Eye On Science

TIME senior writer Michael D. Lemonick fills you in on what's hot in the world of science

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A new theory of why we see in color

I've got red-green color blindness. That does *not* mean I can't see red or green, but only that the contrast between those colors isn't as great for me as it is for most people. People constantly ask me "well, what does red look like to you?"--an absurd question, when you think about it. It looks red to me, but who knows what that really means? I can tell you only that red flowers in a garden don't especially catch my eye, and that when I played croquet as a kid they wouldn't let me have the red ball because I'd lose it in the grass.

Anyway, the question of how we see color has naturally always fascinated me, and a paper in the current issue of *Biology Letters* thus caught my attention. It turns out that Old World primates, whose descendants include us, see it differently from other animals. Like the birds and the bees, our retinas are full of cone cells, which are sensitive to light at specific wavelengths; it's by combining the signals from these different cells that our brains create the sense of color. But while other animals' sensitivities are generally spread out across the visible-light spectrum, primates' "red" and "green" cones detect wavelengths that are very close together. One of mine, the red or the green (can't recall which) is completely defective.

So the question is why primates evolved this strange arrangement. For a century the theory has been that it helped them to notice fruit and thus nourish themselves. But if you actually look at the actual colors of fruits available in the rainforest, say the Caltech neurobiologists who wrote the new paper, that's not a great explanation.

They think they have a better one: our color vision turns out to be ideally suited to picking out the changes in skin tone that happen when blood has more or less oxygen, and also the changes when people blush, or when the color drains from their faces. The former would be useful in picking out potential mating partners--a rosy glow from oxygenated blood can be a signal of good health. And the latter means we're especially perceptive to the skin's reaction to sexual arousal, or emotion, or fear--all very useful cues if you want to indulge in the evolutionarily useful behaviors of

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having sex on the one hand or survival on the other. As it happens, I can't detect blushing very easily or notice when someone looks pale. Luckily, I don't live in the forest with Neanderthals.

None of this would matter at all if, like other mammals, we were covered in hair or fur everywhere. But we're not--and neither are our nearest primate cousins. Apes and monkeys tend to have bare faces and bare...rear ends, shall we say, both of which are ideally suited for different sorts of skin-color signaling.

Since evolution happened a long time ago, there's no real way of proving the hypothesis. But at the very least, it makes more sense than the old theory. It doesn't, however, make me feel a lot better about the world of color everyone insists I'm missing.

—M.L.

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