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THE INFLUENCE OF ANCIENT SCIENCE
ON JOANNES MARCUS MARCI'S CONCEPTIONS
ON THE PROPERTIES OF LIGHT

In his scientific work Joannes Marcus Marci (1595—1667) attached considerable importance to problems connected with white light and spectral colours.

He lectured at the medical faculty of Prague University. While lecturing he wrote several books, not only on medicine and philosophy, but on mathematics, mechanics and physical optics as well. In the first half of the 17th century, that is at the beginning of the evolution of physical optics and prior to the works of Grimaldi, Newton and Huygens, Marci already wrote works on physical optics.

He studied, whenever possible, the phenomena of spectral colours, and so became aware of the appearance of hues when illuminating either narrow slits or edges of a screen or wire, or even a number of various slits, calling them *reticula*. He also investigated the hues visible on the film of soapbubbles, the colours of the rainbow and the hues appearing in the spectra of prisms. Though Marci observed all these phenomena, yet their physical properties remained unknown to him.

As early as in 1648 Marci published his most important book on rainbows under the title *Thaumantias*, and already in this very year he grasped some of the properties of light, by the way the same which later, in 1672, Newton described in his famous treatise *New Theory on Light and Colours*. Marci already knew, that the size of the angle under which light is being refracted from the prism is responsible for the appearance of hues in the spectrum; he also realized that a further refraction and reflexion of monochromatic light would fail to change the colour pattern of the light rays used.

In the course of his experiments Marci very nearly discovered, that white light is a composition of the colours of the spectrum. In order to blend the particular spectral colours he not only used prisms of the traditional form, but also introduced circular prisms shaped like a bracelet. And this circular prism enabled him—in my opinion quite accidentally—to observe, that white light appeared when the colours of the spectrum are mixed together.

It is remarkable that all this knowledge failed to arouse in Marci's mind the question as to what really happens, when all spectral colours are concentrated in one point. Responsible for this is the fact that—as far as the properties of white light are concerned—Marci adhered to the conceptions advanced by ancient science.

Marci accepted the ideas of Aristotle relating to the four principles (elements) in Nature, and was of the opinion that white light is a principle too, yet a more delicate and more dignified one than the four common principles of Aristotle. He even alleged that these four common principles had their very origin in the principle of white light. He rejected the old idea according to which spectral colours are a product obtained when mixing white light with darkness. Yet his belief in the superiority of white light over all other principles was the reason, why he considered that white light is undergoing some kind of contamination (*degeneratio*) while spectral colours are being formed, this contamination being caused not only by the peculiarities of white light but also by the properties of matter.

Though Marci generally expressed the opinion that white light is a single substance, he also wrote in his works about light being a compound of rays of different kinds—that is, of rays present in the white light which resemble luminous or illuminated objects, and of rays capable of being coloured—he calls the latter *radii colorigeni*.

The summing up of all these thoughts and ideas would show, that the white light remained for Marci a singular substance, and that Marci failed to discover that light is a composition of the spectral colours. He adhered to the ancient doctrines of singular elements and believed white light to be one of them.

Although the concept of an index of refraction was unknown to Marci, he nevertheless was—in my opinion—not far from discovering the composition of light. Here, in Marci's reasoning, ancient science was the factor that impeded further progress.