Chapter 3

Zeising and the Golden Number

> . . . [we will call it] “the aesthetic law of proportion” or, for short, “the law of proportion”. [The two parts of the line] will be designated as the larger and smaller, or major and minor. Because of the role that the major plays in the proportion, to the whole on one hand and to the minor on the other hand, the major will be referred to as the “middle term” or “median”.
>
> Mathematicians call the proportion that we are talking about, “division in extreme and mean ratio” or the *goldener Schnitt* [literally: golden section or golden cut] .[1]
>
> Adolf Zeising, 1854
> *An Exposition of a New Theory of the Proportions of the Human Body, Based on a Previously Unrecognized Fundamental Morphological Law which Permeates all of Nature and Art, Together with a Complete Comparative Overview of Previous Systems*

Although he certainly would not have wished it thus, after his death almost everyone who had heard of Zeising, aside from some aestheticians and his acquaintances in Munich, associated him uniquely with the golden number. Furthermore, if we are to believe the statement by Hartmann on the title page, this was also the case when he was still alive.

What was so special about Zeising’s writings? His 1854 *Neue Lehre von den Proportionen des menschlichen Körpers* was far from the first work, and certainly not the last, to propose a system of proportions for the analysis of the human body or of architecture. Yet none of these systems has aroused as much interest as Zeising’s golden number based system.

Zeising was not even the first person to associate the golden number with works of art or natural phenomena. Nor, as I discuss in my book *The Golden Number*, was he the first to proclaim that the golden number was in some way the basis of a universal law of nature.

What distinguishes Zeising is that his 1854 *Neue Lehre* was the first work, along with an essentially simultaneous, but much shorter, publication by Friedrich Röber in 1855, to present what we can call a unified golden number based analysis. However, unlike Röber and virtually all the golden numberists who followed him, Zeising went to great lengths to present a *foundation*, in his case philosophical, for his claims. Further, again unlike most other writers, he presented his own ideas only after having presented a description of the systems and ideas of earlier authors.

According to Zeising’s statement in the preface of the 1855 *Aesthetics*, the *Neue Lehre* seems to have been very well received.[2] This book, along with the articles that he wrote in the following years, prompted an ever increasing group of authors to follow Zeising along the paths of golden numberism. By 1865 Gustav Fechner would open his article "Ueber die Frage des goldenen Schnittes" by a reference to the "much spoken about golden number".

For the purpose of analysis we can identify three periods: the genesis of his ideas concerning the golden number and the publication in 1854 and 1855 of his *Neue Lehre* and *Aesthetics*; the publication between 1855 and 1858 of a series of at least ten articles and booklets on the golden number; and, after a period of nine years in which he apparently did not mention the golden number in his writings, articles whose main focus was the cultural and philosophical aspects of form.

1. An Overview of Zeising's System

In order to facilitate an understanding of Zeising's writings, I will first present an overview of his approach to the golden number. First of all there is the question of the name. Zeising notes that the technical mathematical expression for a golden number division of a line is "division in extreme and mean ratio", but that the expression *goldener Schnitt*—for which I will use the English expression "golden number"—is also used.[1]

As Zeising states, a golden number division of a line is one in which the larger segment ("major") plays the role of an intermediary between the smaller segment ("minor") and the whole line.[2] There are two, entirely equivalent, ways of interpreting the statement. In the first interpretation we work with the ratio of smaller to larger, and this will lead to a value of the golden number which is less than 1. In the second interpretation we simply reverse the order and use the ratio of larger to smaller, and this will lead to a value of the golden number which is larger than 1.

For the first interpretation we can write the definition of a golden number division of a line symbolically as:

$$(1) \qquad \text{smaller segment} : \text{larger segment} = \text{larger segment} : \text{whole line}$$

and for the second:

$$(1') \qquad \text{larger segment} : \text{smaller segment} = \text{whole line} : \text{larger segment}$$

In the first case the common ratio has a numerical value equal to .618 . . . , whereas in the second case the common ratio is 1.618 . . . , i.e. the two values differ by exactly 1.

Zeising explicitly notes these two possible ways of interpreting the definition of a golden number division of a line and we find him switching between the two.[3] Since it is sometimes more convenient to think in terms of (1) and sometimes in terms of $(1')$, and since (1) and $(1')$ are equivalent, I will follow Zeising's lead and switch back and forth without explicitly saying so. In other words I will refer to both (1) and $(1')$ as defining a golden number division of a line, and numerically I will work with both .618 . . . and 1.618 . . . . Further to distinguish the