THE HYPOTHETICAL GEOMETRY OF THE PYRAMIDION OF AMENEMHAT III AND THE MODERN METRIC SYSTEM

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Abstract

The geometric parameters of the pyramidion of Amenemhat III have been calculated based on the numerical values of three proposed size variants. Analysis of the numerical data from these three geometric models yielded results that closely align with the Golden Ratio constant and whole numbers within the metric system. According to our formulated hypothesis, there is a possibility that the metric system was used as a 'key' to interpreting the symbolic information of the Giza pyramid complex, and as a kind of social trigger for contemporary human society

1 Introduction

The Pyramidion of Amenemhat III — the capstone that once crowned the Black Pyramid at Dahshur (Egypt). Created around 1850 BCE, during the late 12th Dynasty of the Middle Kingdom, this pyramid-shaped stone is now housed in the Egyptian Museum in Cairo. Carved from a single block of basalt, the pyramidion has remained nearly intact, except for one chipped corner and minor damage near the apex and base edges. According to the literature [1], the stone's height is 1.40 meters, and the base length is 1.85 meters. Its lower edges are cut at an angle to the horizontal plane (see Figure 1). It is assumed [1] that this angled cut was intended to help secure the pyramidion atop the pyramid. However, in our view, this approach may not be optimal: such a design could allow water or sand to accumulate beneath the pyramidion. A more reasonable solution would be to remove some material from the center of its underside, thereby allowing it to be fixed more securely to the pyramid's summit.

Based on our earlier theoretical studies of the geometry of the Giza pyramid complex and the "King's Chamber" [2, 3, 4, 5], we have formulated a hypothesis: it is proposed that the pyramidion of Amenemhat III may contain a set of geometric dimensions that are either proportional to the Golden Ratio constant or correspond to whole numbers within the modern metric system. This hypothesis aligns with the concept of an ancient highly developed civilization and its leading role in the advancement of human civilization (A.Yu. Sklyarov).

Figure 1 – The Pyramidion of Amenemhat III on display at the Cairo Museum

2 The main part

To test our proposed hypothesis, we calculated the geometric parameters of the pyramidion of Amenemhat III based on the numerical values of three size variants (see table). The dimensions of the pyramidions were slightly adjusted due to the lack of precise data regarding their actual measurements (source of size data [1]). Therefore, we considered three possible base lengths, all assuming the same height (=√2).

Table – Hypothetical Geometric Parameters of the Pyramidion of Amenemhat III

Parameter	Variant #1 (Numerical Value)	Variant #2 (Numerical Value)	Variant #3 (Numerical Value)
Height, m	1.414213562373095	1.414213562373095	1.414213562373095
Smaller base side, m	–	–	1.82035945
Medium base side, m	–	1.8477591	–
Larger base side, m	1.85123	–	–
Slant edge, m	1.927051181585	1.925384856546	1.912290318859
Pyramid apothem, m	1.690196180396	1.689246406806	1.681792832605
Pyramid volume, m³	1.615528047569	1.609475769182	1.562097180308
Surface area, m²	9.684936262968	9.65685453227	9.436643478753
Base area, m²	3.4270525129	3.414213691633	3.313708527204
Lateral surface area, m²	6.257883750068	6.242640840637	6.122934951549
Pyramid perimeter, m	15.113124726342	15.092575826184	14.930599075436
Face inclination angle, degrees	56.794906247835	56.844157771407	57.234900149323
Edge inclination angle, degrees	47.212191190626	47.265789858499	47.692173248453
Base corner angle, degrees	90	90	90
Inscribed circle radius, m	0.925615	0.92387955	0.910179725
Circumscribed circle radius, m	1.309017286536	1.306562989609	1.287188511292
Inscribed sphere radius, m	0.500424991049	0.500000004288	0.496605763636
Circumscribed sphere radius, m	1.010018290106	1.008883487908	1.000000002494
Base diagonal, m	2.618034573072	2.613125979218	2.574377022584

Based on the analysis of numerical data from the three geometric variants we proposed for the pyramidion of Amenemhat III, the following values were obtained, which closely approximate the Golden Ratio constant and whole numbers in the modern metric system:

– Variant #1: The volume of the pyramid was calculated as 1.615528047569 m³ (the Golden Ratio is 1.618033988749895…), and the base diagonal equaled the square of the Golden Ratio — 2.618034573072 m (Figure 2);

– Variant #2: The radius of the inscribed sphere was found to be 0.500000004288 m (Figure 3);

– Variant #3: The radius of the circumscribed sphere was calculated as 1.000000002494 m (Figure 3).

In interpreting these results — the values of the three geometric variants of the pyramidion — the semantic aspect should be considered foremost. According to the logic of our formulated hypothesis, there is a possibility that the metric system was used as a “key” to understanding the symbolic information embedded in the Giza pyramid complex, and as a kind of social trigger for modern human society [3].

If, through mathematical methods, it becomes possible to fully prove that the pyramid builders possessed knowledge of the meter as a unit of length (for example, by analyzing the geometry of the King's Chamber [2, 3, 4, 5]), this could serve as a foundation for formulating a truly scientific hypothesis about the existence of an ancient highly developed civilization on Earth and its leading role in the development of human civilization. This represents the social aspect. There may also be a practical aspect to this phenomenon, which we associate with the Giza pyramid complex as a unique object, analogous to the Voyager mission [3].

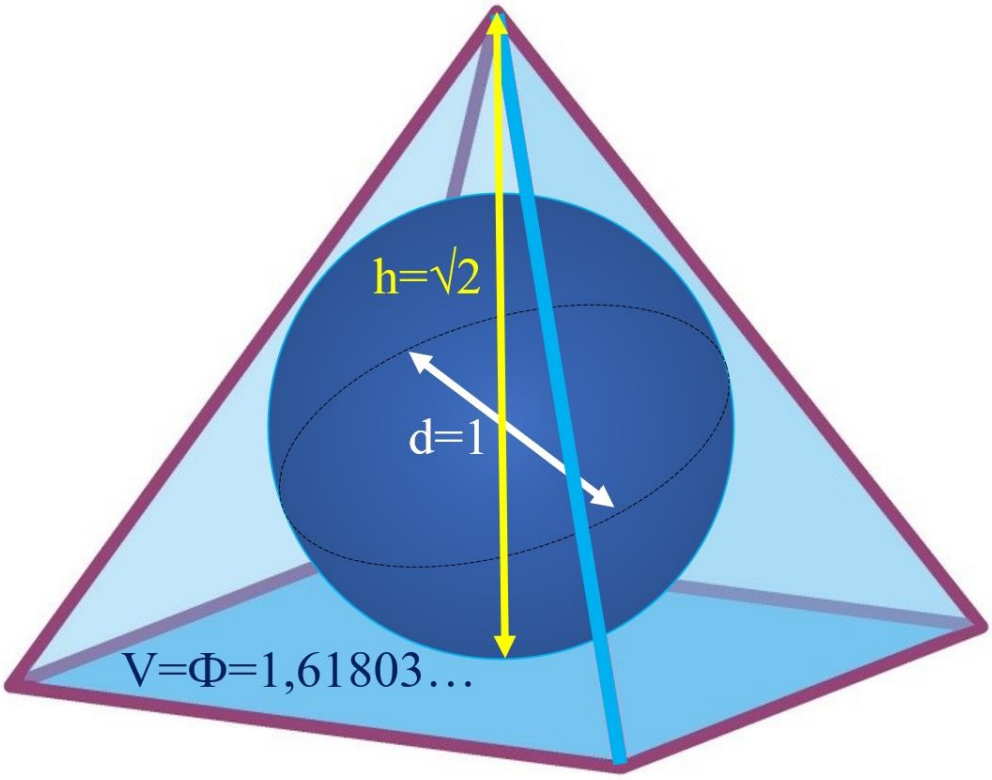

Figure 2 – Hypothetical Geometry of the Pyramidion of Amenemhat III (Variant #1)

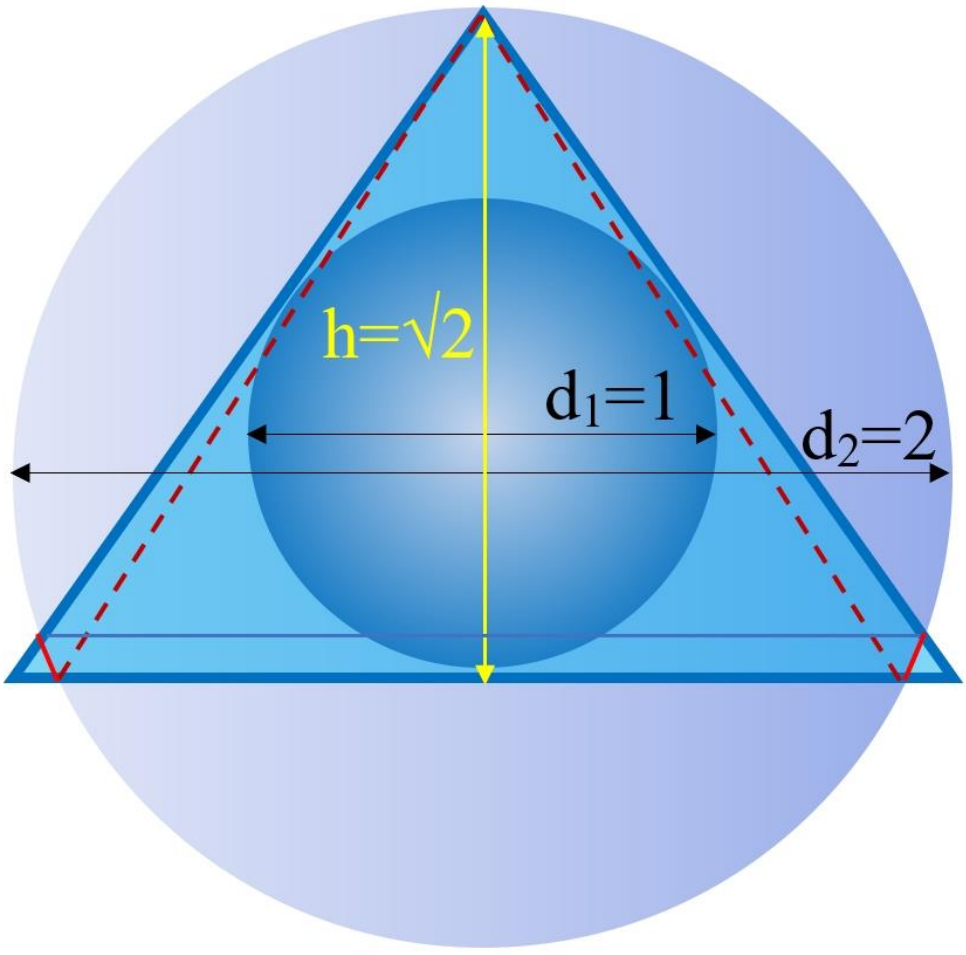

Figure 3 – Hypothetical Geometry of the Pyramidion of Amenemhat III (Variants #2 and #3)

3 Conclusion

1. The geometric parameters of the pyramidion of Amenemhat III were calculated based on the numerical values of three proposed size variants. The dimensions of the pyramidions were slightly adjusted due to the lack of precise data regarding their actual measurements.

2. As a result of analyzing the numerical data from the three geometric models we proposed for the pyramidion of Amenemhat III, values were obtained that closely approximate the Golden Ratio constant and whole numbers within the modern metric system.

3. In interpreting the obtained data—the values of the three geometric variants of the pyramidion of Amenemhat III—the semantic aspect should be considered paramount. According to the logic of our formulated hypothesis, there is a possibility that the metric system was used as a "key" to understanding the symbolic information embedded in the Giza pyramid complex, and as a kind of social trigger for modern human society.

References

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