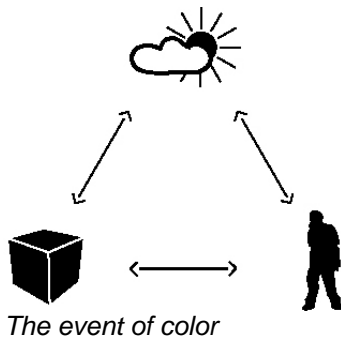


# GenoColor

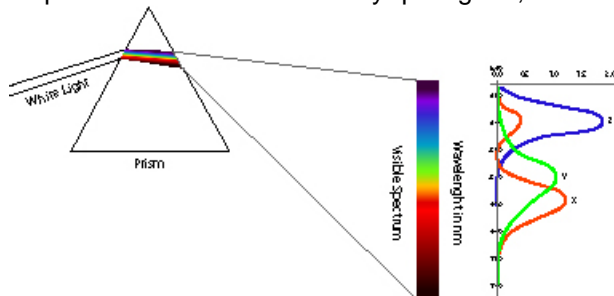
Everyone has heard of color theory and color wheels. If you have not heard about it, do not worry. It is difficult to unlearn a theory. We present here, a different way of understanding and working with color. It is possibly a better way, not only for the technicians and experts using it today, but also for you. It is up to you to judge.

Color happens when light shines onto an object and you look at it. Color is rather an event than a fact. Three parts have their share in the color event: light, object and a human. Many smart men looked into color and fought about the order that is appropriate, but as they started from different elements of the event, they came to different conclusions. They could not imagine that all of them were kind of right.



## The color of Light

Sir Isaac Newton was a physical scientist. He discovered that the light could be split into a spectrum of colors. He wrapped the spectrum into a circle and named parts of it, he saw 7 colors – that wasn't very scientific. From anatomic frog observations it became clear (around 1800) that our eye has 3 different color receptors, which according to their sensitivity peak to the sunlight's wavelength where named RGB: red, green and blue. With those three primary light colors all other colors could be mixed, with the addition of no light to create black. That is very true, your computer monitor works that way quiet good, doesn't it?



*From left to right: White light split by a prism into the visible spectrum, the wavelength sensitivity of the 3 cones in your eye(xyz), light color mixing from the 3 primaries Red, Green and Blue (This is called Trichomacy).*

### The color of Material

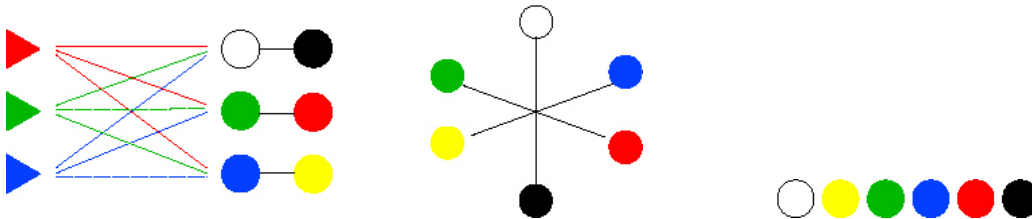
Johannes Itten was a painter and teacher. He knew from experience that yellow paint mixed with blue paint make a green paint. It was clear to him and all other people mixing colored paints before him that red, yellow and blue should be the primary colors. This is what works, so there is some through in it.



*From left to right: Mixing colors from the 3 material primaries Yellow, Red and Blue, Color circle according to Itten and one of his constructions to make harmonious color combinations.*

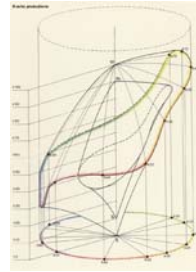
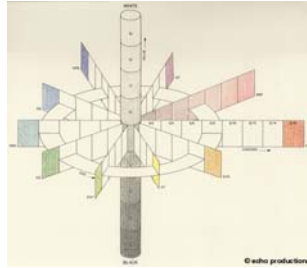
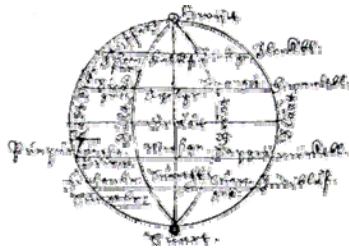
### The color as we see it

Ewald Hering is a psychologist. He observed in 1878: "Yellow can have a red or green tinge, but not a blue one; blue can have only either a red or a green tinge, and red only either a yellow or a blue one. The four colors can with complete correctness therefore be described as simple or basic colors, as Leonardo da Vinci has already done." Hering stated that our mind handles color as 3 opposing pairs: red-green, blue-yellow and white-black. Brain research proved him correct, but that a lot later (Ungerleider & Mishkin 1982).



*From left to right: The rgb signal measured by our eye translated according to Fairchild into 3 opposing pairs postulated by E.Hering (Opponent theory), the axis of our 3 dimensional mental model of color, Leonardo da Vinci's line of color*

In your head color is organized in a 3 dimensional manner, using the opposing pairs as axis to define this color space! The shape of this space has been idealized as spheres, cones or cylinders – well, we like the world to be easy. As it turns out this space is somewhat irregular if all colors are arranged with distances that reflect our idea about how different the colors are. The artist Albert Henry Munsel build a very convincing color tree, where colors all have equal distances to each other.



From left to right: Aron Siegfried Forensius color sphere from 1611, Munsell's perceptual uniform color tree 1916, 'coloroid' color space as validated with 70.000 users by Antal Nemcsics 1974 (all pictures from [www.colorsystems.com](http://www.colorsystems.com) )

### Color without theory

May be by now you feel lost in color space? Actually you can not get lost; this map of color is an in-built feature of any human being. GenoColor allows you to drive through this space, without worries about any theory at all. What you see are colors like an object would show them, groups of more or less similar colors.



Left: a façade displaying many shades, tints and variations of the actual stone color  
Right: a color group in GenoPalette

### Color groups

Any color group GenoPalette and Swatch display can be seen as a blob in your mental color space. The shape and size of it varies with the position of the sliders in the programs.

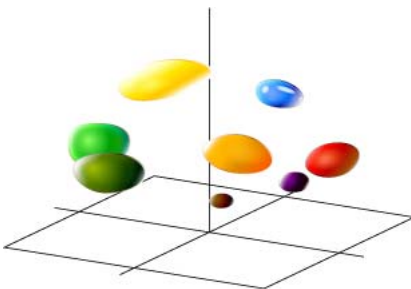


Illustration of color groups as volumes in color space

### Color matching

The color combinations displayed by GenoColor look often very good together – hope you can see that. This seems to be related to our perception of the world around us. We enjoy the endless variation in appearance of for example flowers in a field or lights and shadows of a mountain range in the afternoon sunlight. As if the pattern recognition happening when we compare

similarities and differences in color groups is a joyful activity for our mind. Quiet like listening to harmonies in music, where a theme is introduced, repeated and variations are presented. Drawing comparisons between music and watching color has tradition, Newton and Goethe went that route before; quiet like here it is introduced, without any hard evidence. But to conclude the attempted explanation: GenoColors look good, because they have something to do with each other; they seem logic to your eye. Sometimes it is not quiet that obvious what they share, so your mind gets switched on. Try these:



Color without theory. GenoColor.

Genometri

2006 by Christiane English