

# Slavomír Gálik

## Andrej Démuth, Slávka Démuthová, Adrián Slavkovský: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*

The scientific monograph entitled *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*, written by Andrej Démuth, Slávka Démuthová and Adrián Slavkovský, explores beauty that is found not only in mathematics, but also generally – starting with the beauty of the human body and ending with the philosophical and spiritual aspects of beauty. Respecting the nature of beauty, the authors use an interdisciplinary approach: it utilises the philosophical, psychological, biological, mathematical and also theological perspectives. I appreciate this method and also the very fact that they decided to offer their view of the topic in a way that is unique and exceptional not only in Slovakia, but also internationally. The presented monograph is not only remarkable, but also up-to-date, as we are living in an era of aesthetic canon that determines our lifestyle and dictates what is attractive and elegant and what is repulsive. In contrast to this canon, the monograph goes deeper, with the authors trying to identify the reason why we like something – for example why we find mathematical formulas

beautiful, too.

In the *Introduction*, the authors follow Vopěnka's idea that medieval thinkers were driven more by amazement and beauty than the need for the truth<sup>1</sup>. This idea also separates two types of knowledge – Greek and Barbarian. The Greeks wanted to know about the world generally, while the Barbarians wanted knowledge that would be useful for practical purposes. They were not interested in useless contemplation of knowledge and beauty<sup>2</sup>. However, the authors agree with M. Heidegger that in order to contemplate beauty, one needs to

1 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 9.

2 Throughout history, European philosophy has often distinguished theoretical and practical knowledge. In the Middle Ages not only knowledge, but also life was described as *vita contemplativa* and *vita activa*. In the Modern Period, under the influence of natural sciences, practical knowledge was emphasized more. In the second half of the 20th century, but also now, we can notice a strong diversion from metaphysical approach to knowledge, turning to language or media-based knowledge that is also linked to practice. See more on this: GÁLIKOVÁ TOLNAIOVÁ, S.: Media and Truth in the Perspective on the Practice and Life Form of the Modern "Homo Medialis". In *Communication Today*, 2019, Vol. 10, No. 1, p. 9.

have time in the first place<sup>3</sup>. In the first chapter, *Mathematics as a search for symmetries*, the authors study the theory of Golden Ratio<sup>4</sup>, a phenomenon that was first described in Antiquity. This is not surprising, as the Golden ratio has been used as an aesthetic canon in western culture over a considerably long period. The authors explain that "[...] the Golden ratio describes a line divided into two parts of unequal lengths, with the ratio between individual lines being the same as the ratio between the longer line and the original length of the line"<sup>5</sup>. The theory of Golden ratio is used in numerous instances, including the human body. The authors state: "[...] empiric studies show that, in terms of aesthetics, this way of dividing is generally accepted as the most pleasing one"<sup>6</sup>. However, perfect symmetry is boring and actually not found in real life, so the authors add: "[...] real attractiveness is found when the symmetry of a given object is slightly distorted"<sup>7</sup>. Symmetry, as they claim,

3 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 9.

4 Golden ratio, also known as divine proportion (lat. *sectio divina*).

5 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 16.

6 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 16.

7 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 24.

is also linked to evolution theories – symmetry of the face or body is an indicator of beauty, but also biological stability and suitability of a partner in terms of reproduction. Yet, is beauty purely symmetry or perhaps slightly distorted symmetry of the human body? Is a human not a more complex being, featuring both physical and mental qualities? Here, the authors could have mentioned also the so-called "inner beauty," or "inner happiness" – *esprit*.<sup>8</sup> Even ancient Greeks knew the term *kalokagatia*, a reflection of harmony between body and mind. The monograph graduates in terms of content, but also extent in the second chapter, entitled *Beauty as calculation*. Here the authors agree with a widespread idea: "[...] perception of beauty, feeling, but also aesthetic evaluation, or creation a work of art, are explainable using language, as well as logics and terminology used in mathematics and applied informatics"<sup>9</sup>. They refer to the followers of Pythagoras, especially Polykleitos and his Canon, Vitruvius, the Middle Ages and Renaissance. Therefore, beauty is a feature that is found not only in physical objects but also in mathematical calculations. What is different is that we perceive the beauty of the body directly, while mathematical beauty is something that we first need to be acquainted with. Undeniably, one of the most

8 The term *esprit* originates from the French *l'esprit* and means wit, sagacity, ability. In a broader sense, it may also mean *spiritual* or *inner beauty*.

9 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 37.

important mathematical equation for beauty in European culture is expressed by the Golden ratio. It is used in numerous areas of human life, for example in statuary, architecture, painting, but also music. The authors also say: "[...] the golden ratio can be found in optimal proportions of human body. Examples can be seen also in the work of the Greek sculptor Polykleitos (477 - 410)<sup>10</sup>". In their monograph, the authors also mention computer-generated approximated proportions of the face and come up with an interesting conclusion: "[...] the more a real face resembles this prototype, the more people describe it as beautiful"<sup>11</sup>. Such a face shows a probable ideal shape, regardless of how rarely it may be found in reality. In this chapter, we also learn some interesting information about why we prefer a symmetrical face to a slightly asymmetrical one. According to the authors<sup>12</sup>, in terms of the cognitive approach, this is more efficient considering energy requirements and speed of processing, while in terms of the evolutionary approach, we try to identify a genetically

10 For example, there is a well-known replica of his statue – Doryphoros. This statue has ideal proportions, i.e. uses the Golden ratio.

11 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 60.

12 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 60.

13 DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 63.

suitable and high-quality partner. The authors state that this is generally true across cultures. In my opinion, however, such a claim is rather questionable, as we see numerous examples of women in certain cultures trying to “beautify” themselves by doing something that our culture evaluates as ugly (for example chiselled teeth, lip plate, neck elongation, deformation of the feet and so on.). Along with biological determinism, we probably need to consider also cultural determinism.

The third chapter, *Philosophical questions related to the mathematics of beauty*, is the place where the authors work with a broader philosophical context. Here they claim that the purpose of beauty is to seek and realise a better world<sup>14</sup>. This requires a long evolutionary path of perception of beauty, as well as emotional (pleasant and beautiful) feelings brought by calculation, as we can see for example in mathematics. In the fourth chapter, entitled *Learning to perceive*, the authors offer some rather special content, for example – beauty in mathematical tricks, relationship between religion and mathematics and disputes in mathematics. We can surely agree with the authors that mathematics is stimulated by beauty, fascination triggered by the internal harmony of abstract ideas and their inner structures<sup>15</sup>.

In the *Conclusion* the authors state<sup>16</sup> that their monograph utilises three viewpoints: the viewpoint of a philosopher – cognitive scientist, psychologist, and mathematician – theologian, who studies the relationship between beauty and mathematics. The diversity of approaches is turned into a coherent standpoint by mathematics, which is “[...] not limited in terms of words or means that can describe beauty”. Many philosophers believe, following Pythagoras and Plato, that beauty and the structure of beauty are hidden in the laws of mathematics. The already mentioned diverse viewpoints can be seen as a distracting element of this monograph, as they introduce questionable ideas that the reader may find redundant or unnecessary. Mathematics, in my opinion, is a rather inefficient tool to link various levels (for example the beauty of mathematical calculations and the beauty of the human body) and approaches (philosophical, psychological and theological, but also biological) to exploring beauty. I would prefer a simpler approach, for example exploring the beauty of the human body only from a philosophical, or perhaps a philosophical and psychological point of view and applying mathematics only here. Despite my doubts and comments, I can conclude that *Mathematics and Beauty. An Attempt to Link*

*the Cognitive and Philosophical-Spiritual Aspects of Beauty* is an important scientific monograph that offers reflections and analyses of relationships between beauty and mathematics, with special emphasis on the beauty of the human body, as well as additional psychological and biological aspects of beauty. Therefore, my recommendation is that this monograph should be noticed not only by philosophers, but also by those who are interested in the phenomenon of beauty.

#### Bibliography

DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019.  
GÁLIKOVÁ TOLNAIOVÁ, S.: *Media and Truth in the Perspective on the Practice and Life Form of the Modern “Homo Medialis”*. In *Communication Today*, 2019, Vol. 10, No. 1, pp. 4-19. ISSN 1338-130X.

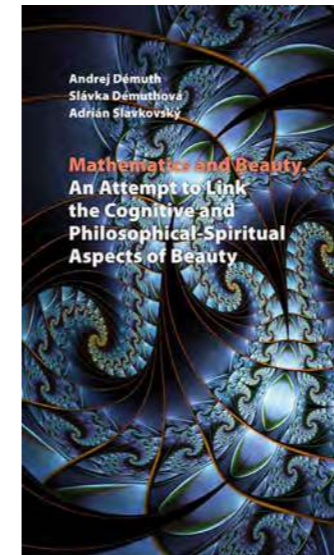
<sup>14</sup> DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 107.

<sup>15</sup> DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual*

*al Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 118.

<sup>16</sup> DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Berlin : Peter Lang Verlag, 2019, p. 133.

#### Reviewed Book



DÉMUTH, A., DÉMUTHOVÁ, S., SLAVKOVSKÝ, A.: *Mathematics and Beauty. An Attempt to Link the Cognitive and Philosophical-Spiritual Aspects of Beauty*. Bratislava : VEDA, Peter Lang, 2019. 160 p. ISBN 9788022417648.

#### Author of the Review

Prof. PhDr. Slavomír Gálik, PhD.  
slavomir.galik@ucm.sk

Faculty of Mass Media Communication  
University of Ss. Cyril and Methodius  
in Trnava  
Námestie J. Herdu 2  
91701 Trnava  
SLOVAK REPUBLIC