

Optical effects and illusions during sunset

G.P. Können, Terschelling Diary 2007/2

Sunset from the beach is everlasting spectacular. Before the sun disappears, we perceive a huge sun disk: its size seems to be three times larger than normal. Indeed, 'seems', as the swollen sun is not real but 'between our ears': it is just an optical illusion. Don't you believe? Take a picture then of the setting sun and a second one when the sun is high in the sky – and you will see that these suns are equally big*. This simple truth doesn't need to spoil the magic of sunsets: we experience the sun the way we do, and that happens to be an enlarged version.



Left: sunset, photographed by the Englishman Les Cowley. The sun disk is flattened because the light rays from its bottom are stronger refracted by the atmosphere than the rays from its top. Right: same picture, rotated by a quarter of a turn. As the vertical-stretching illusion acts now in the other direction, the flattening looks stronger than on the non-rotated picture.

Apart from enlarged, the setting sun is also flattened. This is indeed real, and is related with refraction by the atmosphere of the incoming sun rays. But also in this effect optical illusion is present: objects near the horizon become vertically stretched in our brains, and this subjective effect partly compensates the real flattening. So the flattening seems less than it actually is. But if we keep our head inclined, the real and the subjective effects act in the same direction and the sun looks cigar-shaped.

This can even be seen on pictures of the setting sun, by rotating the image by a quarter of a turn – see Fig. 1 Once aware, vertical stretching is apparent in many objects. Distant persons on the beach appear as thin lines; the same happens with people standing on a remote hill. Sheep on a ditch seem to have unnatural tall legs, if one watches them from below. But the best opportunity to see the effect is indeed during sunset on the beach. All the more reason to watch it regularly.

Finally another noticeable effect during sunset: seen from a line of dunes (~10-15 m high) the sun disappears about one minute later behind the horizon than from the beach. Sitting on the dunes one notices indeed that the sunset-watchers on the beach start to return home while from your position the sun has not completely set.

*In 1995 I made a presentation about this kind of effects for a number of artists. They just could not believe that the swollen sun was 'behind their ears'! Only when I showed pictures of the vertical stretching of the sun (like those above) they started to admit that their eyes were not always telling the truth.