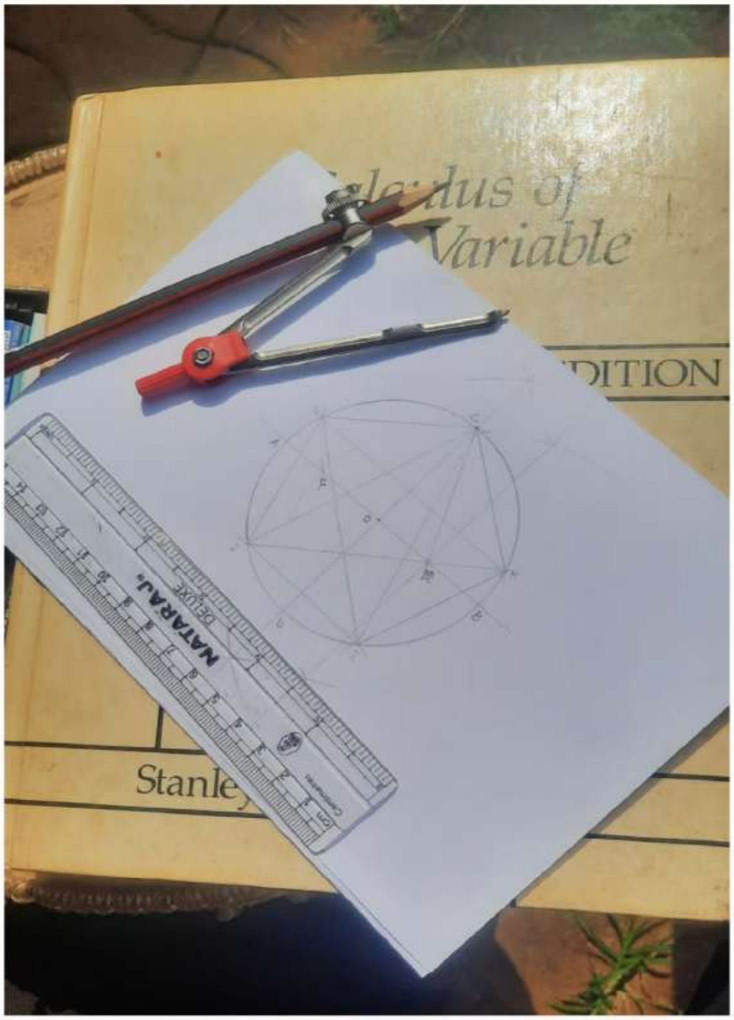
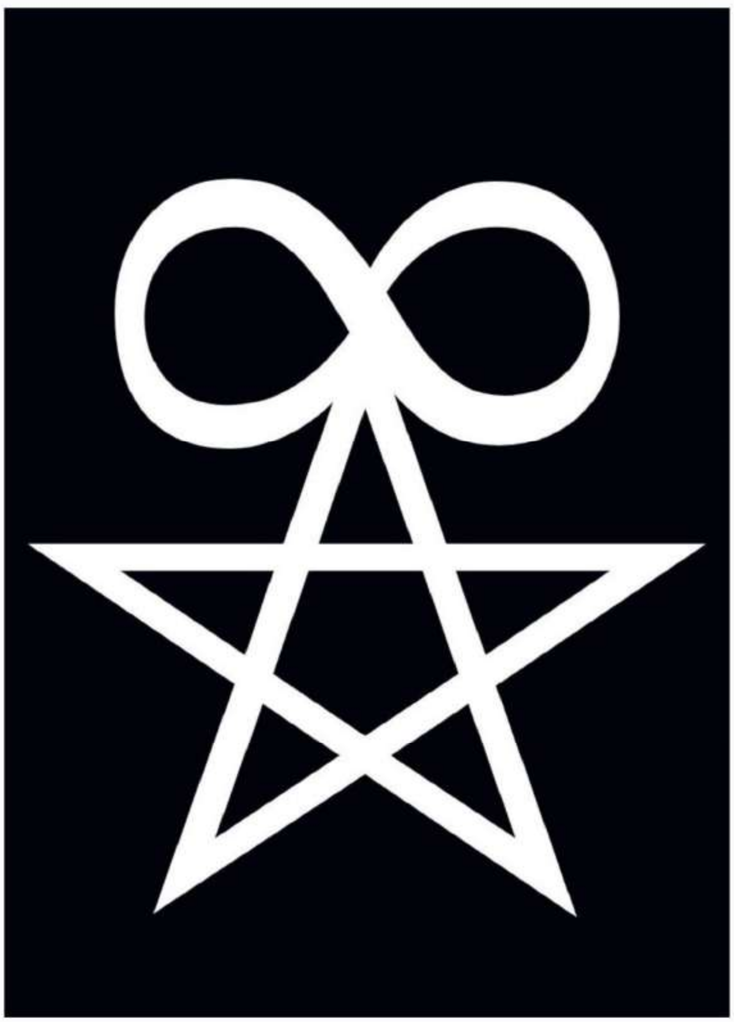


MASONIC CONSTRUCTION

The Pentalpha Method



J'WILLRICH LUTALO

A Certain **Masonic Construction**: Perfect **Pentagon** or **Pentagram**

(The Masonic Pentalpha Method)

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Abstract

The masonic construction method is essentially Euclidean in nature — whether applied to sacred or mundane geometry — we construct using just a stylus, compass and ruler. Because of its paramount importance in mainstream mathematics, but also in occult philosophy and science, the basic, straightforward method for how to construct a perfect pentagon or pentagram is necessary to curate for modern learners and practitioners. In this manuscript then, I lay down a method refined by myself — a mathematical researcher at Nuchwezi Esoteric School and regular contributor to the annual **IoNA Journal**[1]. What I present here is **a certain method** — readily reproducible, algorithmic and leveraging basic **masonic apparatus** — pencil, paper, compass and straightedge. I demonstrate an **iterative construction** of both a pentagon and pentagram ("pentalpha"), via a technique that proceeds starting from the construction of an **arbitrary radius perfect circle**, then its diameter, then diameter bisection, then bisection of one radius, then leveraging that to obtain the perfect chord length with which the essential 72° interior angle necessary to split a circle into 5 edges describing **a pentagon** can readily be obtained. For a perfect pentagon, the ratio of any diagonal in the resulting pentagon to that chord length (one side of the pentagon) must be the golden ratio. We can, and do leverage that fact to empirically evaluate how accurate any particular construction is or if two different construction methods are equivalently accurate. Finally, we highlight that, once a pentagon's edges are thus obtained, the construction of either an upright or **inverted pentagram** readily follows as well.

Keywords: Foundations, Mathematics, Geometry, **Technical Drawing**, Masonic Construction, Pentagon, Pentagram

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[1]IoNA: Illuminates of Nuchwezi Angelic — see https://iona.nuchwezi.com

1 Introduction

The necessary preamble has been laid down in the abstract. I shall only stress here that first of all, the method described here derives from, or rather, improves/simplifies on what was classically described in the ancient mathematics tract; **Euclid**'s *The Elements*, [3], particularly Book IV, Proposition 11.

Moreover, unlike most [online] resources that either reproduce or derive from that work, ours shall not leverage electronically drawn diagrams, and will instead use demonstrations based on actual hand-drawn diagrams that have then been scanned. This, so that the begining student can readily relate their progress with the method based on how the iterative, step-by-step drawings advance from **Step 1** till **Step 7** or **Step 8** when attempted practically using similar apparatus.

In the following section then, I will simply describe the iterative method via which you might reproduce our refined and proven way of constructing either a pentagon or pentagram of arbitrary (but also desired) size. Further note that, unlike our original curated lecture[4][2] (by the present author likewise at NES) demonstrating a similar feat, the method laid down here does not assume one already has **the critically essential element** — a circle's special "pentasector"; a special chord-length subtending the angle 72° at the circle's center — and instead starts out with how to geometrically derive or arrive at that critical length or element. Which, once it is obtained (and not via use of a protractor as was the case in the original lecture), can then be readily utilized to construct either a pentagon or pentalpha of a particular size.

2 The Method

In this masonic construction of a pentagon and pentagram, the only tools you shall need are;

1. Where to draw — such as a clean sheet of plain paper.
2. What to use to draw — I recommend a pencil.
3. What to use to construct — essentially, a geometrical compass.
4. What to use to demarcate lines — essentially, a ruler.

With those tools then, let's start out with a clean slate, and then mount our drawing apparatus or stylus into the compass.

2.1 Step 1: Drawing A Perfect Circle

Having readied the compass then, let's proceed to draw a circle of any size we desire — depending on the scale of the final inscribed figure we wish to construct.

[2]Refer to: `https://youtu.be/BrRihQ4Orgg`

For example, one might basically start out with a circle of radius 4.5cm as I use throughout this demonstration. You basically place the tip of the compass at the point 0cm on the ruler, and then adjust the drawing hand till it touches the point 4.5cm on the ruler. Without further adjusting the compass, you then simply lift off the ruler, and instead place the tip somewhere suitable on the drawing surface. Next, you then describe an arc in some particular direction such as left to right or right to left, and such that, the arc eventually returns to where it started from. Having completed that step then, you shall have drawn or successfully described a perfect circle as shown in **Figure 1**.

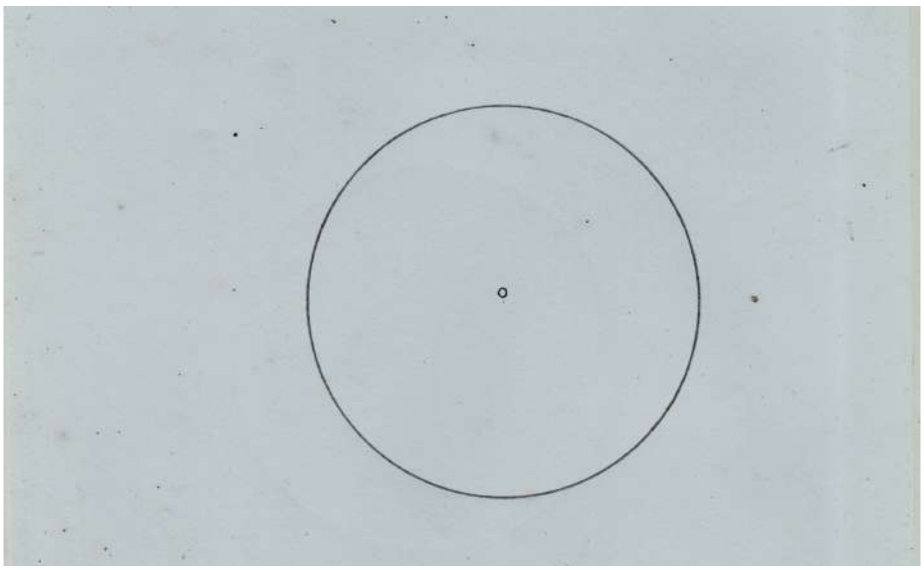

Figure 1: **STEP 1**: A perfect circle.

For easy reference, as we work through the rest of the construction method, I recommend that the critical points in the diagrams be adequately labeled so as to simplify the description of particular lines and segments, as well as construction reference points as might be necessary in subsequent steps. For starters, let us label or rather, denote our circle's center by the letter **O** as shown in **Figure 1**.

2.2 Step 2: Bisecting the Circle

Next, take the ruler, and placing it in such a way that it touches any two points on the circle's circumference, describe a line that goes exactly through the center, **O**, and then touches the circle on two opposite ends, **A** and **B** as shown in **Figure 2**.

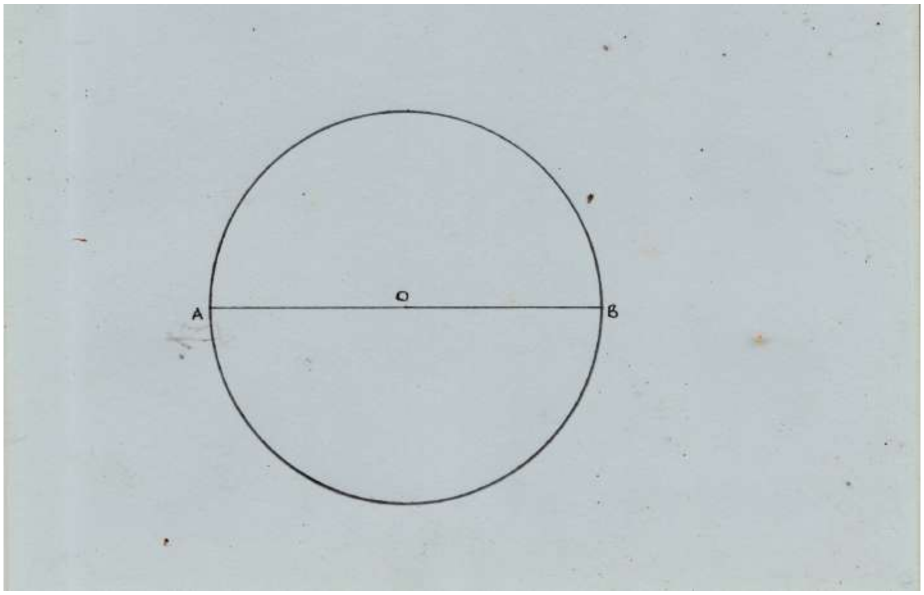

Figure 2: **STEP 2**: A perfect circle bisected using a single diameter.

2.3 Step 3: Bisecting the Diameter

Next, bisect the diameter **AB** by placing the tip of the compass at either point **A** or **B** on the edge of the diameter line at the circumference, and then, extending the drawing hand of the compass beyond the circle's edge. And then, draw two arcs above and below the circle's center **O** as shown in **Figure 3**. Single arcs however would not be enough to describe the diameter bisecting line, and so, if you drew the first with the compass pointer at **A**, then, without modifying the angle subtended by the drawing hand, simply shift the compass to the opposite point, and likewise draw another arc in a similar fashion, so that, finally, we have two intersecting arcs above and below the point **O**.

Then, using the ruler, describe and then draw a line that connects the two bisecting arcs, and which line must definitely cut through the circle's center **O** as shown in **Figure 3**. Thus, the circle's diameter shall be bisected into two equal parts, using a line perpendicular to the original diameter, and which shall likewise have split the original circle into four equal sectors as shown.

At this moment, it shall be helpful to label one of the points at which the diameter's bisector touches the circle with a letter **C** as shown in **Figure 3**.

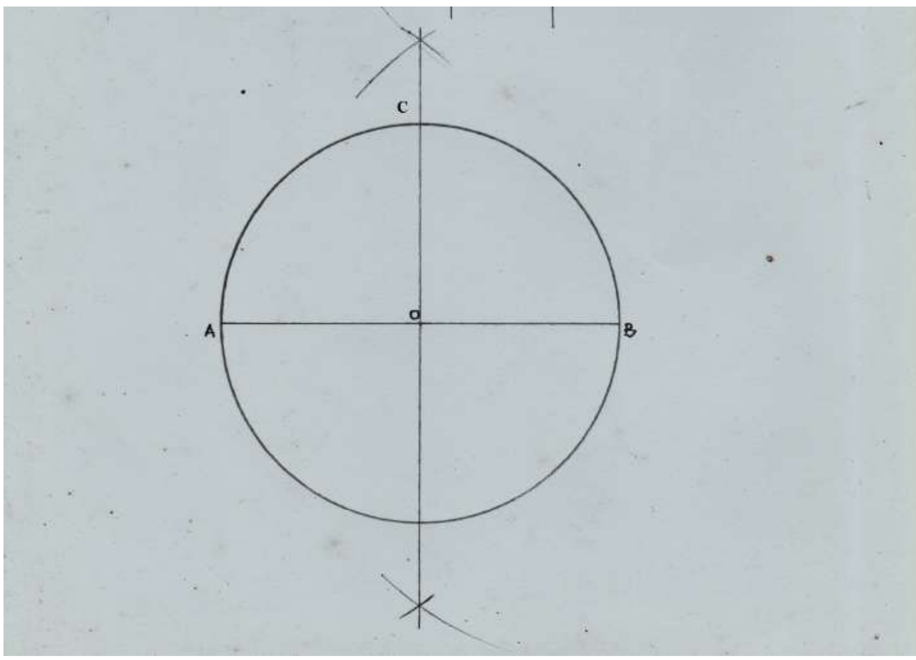

Figure 3: **STEP 3**: Bisect the circle's diameter.

2.4 Step 4: Bisecting One Radius — Splitting Diameter into 3:1

Next, we need to take one side of the original diameter **AB** — particularly, the [radius] line **OB** running from the center **O** to the circumference at point **B**, and then bisect that using a method similar to how we bisected the line **AB** in the previous step (**Section 2.3**).

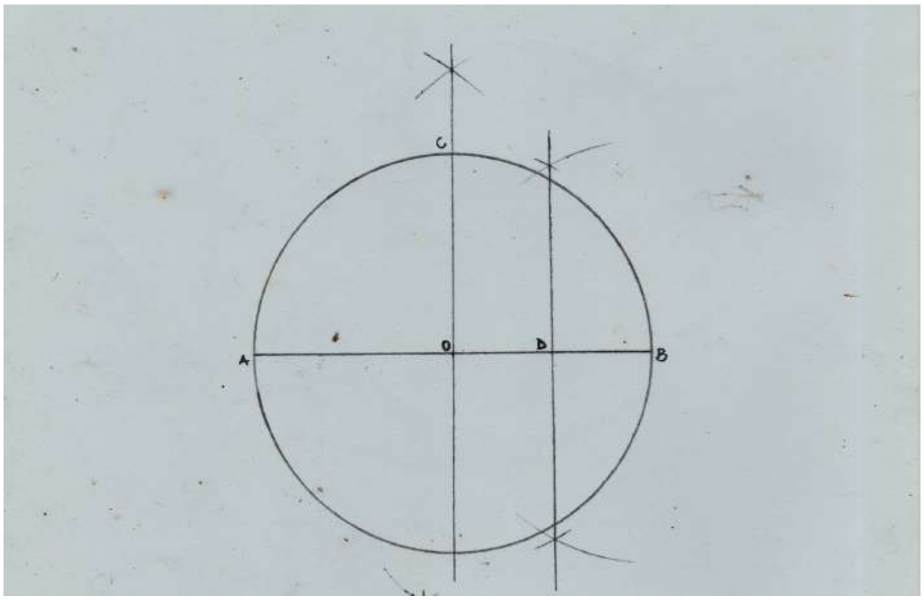

Figure 4: **STEP 4**: Bisect one of the circle's radius. (Golden-ratio step)

Essentially, place the compass tip at point **B** and then draw an arc somewhere outside the circle. Then, without altering the compass, simply shift the tip to point **O** at the circle's center and also draw another two arcs so they touch and bisect the earlier arcs. At that point then, proceed to draw a line that bisects the radius **OB** at a point that I shall label **D** as shown in **Figure 4**.

At that moment, even though it is a secondary issue, the original diameter **AB** shall have been divided into two extra segments **AD** and **DB** that are in a simple ratio ($\frac{AD}{DB} = \frac{(4.5*2)*\frac{3}{4}}{\frac{4.5}{2}} = \frac{3}{1}$).

2.5 Step 5: Deriving 72° [Part 1]

Basing on the construction in Step 4 (**Section 2.4**), we then leverage the length **DC** or **CD** from that step, to describe another intercept along the original diameter **AB** as follows:

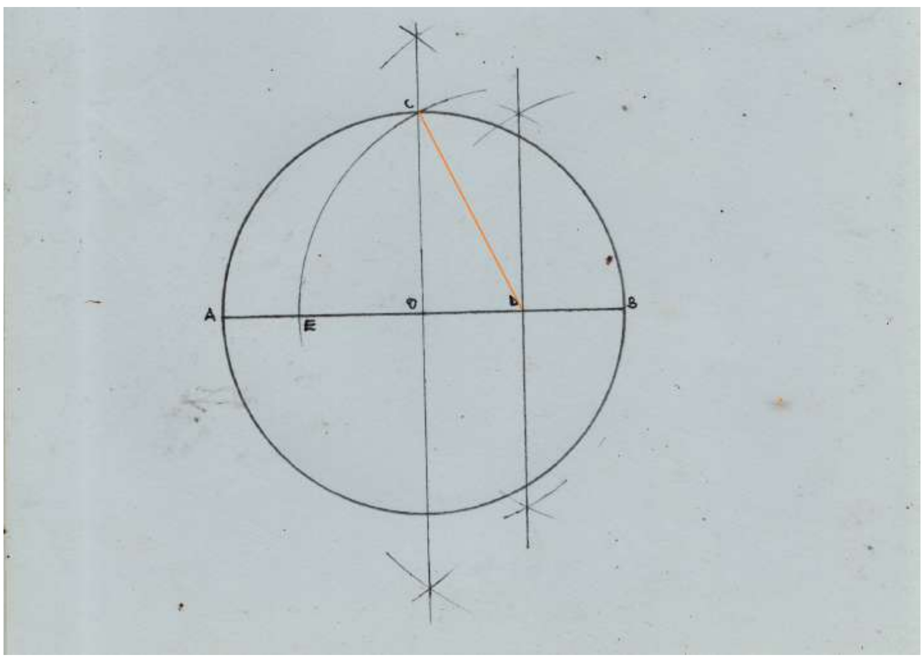

Figure 5: **STEP 5**: Deriving 72° [Part 1]

Place the compass tip at point **D** — the radius bisector, and then adjust the compass so that the drawing tip is at **C**. Having obtained that length, and without shifting the compass, draw an arc that intercepts the diameter **AB** at a point I shall then denote **E**. Essentially, the arc $\widehat{\mathbf{EC}}$ has the radius $\bar{DC}$ and sweeps through both **C** and **E** as shown in **Figure 5**.

2.6 Step 6: Deriving 72° [Part 2] — The Perfect Chord for Constructing a Perfect Pentagon

As part 2 of the task begun in Step 5 (**Section 2.5**), we want to use the special length **CE** as the definition of what **the perfect chord** for constructing one side of a pentagon [inscribed within our original circle] should be. For this, simply place the tip of the compass at point **C**, and then place the drawing tip at **E**, the point I marked last.

Then, using that length [as the radius], and without shifting the compass's pointer, draw an arc that runs from **E** to touch the original circle at a new point that I shall denote **F**[3] — see this in **Figure 6**.

Additionally, and without modifying the compass's subtending angle at all, likewise do the same on the other side of the circle; with the compass tip still at **C**, also draw another arc of length **CE**, that creates a second vertex along the circumference, and which we then denote **G** as shown in **Figure 6**.

Once we have the two starting points **F** and **G**, both of which are actually vertices describing part of the final pentagon we wish to describe, then, we construct the remaining extra two vertices as such:

1. Still keeping the compass subtended so as to describe the perfect chord length **CE**, shift the compass tip to the point **F**, and draw just one other extra arc along the circumference of the original circle, slightly below **F**. Let's refer to that point as **H**.
2. Similarly, draw another circumference-intercept arc basing at point **G**, so that we have the fifth vertex, **I**.

With those steps thus completed, we shall then have 5 vertices along the circle's circumference; **C**, **F**, **G**, **H** and **I**.

At that moment, we are ready to either draw a pentagon or a pentagram as we see in the next two sections.

2.7 Step 7: Drawing a Perfect Pentagon

In case one wishes to draw a pentagon, you would simply take the 5 vertices derived in Step 6 (**Section 2.6**); **C**, **F**, **G**, **H** and **I**, and then join them via

[3] Important to note concerning that moment; The angle $\angle$**FOC** shall exactly be 72°, and that this can be practically proved using a typical mathematical set protractor instrument. However, the masonic construction method I am developing here does not need worry much about that — since we shall not be directly relying on that angle to draw the final figures, and instead shall leverage the chord length it corresponds to, so as to describe the 5 vertices we require, as we see hereafter.

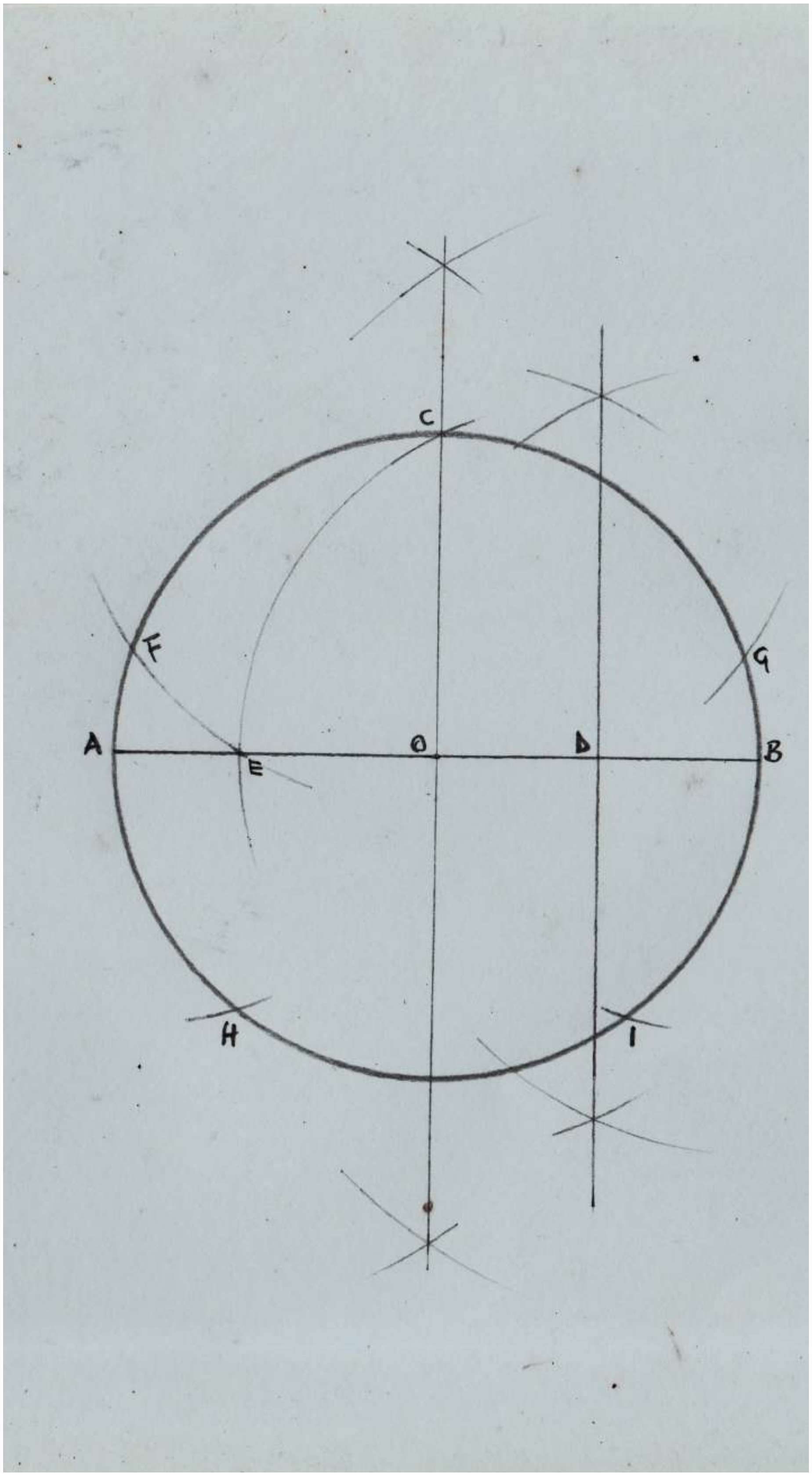

Figure 6: **STEP 6**: Deriving 72° [Part 2]

drawing 5 necessary line segments **FC**, **FH**, **CG**, **GI**, and finally **HI** as shown in **Figure 7**.

To confirm if indeed the resulting pentagon is perfectly drawn, one can leverage the fact that, for a perfect pentagon, the ratio of any one side of the pentagon (such as **FC**) to any one of the pentagon's diagonals (e.g **FI**, **HG**, **CI**, etc.) should be **the golden ratio**. That is, for example[4], $\frac{FI}{FC} = \frac{(1+\sqrt{5})}{2}$.

2.8 Step 8: Drawing a Perfect Pentagram

In case one wishes to draw a pentagram, one shall simply take the 5 vertices derived in Step 6 (**Section 2.6**); **C**, **F**, **G**, **H** and **I**, and **carefully** join them via drawing only the necessary 5 line segments as such; **FG**, **GH**, **HC**, **CI**, and finally **IF** as shown in **Figure 8**.

Moreover, note that, unlike earlier figures where the diagrams somehow maintain the guidelines from all the earlier steps — such as in **Figure 6** and **Figure 7** — the final diagram we see in **Figure 8** was drawn as such, to intentionally demonstrate **how a pro would approach the task of drawing a pentagram.** Essentially, only minimal guiding arcs and intercept points are kept, so that, the final diagram is as clean and as less cluttered as can possibly be. However, the beginner can still derive their pentagram from a continuation of the diagram and process that was either described in **Figure 6** (having only the 5 essential vertices), or as in **Figure 7** — having the larger pentagon that would then circumscribe the pentagram (and which pentagram would itself contain yet another smaller pentagon as we see in **Figure 8**!)

Finally, just like we saw for the pentagon construction in the previous section, note that, **to confirm if indeed the resulting pentagram is perfectly drawn**, one can leverage the fact that, for a perfect pentagram, when we consider the full length of the sides of any of its arms — such as the entire length **FI** or **FG** or **CH** or **CI**, etc. — one should find that, for any such length, when considered together with a point where the side intercepts with that of another arm — for example, for **FI**, the segment **FJ** vs **JI** (see **Figure 8**), we must find that the longer segment, **JI** is in a **golden ratio** with the shorter end **FJ**. That is **JI**:**FJ** $= \frac{JI}{FJ} = \frac{(1+\sqrt{5})}{2}$. Thus, noting as per our reference construct, we find that, with the entire length **FI** = 8.8cm, and that **FJ** = 3.3cm, we have $\frac{JI}{FJ} = \frac{5.5}{3.3} \approx \phi$, which means, I wasn't that perfect at the construction, but was [still] almost close... (for my resulting **1.666666666..** vs **1.618033988..** we see that at least I was accurate to 1 decimal place) just like we saw for the corresponding pentagon construction! It means, those attempting to [re]produce perfect pentagons or pentagrams as per this method, where high accuracy is required, **it is just a matter of having to be more careful when constructing.** Otherwise, the method is indeed provably correct and accurate.

[4]In my particular construction demonstration, with a pentagon inscribed within a circle of diameter **9cm**, the corresponding ratio turned out to be: $\frac{FI}{FC} = \frac{8.8}{5.4} \approx \phi$, which means, I wasn't that perfect at the construction, but was almost close... (for my resulting **1.629629629..** vs **1.618033988..** we see that at least I was accurate to 1 decimal place)

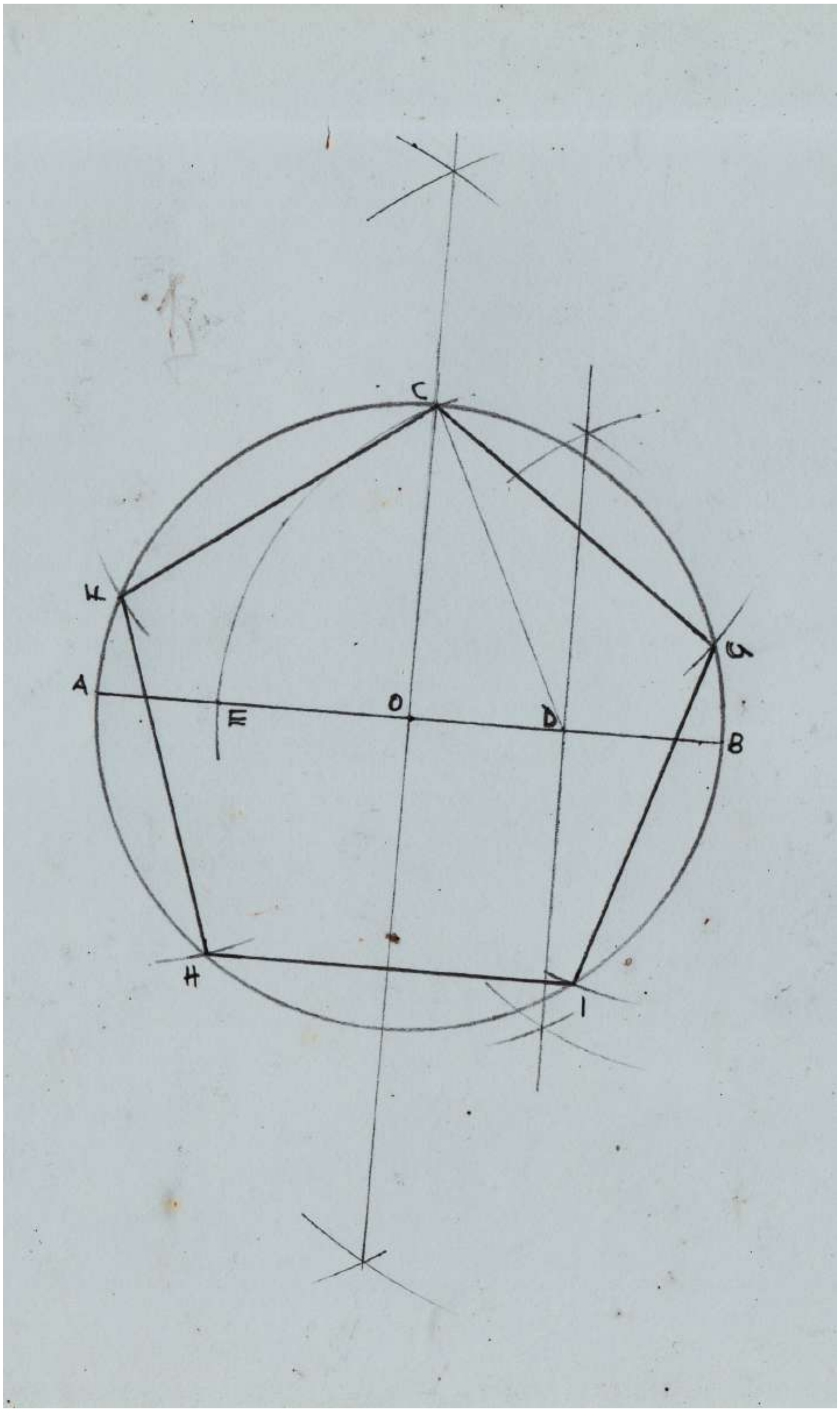

Figure 7: **STEP 7**: Drawing a Pentagon.

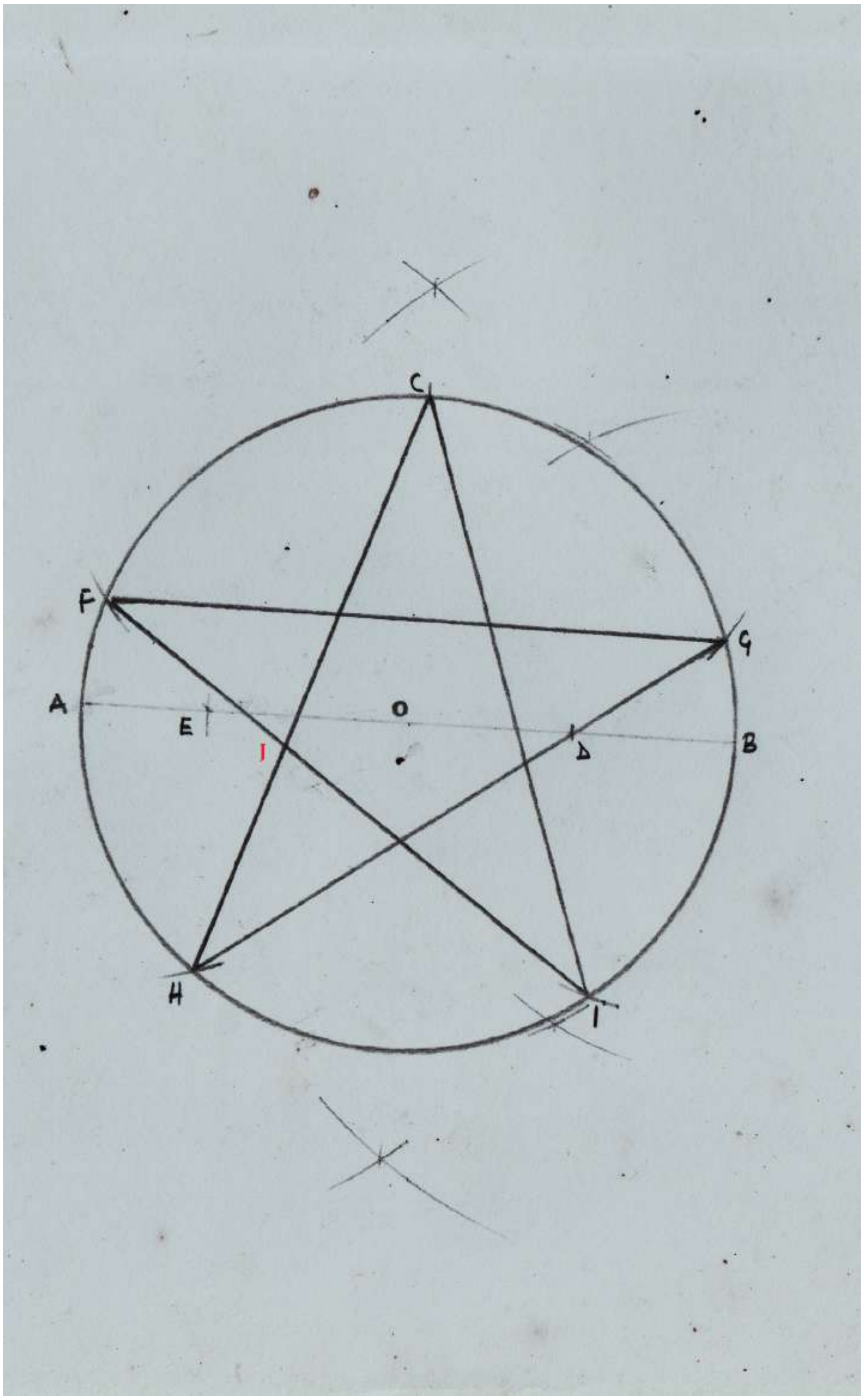

Figure 8: **STEP 8**: Drawing a Pentagram.

3 Conclusion

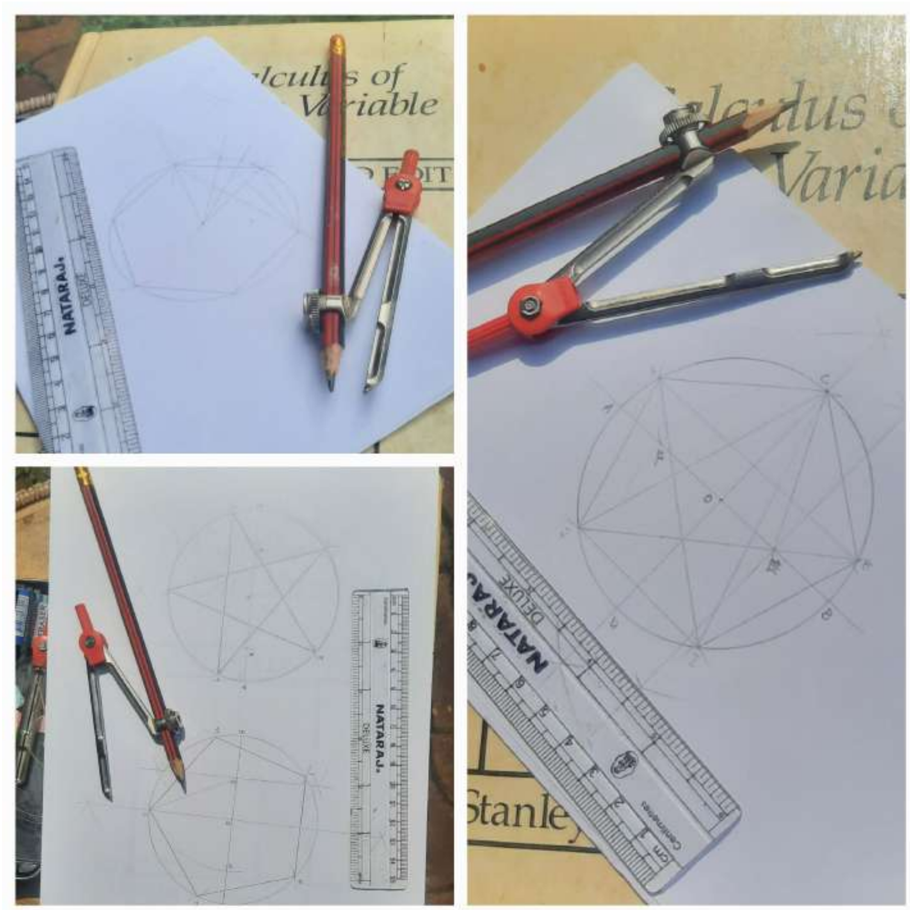

Figure 9: **The Results**: A collage showing the perfectly drawn pentagram and pentagon, as well as bits of other related explorations with the hexagram and alternative approaches to the Pentalpha Method.

In summary then, I have developed a practical, reproducible recipe or algorithm — **The Masonic Pentalpha Method** — by which anyone can precisely draw or describe the dimensions of either a pentagon or a pentagram that is scaled so as to exactly fit inside a circle of some desired radius. The method draws from ancient techniques first described by Euclid, but arguably simplifies on, as well as renders them readily reproducible for the modern student interested in leveraging masonic construction apparatus and methods. Concerning this method, it is especially important to note that, unless one clearly follows the prescibed way to produce all the 5 vertices of the target pentagon or pentagram as described in Step 6 (**Section 2.6**), one is likely to end up with only an approximately perfect figure[5]. Also, as per the concluding remarks in both **Section 2.7** and **Section 2.8**, one can empirically evaluate how accurate their particular construction is — whether for a pentagon or for a pentagram respectively — by leveraging the standard, well-known facts concerning how certain lengths within either a pentagon or a pentagram relate to each other based on the **golden ratio**. This evaluation can likewise help to evaluate the accuracy of this construction method relative to any others, or to compare two students attempting the exercise via our method based on the relative accuracy of their resulting constructions.

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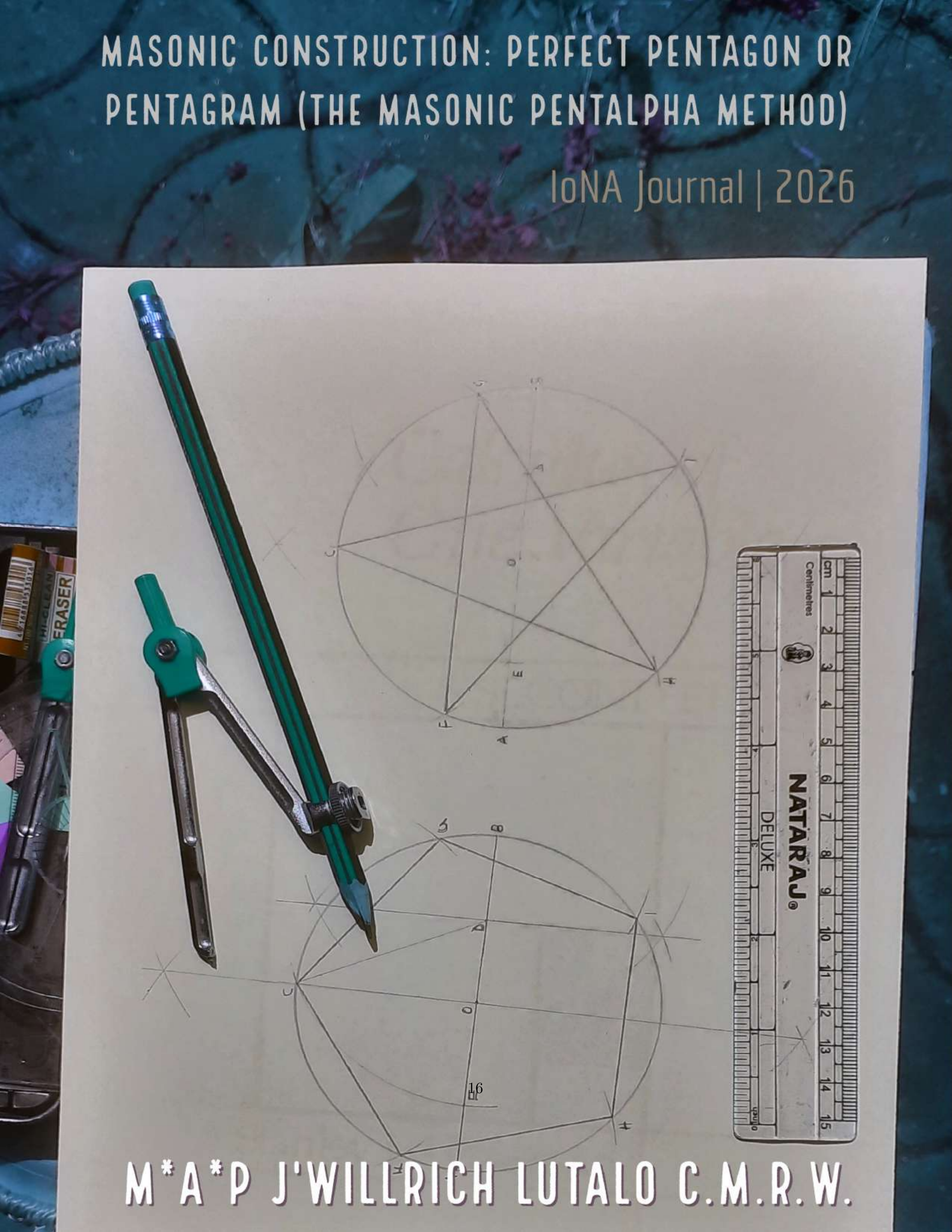
[5] Basically, and via experimentation and critical observations using analysis and numerous reproductions, I have established that, once one has the necessary special chord length **FC** or **CF** derived in **Section 2.6**, an attempt to haphazardly replicate it as via proceeding from F to H and then from H to I, etc.. in that order and until one has a total of 5 vertices — essentially, merely via leveraging the last vertex as the anchor for the compass when describing the next vertex, results in a [surprisingly] inaccurate construction!

MASONIC CONSTRUCTION: PERFECT PENTAGON OR PENTAGRAM (THE MASONIC PENTALPHA METHOD)

IoNA Journal | 2026



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