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Our two eyes and stereoscopic vision

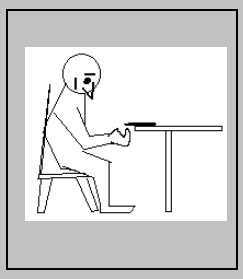
The Cyclops in Homer's Odyssey was a monster in human form with only one eye, in the centre of his forehead, recalls S.Ananthanrayanan.

Ulysses and his men tricked him and blinded him before they made their escape. But a scientist in their place would have know that having just one eye is handicap enough

Two eyes versus one

All creatures in the world have actually evolved with ***pairs*** of eyes. How useful this is easy to try for oneself.

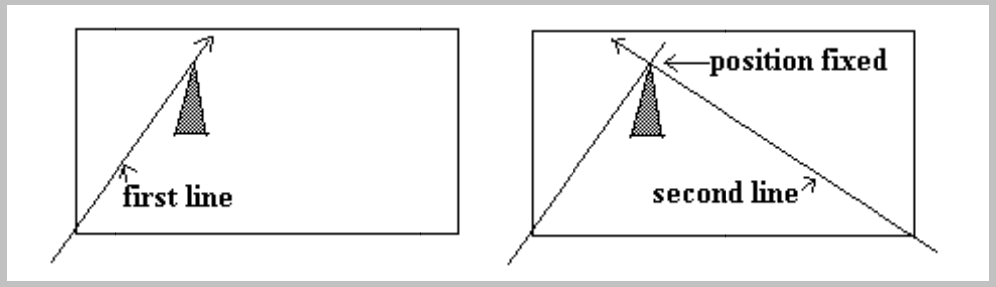
One needs to sit before a pencil on a table, with the pencil pointing towards oneself and a few inches beyond the table edge.



Now, if one shuts one eye and tries touching the tip of the pencil with their finger, bringing the finger in ***from the side***, that is, the movement of the finger being parallel to the table-top, one generally make a mistake in judging the level or position of the pencil tip, that is, the distance. But if one tries with both eyes open, there is nothing to it!

We cannot tell distance, or depth, when we see with only one eye because it is geometrically necessary to have two measurements to fix the position of a thing. Seeing like this is called stereoscopic vision

It is like a surveyor trying to fix a tower on the map of a field. He first sights the tower from one end and draws the line in the first figure. Then he sights the tower from the other end and draws the second line. And there, the position is fixed!



Our two eyes, which are a few inches apart, act like the two measurements and help the brain fix the exact position. New born cannot do this, at first, they need to learn!

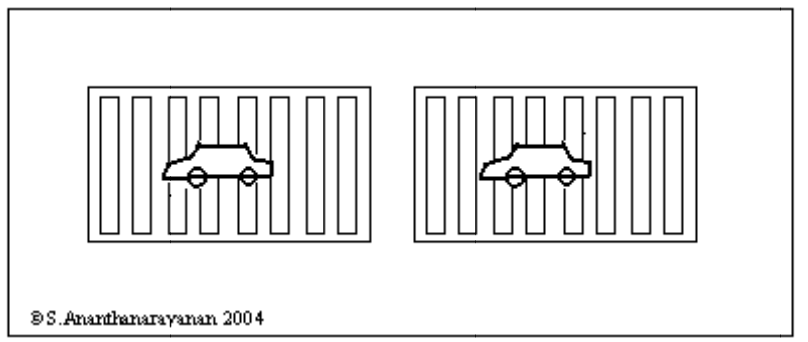
Chickens have their eyes on either side of their heads, so that they can take in the widest area possible, the better to spot that edible tidbit. But that's only to spot it. To get a fix on it they need to see it with the other eye too, and then, peck! This is the reason that chickens keep turning their heads.

The eagle and the owl don't go for tidbits, they go for the chicken. So they have their eyes right in front, just right to spot prey from a distance!

The world around us would be 'flat' and lifeless if it wasn't for our two eyes. Everything we see becomes 'rounded' and 'whole' because each eye sees it a little different from the other eye and the brain puts the images together.

One would have noticed that photographs, which capture the image of only one 'eye' (the camera lens), lack depth. A way of getting around this is to make two photographs, moving the camera a bit each time, and then view the two pictures together, with each eye looking at a different picture!

The two pictures of the car, in the box, below, have been drawn like that, as seen by the left and right eyes. If one gets the eyes a little out of focus, by focusing at a point somewhere behind the pictures, one would start to seeing double.



The pictures then split into four. If one moves the head so that the middle two merge, with each eye is looking at its own picture, one will notice that this middle, merged picture bursts into relief, with the car appearing to be *at a distance from* the fence, as if in real life! Well the eyes have no way of telling that it is not real, because they are seeing different images, as if they *were* real!

The reason that even the best photographs don’t quite look real is that we see them with two eyes and the brain is 'cheated' with two identical images. The problem is solved if we look at photographs with only one eye, just like the camera did. The brain sees as if it were looking at a real object with one eye, and adjusts by filling in some aspects of depth, based on experience. The picture then look more real!

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