Attenborough, Life on Earth, © David Attenborough Publications Ltd*



We are unaware of our tears, most of the time. Only when we are upset and they begin to overflow, do they become a nuisance. Most of the time the salty, antiseptic secretion of the tear glands carries out its vital role of lubricating and cleaning the delicate but exposed surface of the eye, the conjunctiva, with impressive efficiency. But what happens to our tears when we are not crying? Why do they not spill over our lower lid and run down our cheeks all the time, getting in the way? The answer is that in the inner corners of the eyes are two tiny tubes, about 1 cm long, the tear canals, which drain away the surplus liquid. You can find the entrance to the lower one if you stand in a good light with a mirror, and gently pull down your lower lid. It can be seen as a small pinhole in the rim of the eye lid. The canal runs downwards through the thickness of the eyelid itself, and drains the tears into a collecting sac, which then discharges the moisture via a long channel in the bone of the skull to an exit hole on the inside of the nose. That is why the bride's mother always blows her nose at the wedding; as the tears well up in her eyes, the tear ducts bear them away into the nose. Sometimes you can taste the salt, if you sniff when you have been crying.

Now, the question is, how did these tiny tubes evolve? How would a tear canal begin? Did a depression arise on the inside of the eyelid of an early mammal; and then generations later, a tube begin to extend away from this depression? Bear in mind that such a proto-tube would serve no useful purpose, and should theoretically have been eliminated at once by natural selection. Assume that it survives, and after a few hundred thousand years has begun to meander down through the thickness of the eyelid. We now have to imagine a channel opening up for it through the bony ridges surrounding the top of the nose. If there was no way through, the embryonic tube would reach a dead end as it struck the bone, like an oil rig drill meeting impenetrable rock. Even if there was an unused channel already there, it would be pure coincidence if the tube developed **towards** it. Subject purely to random mutations, it has no reason to aim downwards and inwards. In fact, we might have to postulate dozens of tiny tubes springing up in different parts of the eyelid in turn, some near the outer corner, some in the middle, until at last, after millions of years, one tube on the inner corner coincided with a channel that had independently developed in the bone, and broke through the inner lining of the nasal cavity, somehow forming a neat, unblocked exit hole. Now, at last, the tear duct would be able to serve a useful purpose. Fluid could finally flow from eyeball to nose and throat, like the water did on the day they completed the Bridgewater Canal. Through all those long millennia, early mammals would have blundered along, their vision blurred by the tears their eyes must have to keep them clean, and their cheeks permanently wet with an irritating overspill.

from 'Creation and Evolution' by David Pearce.