

## A Commitment to Observation

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### *Summary*

In his article Pepe Veugelers (*Veugelers 2005*) takes up the old issue of whether it is possible to explain “prismatic colours”, i.e. the characteristically coloured and diffuse transitions between bright and dark structures seen obliquely through a boundary between media of different optical densities, with Goethe’s ‘archetypal phenomenon’<sup>1</sup>? In other words his project is to explain colours which arise under the use of dispersive optical media in the context of looking through ‘hazy’ media, i.e. media that in a conventional manner of speaking cause ‘light scattering’. I will not try to decide whether such a project can be at all fruitful, although there are some concerns that will be mentioned later, but I will discuss why Veugelers’ arguments are not convincing for me. Two objections touch his argumentation directly and lead us to more fundamental methodological issues.

### *Zusammenfassung*

In Heft 82 der *Elemente* nimmt sich Pepe Veugelers eines alten Themas an (*Veugelers 2005*): den *prismatischen Farben*. Es geht einmal mehr um den Versuch, die Entstehung prismatischer Farben mit Hilfe von Goethes «Urphänomen» zu verstehen. Sein Ansatz, die Wirkung der optischen Dichte des Mediums und dessen Dispersion so zu kombinieren, dass Argumente aus optischen Situationen im Zusammenhang mit «streuenden Medien» anwendbar werden, soll hier kritisch untersucht werden. Dabei wird auch die Frage aufgeworfen, ob ein solches Unterfangen innerhalb einer «goetheanistischen» Methodik überhaupt fruchtbar sein kann.

Veugelers commits himself to “pure observation” as the starting point of his work (page 75). This is a wonderful place to begin, although, for anyone who has been educated in conventional physics, keeping to pure observation is probably a very tough demand. In his argumentation<sup>2</sup> there are some points which bear the character of thought experiments. This alone would not be a problem, but a problem does arise if an argument in physics contains

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1 Veugelers uses the expression “fundamental phenomenon” – we will use the more common “archetypal”. Actually the problems start with the question whether those are (or one of those is) an adequate translation of what Goethe had in mind and whether this kind of use of “Urphänomen” is what he intended.

2 Cf. page 74 top or Veugelers’ appendix.

parts which are not themselves of a physical, i.e. *observable*, nature. In my opinion the essential difference between ‘conventional’ and ‘Goethean’ physics is definitely not that only the latter is committed to observation as a starting point but it is its attitude of *always* referring to concepts and conceptualizations of possible experiences. Veugelers’ argumentation in a nutshell is as follows: given a pool of water with a black and white pattern on the bottom and an observer looking into it, the optically dense medium appears to bend the bottom of the pool in a ‘bowl like’ manner depending on the refractive index and the position of the observer. For a fixed position of the observer, the inherently diffuse refractive index produces a sight composed (in the sense of overlaying) of differently bent and differently spaced black and white patterns. In this way different ‘brightness in front of or behind darkness situations’ arise which cause coloured images and are governed by Goethe’s archetypal phenomenon. Here, both parts of the argument, the bending and the role of the refractive index, will be explored. Let us start with the latter.

### *Variable versus diffuse refractive index*

In his rejection of Ott’s explanation (Ott 1965) of the prismatic colours with Goethe’s archetypal phenomenon, Veugelers correctly points out that prismatic colours depend on a variable, non-constant refractive index (‘dispersion’) of an optical medium<sup>3</sup>. He states (page 75 top, emphasis P. V.): “Essential though, is the explanation of the *meaning* of this variable refractive index.” He continues with the introduction of his reading of “images” and the “image space” (page 75) which as far as I understand refer to the set of *possible* views of a tangible object and the possibility in the space around this object of having such views.<sup>4</sup> On page 76 he discusses the ideal situation of a point sized object on the bottom of a pool, for example the cross section of a line, and the refraction of an image space segment originating there on the transition between optically dense and lesser dense medium. The transition to an infinitesimal segment gives him two quantitative results:

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- 3 However, his rejection of Ott’s argument is in my opinion too superficial – it does not depend on the fixed index. There is also the work of *Lobeck* (1954) who follows an idea quite similar to that of Veugelers but with a fixed refractive index (and still constructs the prismatic colours in a rigid way).
- 4 His formulation is: “This space around an object, wherein the image is present, will be called the image space.” ‘Image’ is then obviously not a certain, concrete observation but mere the possibility to observe something.