

The Speed of Light Numbers Revealed by the Length in Meters of the Great Pyramid Chambers and Passage Systems

Larry Pahl

The American Institute for Pyramid Research, Crossville, TN, USA

Email: director@greatpyramid.org

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Abstract

Measurements in meters taken from known and prominent features of the Great Pyramid of Giza, when placed in a rational order based on the orientation and common understanding of its existing passage systems, yield the numbers in the speed of light given in meters per second in a vacuum: 299,792,458. The meter measurements found in this study each contain two digits, except for the final one, which is a single digit, as follows: 29 - 97 - 92 - 45 - 8. This paper examines the basis in the Great Pyramid for each of these numbers. A discussion of various issues related to this speed of light finding follows.

Keywords

Speed of Light, Great Pyramid, Metrology, Kings Chamber, Grand Gallery, Queens Chamber

1. Introduction

It is certainly an awkward and unusual claim that the numbers, which form the speed of light, 299,792,458 (meters per second in a vacuum) can be derived by attention to the measures of the passages of the Great Pyramid. I can find nowhere in the body of literature on the Great Pyramid, including the writing of those known pejoratively by many Egyptologists as “pyramidologists”, where this claim is advanced. But this is indeed the claim advanced in this paper. This thesis is aided first, by the fact that the five speed-of-light numbers, 29, 97, 92, 45 and 8, are derived from all the traditional and well-known passages and chambers of the Pyramid. None are left out. And secondly, these five numbers follow a rational sequence as they are started in the lowest part of the Pyramid and follow a sequential path upward. See **Figure 1**.

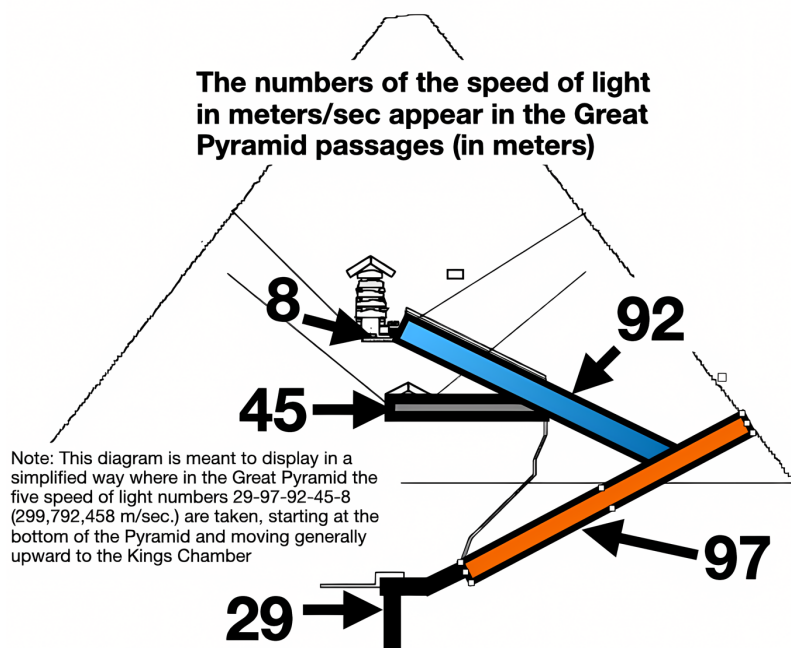


Figure 1. Speed of light in Great Pyramid passages.

After the architectural and metrological arguments for the existence of the speed of light numbers, several issues are discussed. What about the claims of new passages being found in the Pyramid that are thus not addressed by these numbers? How can it be explained that these numbers appear through use of the metric system, supposedly a relatively recently created measuring system? How much is the thesis degraded by the fact that all the speed of light numbers come through rounding the final measures in each Pyramid section? Did the ancient Egyptians have advanced scientific knowledge?

The discussion includes new understandings gained by the author in pursuit of this inquiry, including the findings related to the upper and lower mouths of the Well Shaft, and the division of all the various Pyramid passages into two “roads”, as referenced in the *Book of the Dead*.

2. Genesis

While others have posited the finding of the modern speed of light constant in various ways in the Great Pyramid (see **Appendix**), this is not what prompted the current inquiry. Science smiles at, but allows, the story of Isaac Newton sitting under an apple tree in his garden at Woolsthorpe Manor and somehow being inspired to theorize about the nature of gravity from the event of an apple falling from that tree. The current inquiry was begun when an engineer, Bob Crielly, an associate of the American Institute for Pyramid Research, had a dream of the Great Pyramid passage lengths producing the speed of light. This was the apple falling from the tree for me. I went to the best measures of the Great Pyramid passages I could find and began to see if the numbers in the speed of light were somehow tucked away in the Great Pyramid passages.

3. The Use of the Meter

Mr. Crielly, as an engineer, usually uses the metric system when corresponding with me about various pursuits in which we are engaged. While it may immediately disqualify the present inquiry in the minds of some that an ancient structure might encode a measure founded in 1799 by the French, I nonetheless chose to look for speed of light numbers in meters. The world's leading metrologists have reviewed the possibility that the meter has a history preceding the enlightened French creation of the metric system but have reached no consensual conclusion. But some of the metrologists allow a history of the meter that starts before 1799. Let me give one example of this finding, to show a rational basis for the assertion.

Richard Heath in *Sacred Number and the Origins of Civilization* writes:

“Who would have suspected that the new measure of the meter, designed to replace all the measures of the ancient world, had been based upon an actual ancient measure used in France during megalithic times?” (Heath, 2006)

John Neal in his metrological study “All Done with Mirrors” says that it was an epochal discovery of the metrologists when it was realized that most ancient systems of measure were connected by integral ratios. He writes:

“It was at this point that it was realized that Sumerian, Egyptian, Greek and English metrology were, in fact, one system, and a comparative yardstick was at hand to categorize all other systems and values.” (Neal, 2000)

Table 1 gives one example of the integral ratio connection between major systems of measure, which includes in its final iteration a connection to the meter.

Another justification for using the meter to measure the Great Pyramid passages is its apparent use in two places in the Kings Chamber. The first is in the perimeter of that sacred space. It is well known that the Chamber is a double square with dimensions of 10 royal cubits by 20 royal cubits. The perimeter in cubits is thus an even 60 cubits. Converting that distance to meters yields 31.416 meters, which as a number is π (pi) times 10. See **Figure 2**. Since it is widely recognized that the Great Pyramid is built on π proportions, for instance, its height being in $4/\pi$ proportion to a half base of unity (and a slope angle in ϕ proportion), then a Kings Chamber perimeter of 10π meters could be seen as intentional.

Table 1. Progression of various feet measures leading to the meter.

	Foot Length	Ratio Connecting to the Next Measure
Iberian Foot	32/35 feet	Connection to the Roman Foot: 21/20
Roman Foot	24/25 feet	Connection to the English Foot: 25/24
English Foot	1 foot	Connection to the Persian Foot: 21/20
Persian Foot	21/20 feet	Connection to the Carnac Foot: 25/24
Carnac Foot	35/32 feet	Connection to the Meter: 1/3
The Meter	3.281 feet (rounded)	3 Times the Carnac Foot = 3.281'

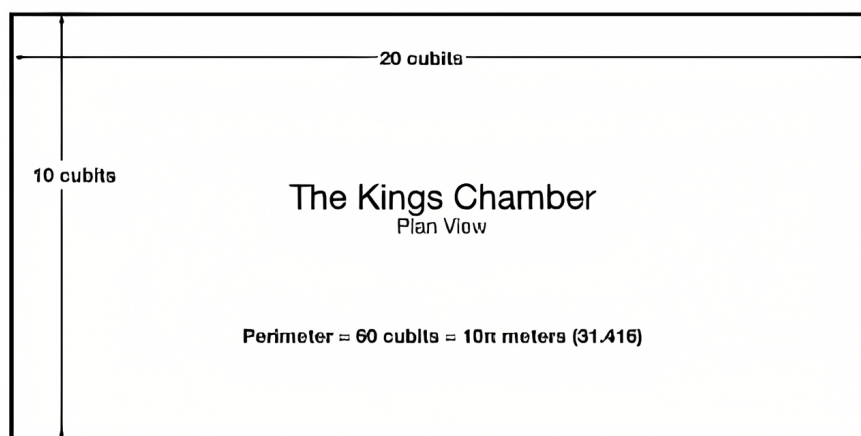


Figure 2. Kings Chamber plan view.

The intentionality can't be proven, but this dimension provides a rational basis for believing it could be so.

A second apparent use of the meter in the Kings Chamber is in the diagonal measure of the long north and south walls of the Chamber. The floor plan has such regular dimensions—10 cubits by 20 cubits—one might think that the Egyptian designers would follow suit and have a ceiling height of an even 10 cubits. But the ceiling is a very uneven 11.18 cubits. Why? Why wasn't an even number of cubits used in the design of the Kings Chamber ceiling height? Again, intentionality can't be proven, but it is an interesting fact that the very uneven ceiling measure of 11.18 cubits yields a diagonal on the Chamber's long walls of almost exactly 12 meters. Any other height would not achieve this resulting diagonal length. Reaching the conclusion that the 12 meter length of the design is intentional is entirely rational. See **Figure 3**.

With these two examples of the appearance of the meter in the Kings Chamber, let us proceed to look at measurements in meters in the Great Pyramid passages.

Figure 4 is a diagram of the Great Pyramid showing its passages and the convention of their naming.

4. The Measures

The lengths of the passages which yield the speed of light in meters per second in a vacuum (299,792,458 km/sec), are the following meter lengths: 29 - 97 - 92 - 45 - 8. These measures utilize all the major passages in the Great Pyramid and follow a sensible order, basically working from the bottom of the Pyramid upward.

4.1. 29 Meters

The first measure starts from the current "bottom" of the Great Pyramid, the bottom of the pit (hereafter referred to as the "Pit") that is on the middle of the east side of the Subterranean Chamber. The bottom of what was once called "the

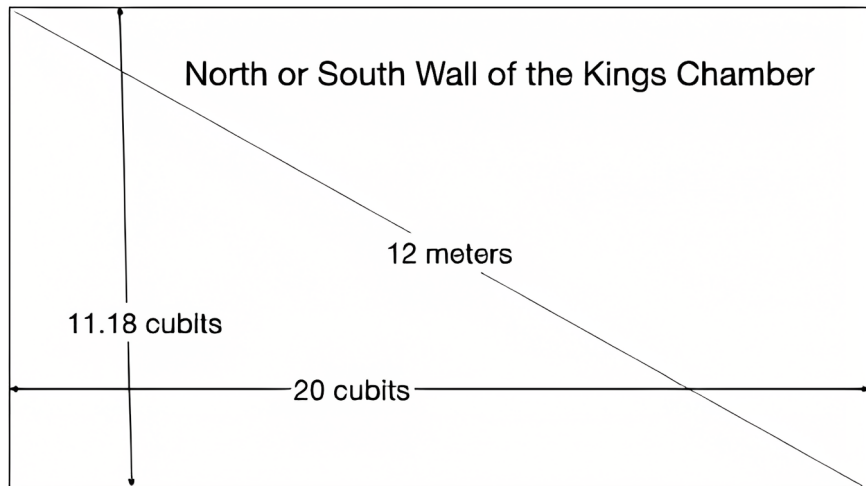


Figure 3. North wall Kings Chamber.

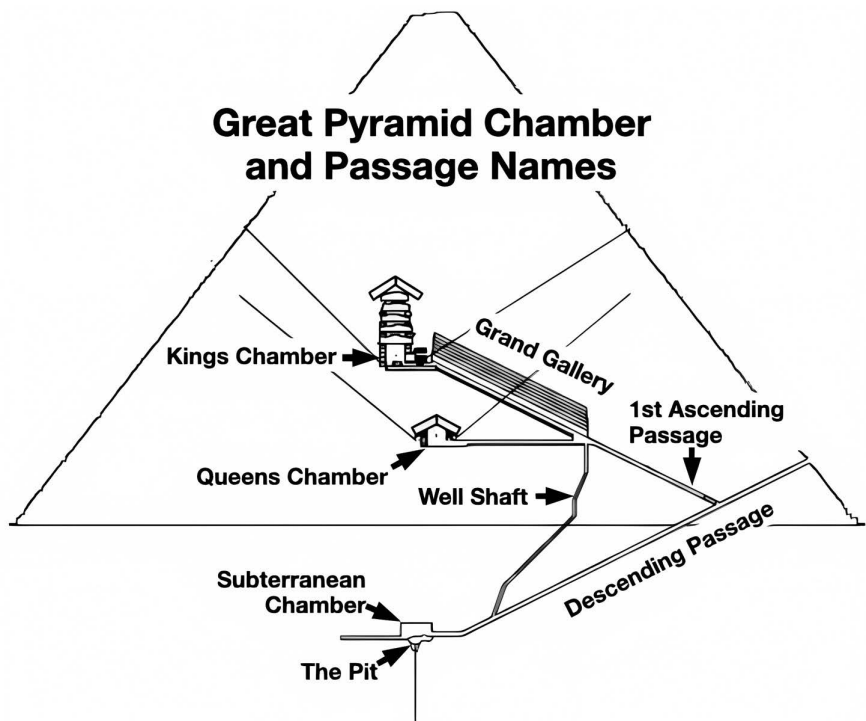


Figure 4. Great Pyramid passages.

bottomless pit” cannot be perfectly ascertained. Perring gave the order to extend what was the bottom in his day—a depth he does not give us—by 50 additional feet (Perring & Vyse, 2015). Because of the “want of a free circulation of air” the excavation, which was exceedingly difficult, was stopped at “thirty-eight feet” (Perring & Vyse, 2015). It is known that at various times in the past there was excessive debris in the Subterranean Chamber, owing to its acting as the dump yard for excavations performed higher in the Pyramid. The debris created by Perring’s dig into the Pit bottom added to this debris.

While there are records in ancient times of visits to the Subterranean Cham-

ber, Davison, in 1763 wrote that the Descending Passage was so clogged that he could not enter (Edgar & Edgar, 1923). In 1817, Caviglia cleared the debris so that the Subterranean Chamber could again be accessed, but with difficulty, as 20 years later Vyse reported that the Descending Passage was “much encumbered with stones and rubbish” (Perring & Vyse, 2015).

More debris must have entered the Descending passage in the next 28 years, perhaps from what Vyse and Perring left, because Scotland’s Royal Astronomer C. Piazzi Smyth reported in 1865 that the Descending Passage below the First Ascending Passage was so blocked with large stones that he was not able to visit the lower passages (Edgar & Edgar, 1923). In 1881, Professor Flinders Petrie had enough of the obstructing stones moved that he was able to make the descent to the lowest Pyramid chamber and take limited measurements. The measurements he took are useful in this quest for the speed of light numbers, but they do not give the place we want to start: the bottom of the Pit. Petrie gives no measure for this.

Figure 5 summarizes Petrie’s measures. Petrie’s measures for the Descending Passage are in inches from the original entrance of the Pyramid. To the northern lip of the Well Shaft opening into the Descending Passage, which Petrie calls the “lower mouth”, is 3825 inches. From the entrance to the beginning of the horizontal passage to the Subterranean Chamber is 4143”, thus yielding 318” (8.08 meters) from the northern mouth of the Well Shaft to the beginning of the horizontal floor (Petrie, 1990).

From that point, moving south along Subterranean Chamber horizontal passage floor to the entrance into the Subterranean Chamber, it is 346” (8.79 meters). See **Figure 6**, where the 346” length recorded by Petrie (Petrie, 1990) is circled.

We are now at a point where we need measurements of the north-south width of the Pit. For this it is hard to find measures. Petrie, Rutherford, the Edgar brothers, and C. Piazzi Smyth, all known as dedicated measurers of the Great Pyramid, do not help much here, other than to let us know, as the Edgars do:

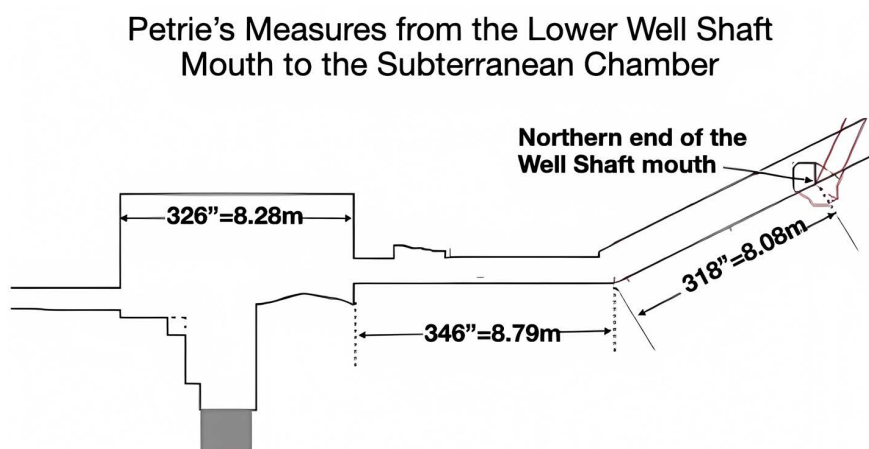


Figure 5. Petrie measures for lower well shaft and pit.

Petrie, length of the Subterranean Chamber horizontal passage

	Distance from End of E. P. Floor.	I
Beginning of Horizontal Passage	0	
Fissure	20	
In Passage	76 W. 91 E.	
N. Door of Side Chamber	121	
N. Door of Large Chamber	218	
In S. Passage	346*	
"	760	
"	900	
"	1040	
"	1180	
End	1318	I

Figure 6. Petrie length of horizontal subterranean passage.

“Only approximate measures can be secured, for there is no part of the Subterranean Chamber clearly defined.” (Edgar & Edgar, 1923)

Stefan Holmgren maintains the website, “The Khufu Pyramid” (Holmgren, 2023), which keeps a compendium of measures and scale model drawings of the Great Pyramid from respected researchers. Using pixels in the Pyramid drawings rendered digitally, and with Excel sheets which can compute angle and distance measures, Holmgren is able to calculate distances for parts of the Pyramid where few or no measurements exist. Here are the distances he shows for the interior sections of the Subterranean Chamber Pit which will be useful in this study (also see Figure 7).

From the door of the Subterranean Chamber to the north end of the Pit (extended) is 3.46 meters and to the south end of the pit (extended) is another 1.99 meters for a total of 5.45 meters. See Figure 8. Joining this with Petrie’s measures beginning with the lower mouth of the Well Shaft (Figure 5) there are 22.32 meters to the south end of the pit (extended to the floor level.)

Since our goal was to begin the speed of light measures from the lowest portion of the Great Pyramid, the Pit within the Subterranean Chamber, we now need a measurement from the Chamber floor line down to the bottom of the Pit. The original floor there does not now exist because Perring and Vyse interpreted Herodotus to mean that the way to Pharaoh Khufu’s burial might be below this spot. As mentioned, with great effort they excavated 38 feet to no avail. The Edgar brothers, in their efforts to clear the Descending Passage and Subterranean Chamber of its debris, besides paying their workers to carry out this rubble by bags, also used this excavated hole as a dump for debris (Edgar & Edgar, 1923).

Petrie and Holmgren Measures from the Lower Well Shaft Mouth to the Subterranean Chamber Pit

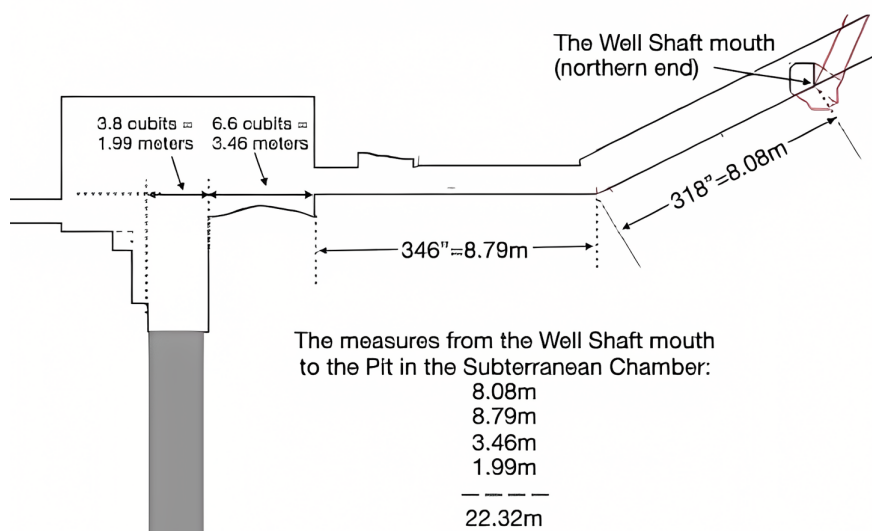


Figure 7. Petrie and Holmgren measures from lower well shaft opening to the pit.

Stefan Holmgren Measures of the Subterranean Chamber Pit

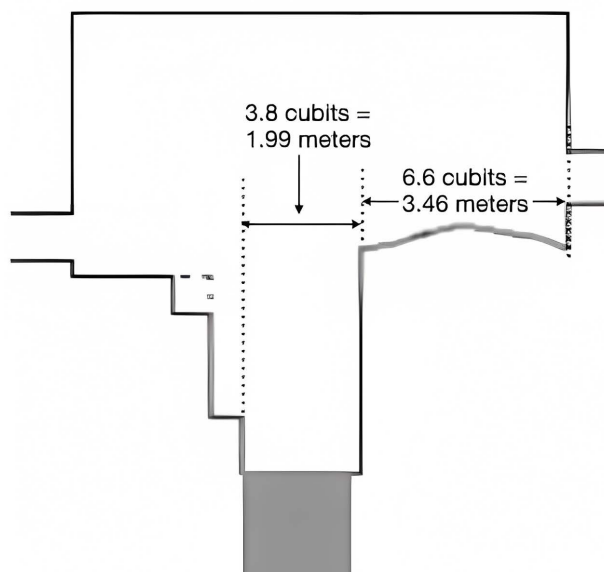


Figure 8. Holmgren measures of the pit.

Whether the current depth of this area is determined by their fill efforts, or that of others, it was this current bottom to which I pointed my laser measure when I measured it. My laser measuring tool showed a distance of 23 feet, almost exactly 7 meters (7.01), and a measure I took on October 16, 2021.

Figure 9 is my photograph of the Pit, used by permission in Keith Hamilton's study, *A Layman's Guide to the Great Pyramid, part 1* (Hamilton, 2022).

That measure is now combined with the previous measurements from Petrie and Holmgren to total 29.33 meters as shown in **Figure 10**. Rounding to the nearest meter, we have the first two numbers in the speed of light in meters per second, 29.

This first measure of 29 meters starts off this pursuit of the speed of light numbers in the Great Pyramid passages with several notices pertinent to this study. First, the addition of the various measures between the Pit and the Well Shaft entrance is not exactly 29 meters. It comes to 29.33 meters, which can be rounded to 29 meters by the conventions used in rounding a number to its closest unit, in this case meters. In all the meter measurements used in this study, the final measure is rounded to the nearest meter. The issue of using such rounding is dealt with in the Discussion section of this paper.

A second point of notice from this first measure is that its starting and ending point are not some obscure spots in the Pyramid, chosen to force these results. The starting and ending points for each of the measures taken in this study are major benchmark points in the Great Pyramid. The bottom of the Pit of the Subterranean Chamber used to be called the "bottomless pit" and is a fabled feature of Great Pyramid lore. The same is true of the location where the Well Shaft joins the Descending Passage. There are almost no diversions or waymarks



Figure 9. Pahl photograph of the pit.

Petrie, Holmgren, and Pahl Measures from the Lower Well Shaft Mouth to the Subterranean Chamber Pit

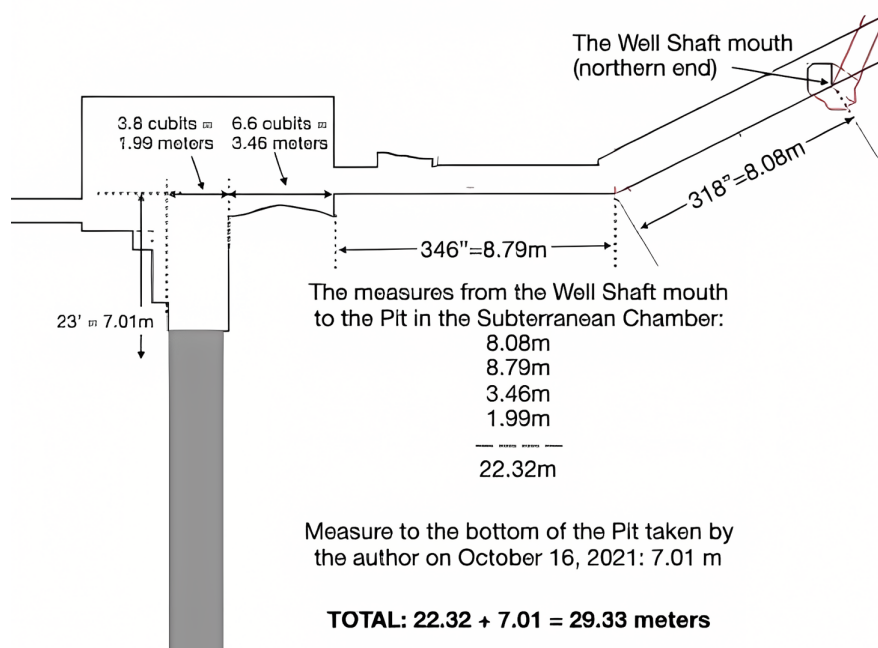


Figure 10. Petrie, Holmgren, Pahl measures from lower well shaft mouth to pit.

in the long descent of the Descending Passage, except for the breaking off from the First Ascending Passage (which was originally hidden and entirely unknown) and this “door” to the Well Shaft which has been known about as long as the Descending Passage has been known about. The point here is that in the whole of the Descending Passage, the longest straight passage in the Pyramid, there are only two, not scores, of major benchmark points. The bottom of the Pit and the door to the Well Shaft are both major Great Pyramid benchmarks. And the bottom of the Pit is an appropriate place to start because it is the lowest feature in the Great Pyramid. The succeeding speed of light number values move generally upward. With this 29 meter measurement, the start of the speed of light measures, let us return to the Well Shaft entrance to look for the next number of meters, 97.

4.2. 97 Meters

This next meter measure is a straightforward one. From the opening of the Well Shaft in the lower descending passage, the point to which the 29 meter measure took us, the next major Pyramid benchmark heading upward would be the original entrance, to the outside of the original casing stones. What is that measurement? Petrie gives the straightforward measure from the Well Shaft opening, which he calls “the lower mouth of the well shaft” (Petrie, 1990) to the outside of the pyramid at the original entrance as 3825”. This ending point (3825”) would be to northern side of the lower mouth of the Well Shaft (It

would be 3856” to the southern side of that mouth). Converting to meters, that is 97.16 meters. Rounding this, we have our 97. **Figure 11** provides a visual for this measure. **Figure 12** is a photo of Petrie’s chart (Petrie, 1990), which contains the measure.

Petrie’s measure is shown in **Figure 12** (Petrie, 1990).

We have so far, moving up the Pyramid, derived lengths of 29 and 97 meters. Now we move to see where the next 92 meters might appear.

4.3. 92 Meters

The 29 meter and 97 meter measures have taken us from the bottom of the Pit to the beginning of the Great Pyramid’s original entrance. Following the idea of moving upward with these speed of light numbers, and using major Pyramid benchmarks, the next natural beginning for a measure would be at the beginning

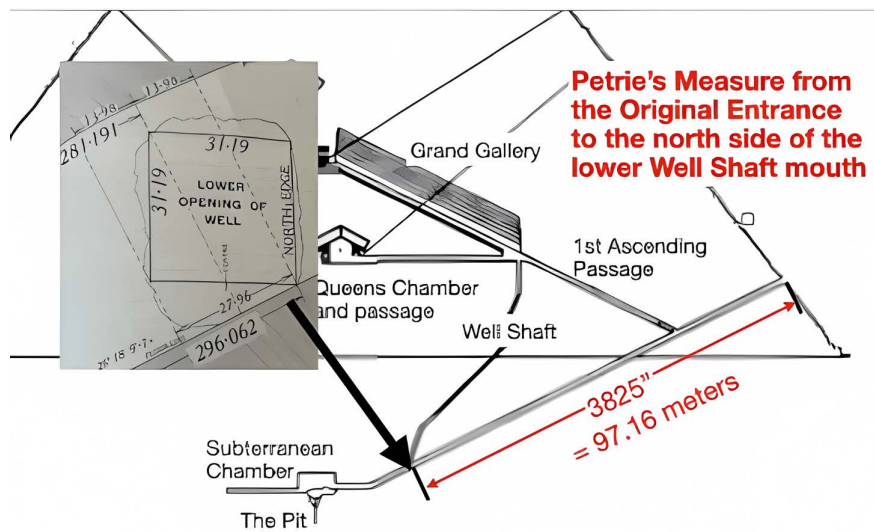


Figure 11. Petrie measure from great pyramid entrance to lower well shaft mouth.

points noted down the course of the passage, reckoning from the original entrance (*i.e.*, the beginning of the rock on the E. side of the roof being 1350’7), are the following :—

	E.	W.
Beginning of inserted stones, filling a fissure	1,569	1,555
Joint in these stones	1,595	None.
End of these inserted stones	1,629	1,595
Sides of passage much scaled, 1 or 2 inches off, } beyond here	2,750	
Fissure in rock	3,086	3,066
	to 3,116	3,097
Mouth of passage to gallery		3,825
End of sloping roof (4,137 Vyse, corrected for } casing)	4,143	3,856

Figure 12. Petrie chart listing distance from original pyramid entrance to well shaft mouth.

of the First Ascending Passage which breaks off abruptly from the Descending Passage, heading with the same angle upwards that the Descending Passage had been pointing downward—slightly more than 26° (Holmgren, 2023). It is from this point that the Great Pyramid separates itself from all other Egyptian pyramids. Not one of them has passages that head up into the body of the pyramid the way the First Ascending Passage and the Grand Gallery do in the Great Pyramid.

It is thus interesting and significant that the measure from the beginning of the floor of the First Ascending Passage, continuing the same line through the Grand Gallery all the way to where it virtually meets the top of the Great Step directly below the southernmost part of the Grand Gallery wall, and then continuing to move south through the Antechamber passageway to the start of the Kings Chamber is 92.44 meters.

Individually these numbers are:

1) From the floor of the First Ascending Passage, where it intersects the ceiling of the Descending Passage, to the north wall of the Grand Gallery, is 1487” based on Petrie’s measures. (He gives 1546.8” as the distance from the junction of the Descending Passage floor and the Ascending Passage floor extended. But he gives the distance from that point to the actual beginning of the First Ascending Passage as 59.8”, so this must be subtracted from the 1546.8” if the measure is truly to start at the beginning of the First Ascending Passage floor.) (Petrie, 1990)

2) Petrie’s measure of the total slope of the Grand Gallery from its north to south wall is 1883.6” (Petrie, 1990).

3) Petrie’s measure from the south side of the Grand Gallery through the Antechamber and Kings Chamber passageway to the beginning of the Kings Chamber is 268.9” (Petrie, 1990). See **Figure 13**.

Adding these three measures:

$$1487.0 + 1883.6 + 268.9 = 3639.5'' = 303.2916667' = 92.44 \text{ meters}$$

Rounding this to the closest meter, the tolerance we are allowing in this study, we have the next major data point in the speed of light numbers, namely, 92. It does seem significant that three separate major passages, the First Ascending Passage, the Grand Gallery, and the horizontal passage to the Kings Chamber are contained in this one measure. Basically, these three combined are the necessary connections to take one from the downward passage systems, shared by almost all Egyptian pyramids, to the Kings Chamber, completely unique in the history of pyramid building. This measure of 92 meters, then, provides an organizing mechanism for three chambers normally treated quite separately, and gives a basis for grouping them with one purpose. **Figure 14** is a simple representation summarizing these measures taken from Petrie.

4.4. 45 Meters

The next target in the speed of light number is 45. The principles we are following include using every major passage in the Great Pyramid, and generally to

Petrie's Measures of the Kings Chamber passage system including Antechamber

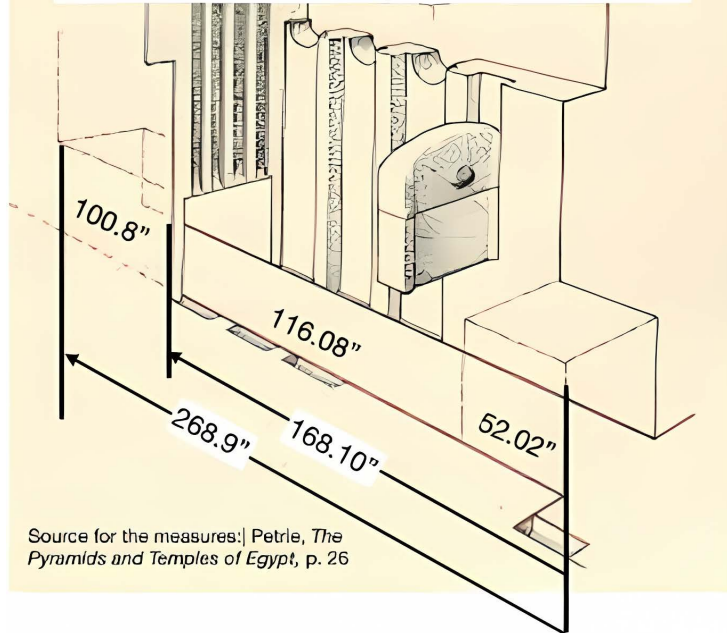


Figure 13. Petrie's measures in Kings Chamber passage system.

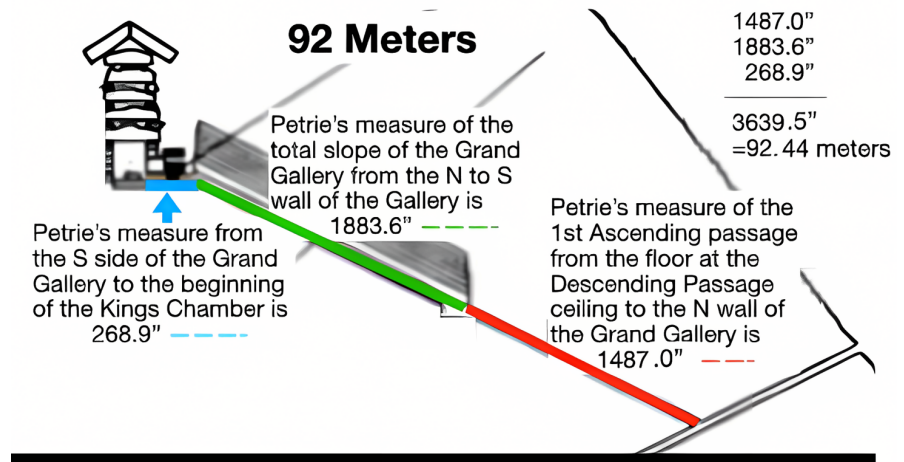


Figure 14. Summary of Petrie measures from first ascending passage to the Kings Chamber.

move from the bottom of the structure to the top. With the 92 meter measure from the First Ascending Passage to the brink of the Kings Chamber, a major passage system was bypassed, namely the Queens Chamber and its horizontal passageway. To the measurements of that feature, we will now move.

The beginning of this passage system starts, apparently, where the Queens Chamber passage floor touches the north wall of the Grand Gallery virtually, pictured in Figure 15.

Virtual Beginning of the Queens Chamber Passage

Near the junction of the 1st Ascending Passage and the Grand Gallery

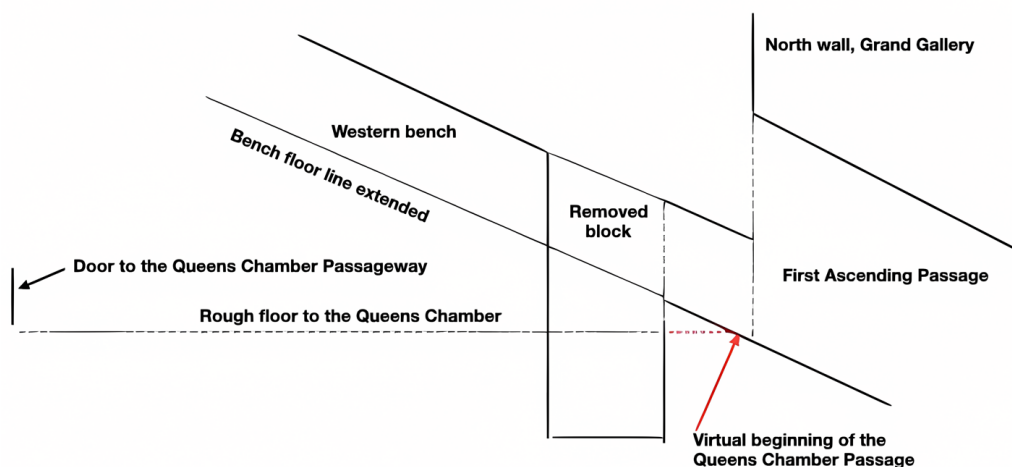


Figure 15. Virtual beginning of Queens Chamber passage.

The distance from this virtual beginning point to the south wall of the Queens Chamber is given by Piazzi Smyth as 43.82 meters, converting from the “pyramid inches” he used (Smyth, 1978), and by Flinders Petrie as 43.96 meters, converting his measures in inches to meters (Petrie, 1990). See **Figure 16**.

Neither of these measures meets the rounding convention for 45, as both are obviously very close to 44 meters. But since our previous measures put a focus on the Well Shaft because its connection with the Descending Passage is a benchmark for the 29 and 97 meter measures, we should look at its other end here, near the start of the Queens Chamber passage system. The Well Shaft is perhaps the most mysterious and least understood part of the Great Pyramid. It is often considered merely a service shaft not essential to the Pyramid’s architecture. It is possible that part of its meaning is associated with the Queens Chamber passage because of its proximity. Christian and New Age groups have made this association based on theological and esoteric considerations. Given the possible connection of Well Shaft and Queens Chamber passage, let us look at the architecture of this connection.

On a plan view, to move from the Well Shaft east to the Queens Chamber floor is 1.93 meters. But the movement if taken straight east does not come to the virtual beginning of the Queens Chamber floor, but 1.06 cubits south of that point as shown on this chart adapted from Piazzi Smyth’s plan view of the First Ascending Passage-Grand Gallery junction. See **Figure 17**.

Figure 18 is another drawing to aid in understanding this connection between the Well Shaft and the Queens Chamber passage system:

A broken ramp stone is in the northwest corner of the Grand Gallery, just north of a missing ramp stone that creates the opening, the connection, between the Well Shaft’s “mouth” and the Queens Chamber passage floor. This is what creates the 1.06 royal cubit “offset” from the virtual beginning of the Queens Chamber floor as seen in a drawing by Piazzi Smyth (Smyth, 1978) (**Figure 19**).

Queens Chamber and Chamber Passageway Length						
Researcher	N Wall of GG to Entry door to QC Passage	Entry door to drop in the passage floor	Floor drop to the N wall of the QC	North to south of the Queens Chamber	TOTAL LENGTH in inches	Metric Conversion
P Smyth	218	1085.5	216.1	205.8	1725.2	43.82
F Petrie	GG n wall to floor drop; 1307.0		217.8	205.85	1730.65	43.96

Figure 16. Queens Chamber and passage lengths from Smyth and Petrie.

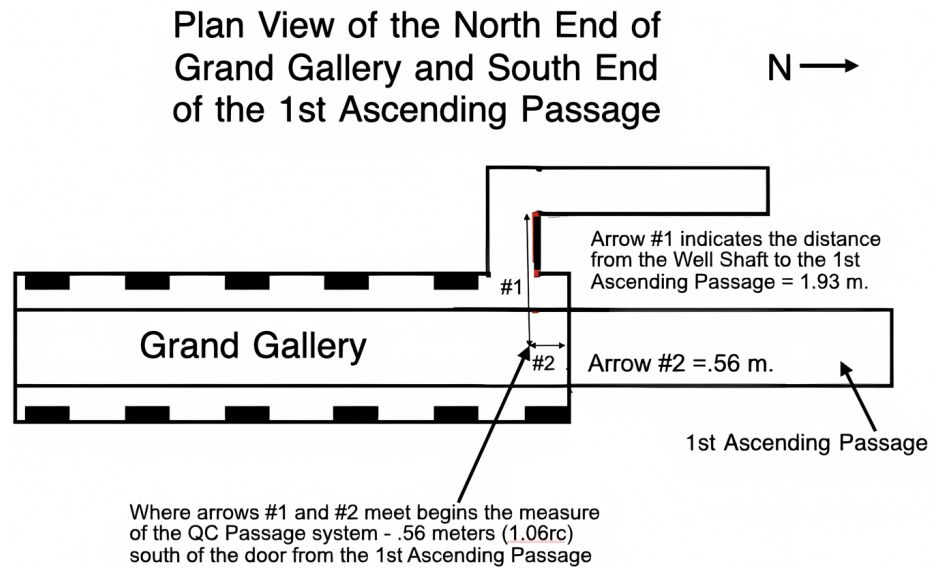


Figure 17. Plan view of north end of grand gallery and south end of the first ascending passage.

Well Shaft Connection with the Queens Chamber Passage

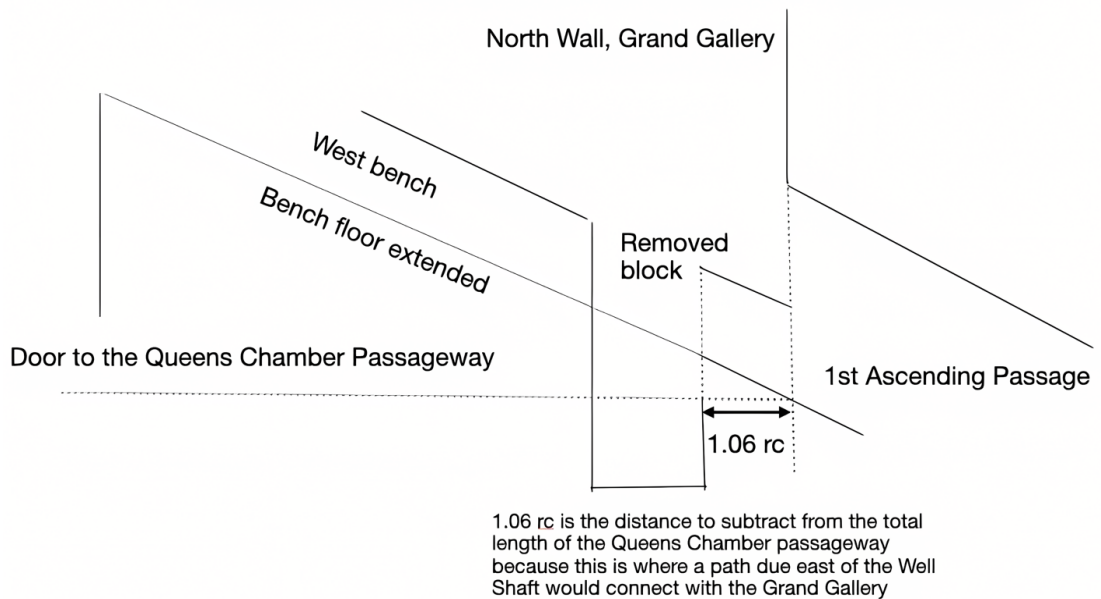


Figure 18. Well shaft connection with Queens Chamber passage.

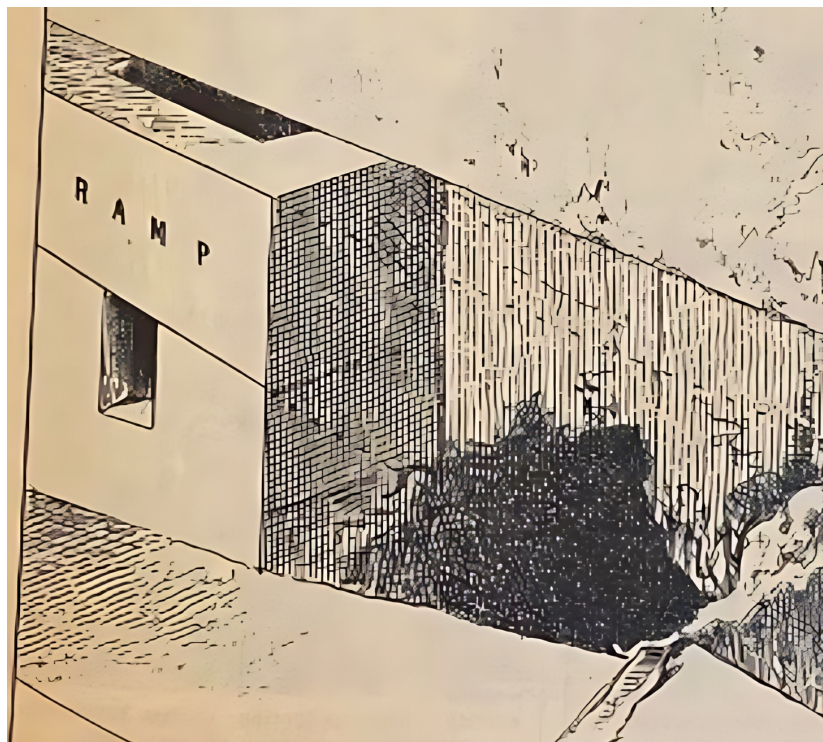


Figure 19. Piazz Smyth drawing of upper well shaft.

To get from the Well Shaft to the floor line of the Queens Chamber Passage requires an eastern movement of 1.93 meters. If that is added to Smyth's length for the total length of Queens passage and Chamber, it comes to 45.75 meters, and 45.79 using Petrie's measures (Petrie, 1990). But this distance should be adjusted because of the 1.06-cubit offset shown in Figure 18. This distance must be subtracted from these totals as this creates a new beginning spot in the Queens Chamber passage from which to begin the move south toward the south end of the Queens Chamber itself. 1.06 cubits is 0.56 meters. Subtracting the 0.56 meters from the lengths just derived, 45.75 (Smyth, 1978) and 45.79 (Petrie, 1990) gives 45.19 for Smyth and 45.23 for Petrie. Both measurements are within the rounding protocol, we are using, each giving distance of 45 meters, rounded to the nearest meter.

Seeking the speed of light numbers in these passages has here led to an interesting discovery of sorts, the intended connection of the Well Shaft with the Queens Chamber Passage. This will be further discussed in the Discussion section.

We have now followed through the Great Pyramid passages the speed of light numbers 29, 97, 92 and 45. One number remains, the only single digit number used here, the number 8. We will look for this number of meters in the Kings Chamber, the only major part of the Pyramid not yet utilized in this query.

4.5. 8 Meters

It is widely known that the Great Pyramid is bereft of hieroglyphics and adorn-

ment of any sort, except for the sarcophagus or “coffer” as Petrie refers to it. This places the coffer in a place of preeminence in the Great Pyramid. Given the Egyptological view of pyramids as places for pharaonic burials, a lone sarcophagus in the upper chamber of the Great Pyramid is like the “holy grail”. This coffer seems to be the fulfillment of the journey in traveling through the passages leading to it. The speed of light numbers, 29, 97, 92 and 45 have taken us to the threshold of the final Pyramid chamber, the entrance of the Kings Chamber. The only speed of light number left is the final unit, 8. If the center of the entrance door to the Kings Chamber—where the 92 meter measurement finished—is taken as the starting point for the final measurement, the obvious target for the measure is the coffer, the “holy grail”.

Another ending point for this final chamber measurement might be the axis running north and south through the Chamber which divides the Great Pyramid into equal east and west halves. When someone enters the Pyramid from its original entrance, they are 14 cubits offset to the east from this north/south axis. It is not until one enters the Kings Chamber and walks west toward the coffer that this north/south axis, this center line, is reached.

So we will look at both “goals” for the measurement to be started at the center of the entrance door. One problem in measuring to the place of the coffer is that there is historical evidence that the coffer has been moved, and its original location is uncertain. Petrie mentions a pebble underneath the Coffin found, apparently, when he lifted the box slightly to measure its base (Petrie, 1990). One technique for moving a very large block is to place it over a pebble to ease its maneuvering. There are accounts of the Coffin being moved at various times within the Kings Chamber, and Petrie mentions there were no marks underneath it to indicate where it should be placed (Petrie, 1990), so it is impossible to precisely know its original positioning. Adam Rutherford, who spent many years at Giza measuring the Great Pyramid gives this account:

“From time to time the Coffin has been moved a little from its original position by investigators and others. When the author first visited the Great Pyramid in 1925 the Coffin was standing askew to the walls of the Chamber (see Figure 20), but the Egyptian authorities have now oriented it and set it very nearly in its original position which was midway between the north and south walls of the Kings Chamber with its sides parallel to the respective sides of the Chamber and its axis coinciding with the Pyramid’s own north-south axis. Geometry, symmetry, and symbolism all indicate this as the Coffin’s original position in the Pyramid’s design.” (Rutherford, 1974)

Figure 20 is taken from Smyth’s drawing of the Coffin (Smyth, 1978).

While this description is not taken as fully authoritative, it provides a conventional and rational basis to position the Coffin for purposes of measuring, especially since it places the Coffin in a spot that can be accurately located, its north-south axis aligned with the Pyramid’s north-south axis and centered east to west.

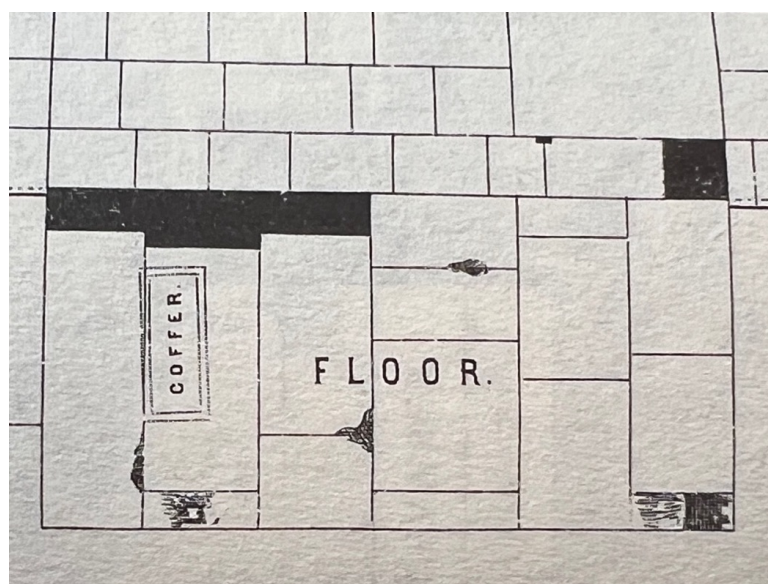


Figure 20. Photo of a portion of Smyth Plate XVII, showing the angle of the coffer.

Figure 21 is Rutherford's representation of the Coffers' placement in the Kings Chamber (Rutherford, 1974).

Figure 22 adds another Coffer whose eastern side is aligned with the Pyramid's north-south axis, unlike Rutherford's traditional positioning of the Coffers' axis aligned with the Pyramid's axis. This Coffer alignment comes from the work of Ian Douglas (Douglas, 2022c) who has posted many studies on the exact dimensions of the Kings Chamber. Measurements are taken between the three points mentioned above on these two possible Coffer positions. **Figure 22** shows 7 of these measurements, all rounding to 8 meters. The distances of the lines here are taken directly from the measurements of Petrie and Rutherford or derived from them through triangulation. Here is a description of the seven measures pictured in **Figure 22**, A - G, with their rounded and (actual) measurements. (The measures with asterisks [*] include a vertical component, to the Coffer rim):

- A) 8 m (7.8 m) East wall of Kings Chamber to N-S axis of the Coffer.
- B) 8 m (7.78 m) East wall of Kings Chamber to the center of the Douglas Coffer.
- C) 8 m (*8.35 m) East wall of Kings Chamber to east side of Coffer, then vertical to rim.
- D) 8 m (*7.83 m) Axis of entrance passage (extended) to east side of Coffer, then to rim.
- E) 8 m (*8.32 m) Center axis of north wall entrance to center of east side of Coffer, then to rim.
- F) 8 m (8.19 m) Center axis of entrance at north wall to center of the Pyramid N-S axis.
- G) 8 m (7.73 m) Center axis of entrance at north wall to Douglas Coffer central axis.

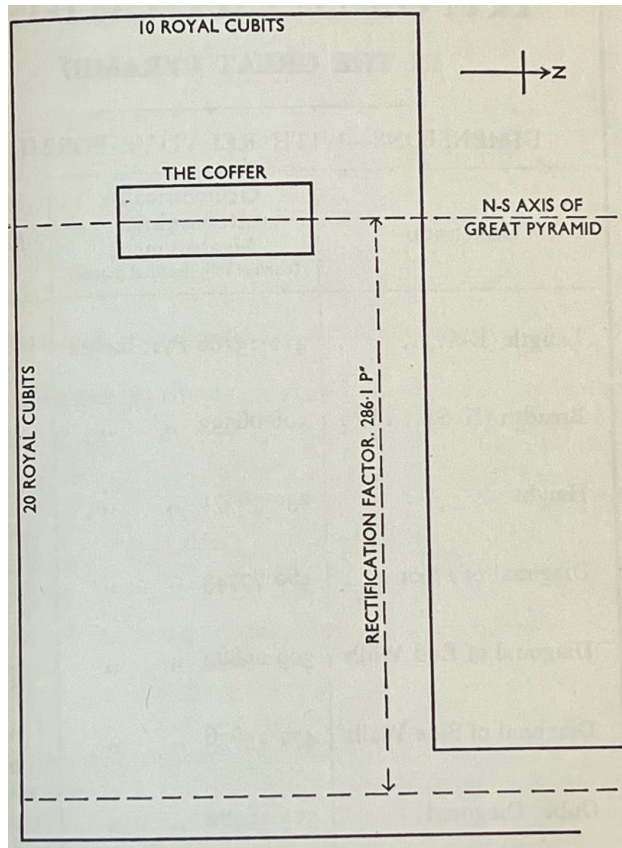
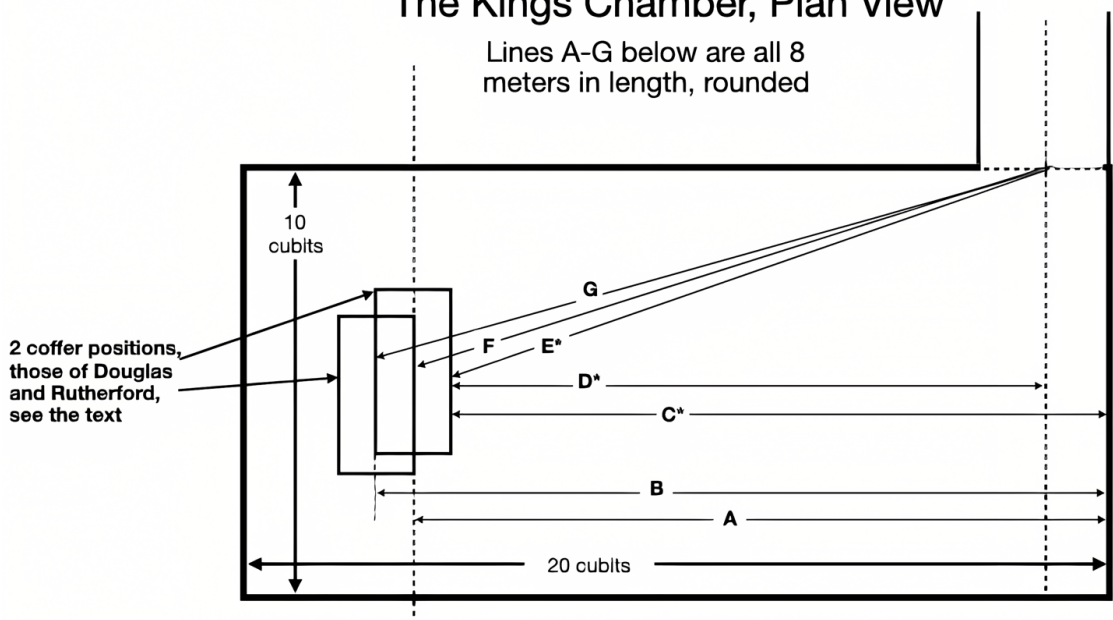


Figure 21. Rutherford's representation of the Coffin placement.

The Kings Chamber, Plan View

Lines A-G below are all 8 meters in length, rounded



Represented here are 7 possible ways to measure from the center point of the Kings Chamber entrance to either one of the Coffin positions. See the text for a description of lines A-G. The asterisk (*) after lines C, D and E indicate that they are measured across the floor until they reach the coffin, and then angle vertically to the top of the Coffin rim.

Figure 22. Kings Chamber plan view of various 8 meter measurements.

Four of the measurements are east-west horizontals to the Coffin and/or north-south Pyramid axis, two of which then follow up the east side of the Coffin to its rim, indicated by the asterisk there. The other three are diagonals from the middle of the entrance passage at the line of the north wall directly to the Coffin and/or north-south Pyramid axis. Line E follows up the east side of the Coffin to its rim. Any one of these could be used as a rational distance marker between the entrance passage and the Coffin and/or Pyramid axis. And all 7 of these rational choices round to 8 meters.

The previous 8 meter measures were all based on the primacy of the Coffin in the calculation. But if we make the primal consideration for this final measure instead be height, as the initial measure of 29 was based on the depth of the Pit, we are again rewarded with two powerful 8 meter lengths. Once the 92 meters take us to the Kings Chamber, if we make height our goal, we could start from the east wall of the entrance passage where it joins the Kings Chamber floor and angle toward the far corner of the east wall. This would be the ceiling of the Kings Chamber, on the south wall, as high as one can go inside the Pyramid as designed, through normal means. Being the length of the diagonal of the short Kings Chamber wall, 15 cubits, it is thus 7.85 meters, neatly rounding to 8 meters, as seen in **Figure 23**.

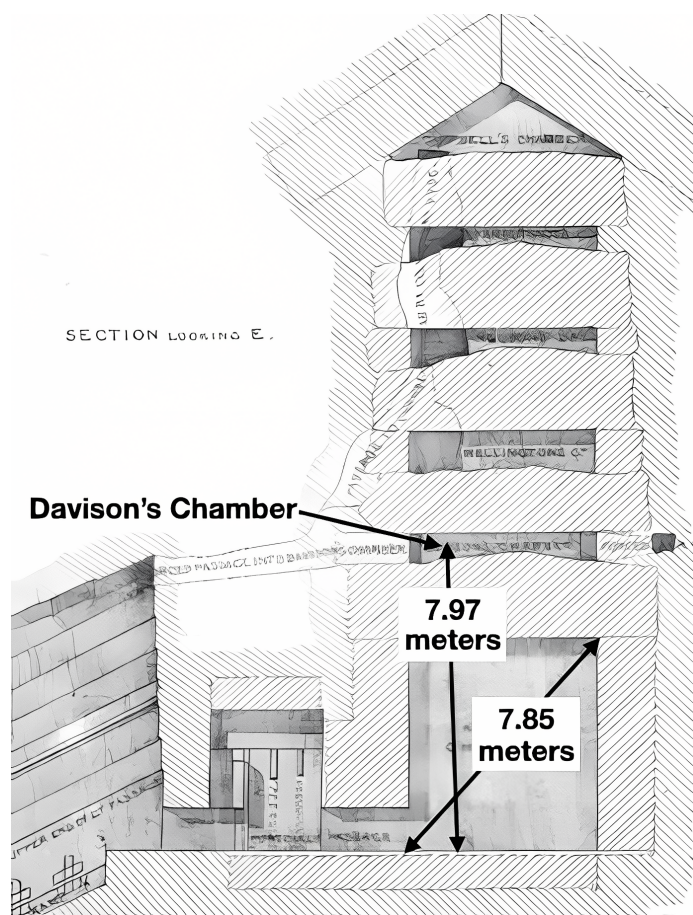


Figure 23. Illustration of Davison's Chamber with measures to the Kings Chamber.

Or if we take the measure straight up from the floor of the Kings Chamber (from any point on the floor), it reaches into Davison's Chamber. What is interesting about this 8 meter measure is that Davison's Chamber is the highest place one could get to in the Pyramid the way it was originally constructed. It would take a very dangerous climb up the southeast Grand Gallery wall to get to the opening Davison discovered, or a long ladder precariously placed in the area of the Great Step, then angling over to the southeast corner of the Grand Gallery to the opening leading to Davison's Chamber. Davison's Chamber, the lowest of the five relieving chambers above the Kings Chamber, is the only one accessible by the original design of the Pyramid. Davison discovered it on July 7, 1765 (Edgar & Edgar, 1923). The other relieving chambers were only made available through the "dynamite archaeology" of Colonel Vyse, long after the Pyramid was constructed. The blasting of Vyse commenced in 1837 (Edgar & Edgar, 1923).

Following the principle of starting with the Pyramid's lowest constructed point, the Pit, to its highest accessible constructed point, Davison's Chamber, or, if we exclude the very difficult ascent to Davison's, the ceiling of the Kings Chamber, we have heights of 8 meters.

There is thus very ample evidence supplied by the Great Pyramid that we have reached the final number in the speed of light numbers, 8. The meter distances of 29, 97, 92, 45 and 8 utilize all the traditional major passage systems in the Great Pyramid. The speed of light in meters per second seems to be encoded in the Great Pyramid.

Some discussion follows.

5. Discussion

Most of the-speed-of-light numbers derived from the Great Pyramid passages in this study are taken from straightforward measurements from widely respected students of the Great Pyramid. The numbers followed a rational pattern of starting at the lowest part of the Great Pyramid and working generally upward to the marvelous construction of the Kings Chamber. All the major chambers and passage systems were used in this journey to find the speed of light numbers:

- 1) The Pit.
- 2) The Subterranean Chamber.
- 3) The Descending Passage.
- 4) The First Ascending Passage.
- 5) The Queens Chamber Passage.
- 6) The Well Shaft (using its upper and lower mouths, its beginning and ending).
- 7) The Queens Chamber.
- 8) The Grand Gallery.
- 9) The Kings Chamber horizontal passageway, including the Antechamber.
- 10) The Kings Chamber.

While it has surprisingly not gained much attention to this point, the radar scans of the Great Pyramid by Biondi and Malanga have discovered 20 new chambers and passages in the Great Pyramid (Biondi & Malanga, 2022). Then, there are the new “void” chambers discovered through muon scanning in 2017 (Morishima, Kuno, & Nishio, 2017) by the ScanPyramids team, recently highlighted because of the photographs taken of the smaller void chamber near the Pyramid’s entrance (Parker, 2023). As these chambers are more widely documented, they will likely begin to appear in diagrams of the interior of the Great Pyramid. However, these chambers are not included in the speed of light meter indications presented in this paper.

It is the sense of the author that these chambers will prove to be related to the construction of the pyramid in a practical, industrial sense, and not be pertinent to the symbolism, which seems to relate to the main Pyramid passages used in the current study, which have long been known about. In this sense, the speed-of-light numbers seem to tag the passages that are part of the Pyramid’s symbolic message. The shape of the Grand Gallery, Kings Chamber, Queens Chamber and Subterranean Chamber serves no architectural purpose. It seems likely therefore that they serve some kind of religious or symbolic purpose. Most Egyptologists believe the Chambers each play a part in the funerary services for the Pharaoh. Various Christian groups believe that various Chambers reveal Christian theology (Davidson & Aldersmith, 1992). These chambers and the passages to them are the ones that have been “tagged” by the speed of light numbers. So, the passages and chambers that “carry the light”, that is, that hold religious/symbolic meaning, are the ones tagged by the speed of light numbers.

It will be interesting to see in the years to come as means are discovered to explore the new chambers being found if they appear to bear symbolic or utilitarian purposes. Dr. Mostafa Waziri, Secretary-General of the Supreme Council of Antiquities, recently announced that the Great Pyramid will be closed in June of 2023 for maintenance and restoration (ED News, 2023). It is likely that the Egyptian government will use this opportunity to find ways to explore the newly found chambers and passages.

Of the five sets of measures found here: 29, 97, 92, 45, and 8, the two that presents the largest challenge to the plausibility of the findings are the first, the 29 meters from the Pit to the Well Shaft mouth in the Descending Passage, and the 45 meters from the upper Well Shaft mouth to the end of the Queens Chamber. The other three, the 97 meters from the lower Well Shaft mouth through the Descending Passage to the original entrance, the 92 meters from the beginning of the First Ascending Passage through to the Kings Chamber, and the 8 meters within the Kings Chamber itself, all involve straightforward measures from and to well-known points.

Before looking at these two more challenging measures, it might be good to take up the unit of measure used to obtain the speed of light numbers, the meter, and its rounding. As stated above, some metrologists believe that meter was

known anciently, and there appears to be evidence of its use in the Kings Chamber as noted previously. It was also noted that the meter seems to be used not as a unit of construction, but as an encoding of sorts, in this case, to house a revelation of the speed of light in meters per second in a vacuum. While some might allow the possibility of an ancient knowledge of the meter, very few people would be willing to entertain the notion that there was ancient knowledge of the speed of light.

If the Great Pyramid was the only place for which a claim like this was made it would indeed be easy to shrug off. But the phenomena of evidence for advanced scientific knowledge in ancient megaliths is widespread, just not widely recognized perhaps. The works of Robin Heath (Heath & Michell, 2006), John Michell (Michell, 1983), John Neal (Neal, 2000), Algernon Berriman (Berriman, 1953), Alexander Thom (Thom, 1967) and other metrologists have made this plain, and on what, by any honest evaluation, is a scientific basis. One example of the hundreds given by these metrologists is that of the triangle formed by Stonehenge-Lundy Island and the site from which Stonehenge's bluestones derive (Heath & Michell, 2006). See Figure 24.

This Pythagorean Triplet triangle, 5:12:13, the only triangle whose perimeter equals its area, put on the English landscape long before Pythagoras wrote his Theorem, shows, according to Heath, the length of the solar year, the lunar cycle, and the 346.6 days of the "eclipse year". It also shows the ability to do accurate global positioning and shows the relationship between the English foot and Egyptian cubit. All these metrologists, as they discovered the hidden advanced knowledge in these ancient megaliths, came to realize the necessity of a reassessment of the capabilities of ancient man. Heath writes:

"The geodetic and geomantic evidence presented here indicates further levels

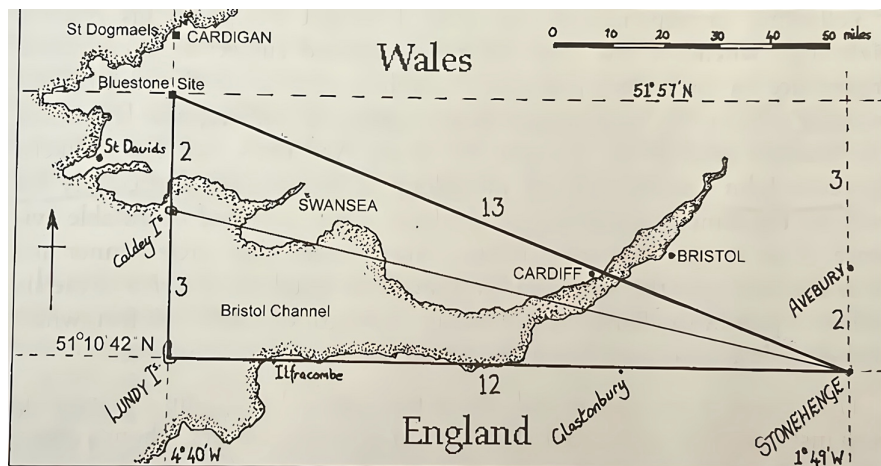


Figure 4.4 The Stonehenge lunation triangle, as defined by Stonehenge, Lundy Island, Caldey Island and the bluestone site. A geomantic symbol of soli-lunar wisdom from 3000 BC. The rectangle depicted above is 2,500 times larger than the station stone rectangle at Stonehenge

Figure 24. Heath Pythagorean Triplet triangle with Stonehenge, the Bluestone site and Lundy Island.

of skill and aspiration previously unassociated with Neolithic, Bronze Age or even the later Celtic culture. These skills are, in essence, identical to those of modern surveying... for distances exceeding a few miles, the calculations require an accurate knowledge of the size and shape of the earth, our modern science of geodesy.” (Heath & Michell, 2006)

While this geodesy does not include knowledge of the speed of light, the same principle applies. If the encodings of the speed of light referenced in **Appendix** do indeed appear in the Great Pyramid, the same reevaluation Heath speaks of for ancient man applies. I will leave that query for another study. Suffice it to say that I think it is necessary because of the evidence demanding it. If the speed-of-light numbers are indeed encoded in the Great Pyramid, in meters, there must be a rational explanation. I believe one exists, but that is the subject of another study. Whatever that explanation is, it requires that ancient Egyptians and ancient man generally, be held in higher regard as to their knowledge and capabilities.

If the meter is used, as suggested here, as a measure for encoded revelation, in this case for hiding the speed of light value, why the rounding? If these speed-of-light numbers were really intended to be encoded in the Pyramid, why were they not exact? This is a legitimate question. Since they are not exact, but in every case rounded, it would seem to be saying that this was not the first purpose being accomplished in the design of the Great Pyramid. It is widely recognized that this Wonder of the World contains amazing arithmetic, geometric and astronomical indications in its architecture. It is still remarkable, if true, that the speed-of-light numbers are hidden, even if by rounding. The fact that they all must be rounded to get the speed of light numbers could indicate that they are indeed inherent in the Pyramid, but not one of its primary revelations. In a sense, the rounding of the meters places a note of perspective on this revelation. Sort of like a message to us saying, “Yes, we knew the speed of light, but that is not one of main things we are trying to reveal here”. And there is, of course, the matter of the varying values for the speed of light, depending on the medium involved in the light journey.

Let us take up first, then, the measure beginning in the Pyramid’s depth. A critical measure of the distance from Pit to Well Shaft mouth was taken by the author, using a laser measuring tool. Since the Egyptian government does not allow access to the Pit, even with private permission to enter the Subterranean Chamber, I could not tell exactly what was at the bottom of the Pit. Because the lighting is poor, I simply took the measurement based on what the red dot from the laser measure was touching. It was directed to the lowest point in the Pit. How much rubble is still in the excavated hole at the base of the Pit is uncertain. Thus, the first measure begins the study with a sort of question mark, because it is measuring a depth that may not be the original depth of the Pit. But the 29 meters (rounded) is a real and honest measure. It is taken from two designed parts of the Great Pyramid, its bottom, and the lower Well Shaft mouth. The fact that three undefined elements make up the entire edifice of Euclidean geometry

(the point, the line, the plane) does not disqualify the entire house of geometric proofs descended from them. There are 29.33 meters, rounded to 29, between the Pit and the lower Well mouth.

The measure sure to arouse the most challenge to the thesis here is the one connecting the Well Shaft mouth to the Queens Chamber passage system. If all the measures involved only the Queens Chamber and the passage to it there would be little to contest. But the amalgamation with the Well Shaft seems at first blush to be a desperate stretch. But upon consideration, the connection has much to recommend it. First, there is reason to believe that the niches in the Queens Chamber passage, north of its entrance door were once the support for a floor that would take one coming out of the First Ascending Passage directly to the rising floor of the Grant Gallery. The Queens Chamber passageway would be entirely hidden from view. Stefan Holmgren illustrates how this could have looked in **Figure 25** and **Figure 26** (Holmgren, 2023).

But though the horizontal passage to the Queens Chamber would have been hidden, it would still have had its connection with the Well Shaft, if the western ramp stone was missing. There is no consensual position among Pyramid researchers as to when this ramp stone was removed. Some have suggested it may have been the architect's decision from the beginning (Edgar & Edgar, 1923).

If that is so, the Well Shaft was connected to the Queens Chamber passage when it was still invisible to someone entering the Grand Gallery from the First Ascending Passage. The 45 meters so derived suggests a powerful insight into these Pyramid passages. The two passage systems—Queens Chamber passage and the Well Shaft—are really one. This significant connection was presented to me only as I set out to search for the speed of light numbers in the Pyramid passages. That this search may lead to other insights into the Great Pyramid is a passive argument recommending it. A quick review of the rationale involved in this measurement is in order.

Since the first measurement, 29 meters, ended at the lower mouth of the Well Shaft where it joins the Descending Passage, a focus was placed on this most

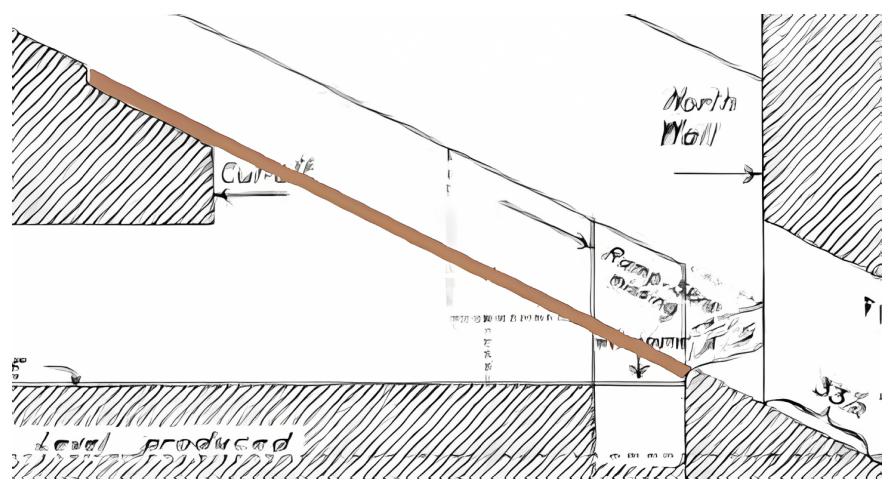


Figure 25. Holmgren illustration of Queens Chamber hidden by planking.

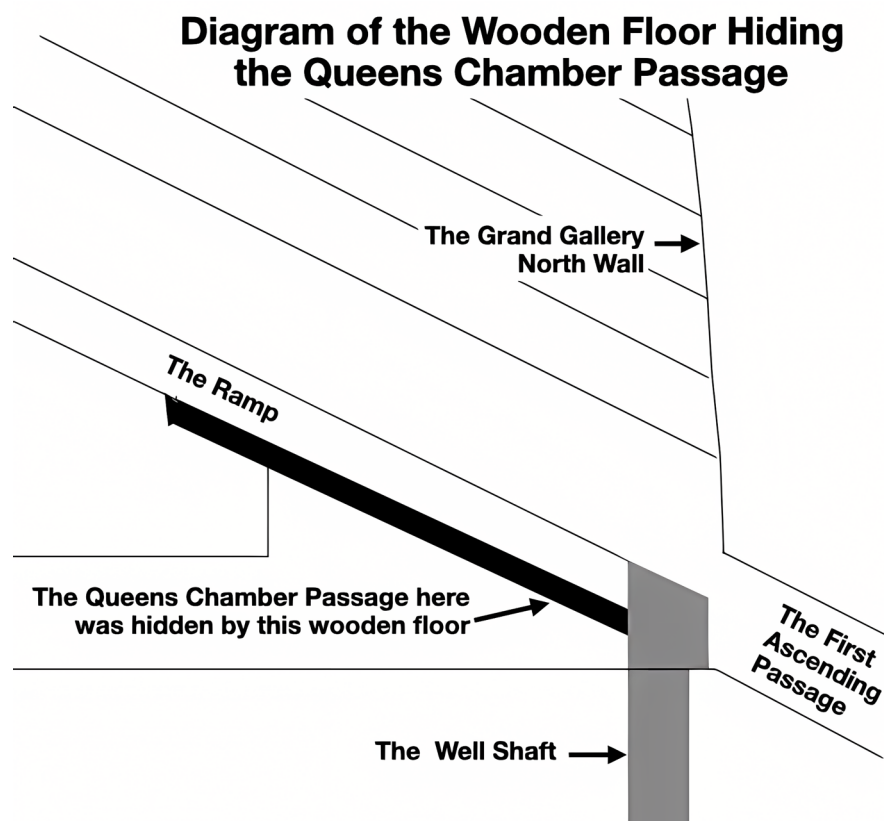


Figure 26. The author's drawing of the wooden floor covering the passage to the Queens Chamber, based on Holmgren's adaptation of an Edgar brothers drawing.

enigmatic feature of the Pyramid, the Well Shaft. The Well Shaft lower mouth is basically the only significant feature in the Descending Passage, other than the breakaway of the First Ascending Passage. Since it was a hope of the study that all the Pyramid passages and chambers would be used, the first measurement, coming to a shaft not often studied, seemed to be inviting its inclusion, somehow, into the measurements. The Well Shaft does not have definite dimensions like the other Pyramid passages. The Well Shaft varies in size at various depths and is not designed with straight lines and fixed dimensions after its initial drop toward the grotto. It is in a sense "dimensionless", thus, in a sense, "excusing" its length from figuring into the encoding of the speed of light numbers. But this "dimensionless" passage is highlighted by having both of its ends figuring into the speed of light scheme. And these two ends, especially the upper mouth, have more definite shapes than the winding passage between them.

The upper mouth of the Well enters the Grand Gallery near its northwest corner, through a removed ramp stone, which creates an opening with the kind of definite dimensions characterizing most blocks in the Pyramid. Petrie says of this area, "Here, the sides of the mouth are very well cut, quite as good work as the dressing of the gallery walls" (Edgar & Edgar, 1923). And the exit point of the Well Shaft, near the bottom of the Descending Passage, was believed by Petrie to have once been covered with a stone (Edgar & Edgar, 1923). The Edgar

brothers attempted to judge “the probable original shape and dimensions” (Edgar & Edgar, 1923) of this stone, which Petrie had said would be about 31”, and they came up with the conception (Edgar & Edgar, 1923) shown in **Figure 27** based on the existing cavity.

It is interesting that converting the inches (31.19) on the side of the square in this diagram to meters, the unit used in the study, the sides are each .7920 meters, the traditional number of miles given by historical metrology to the diameter of the earth, 7920 (Sivertsen, 2009). If it is protested that the 31.19 inches are “pyramid” or “primitive” inches, if converted to British inches they become .7930 meters, and 7930 miles is the current equatorial diameter of the Earth. With the surmised square stone cover of the Well Shaft’s exit now gone, and the hole there now a shambles, could there be a suggestion here of the dissolution of Planet Earth? The Pyramid is known to be a 1/43,200 scale model of the Earth, so it is entirely reasonable to see symbolism relating to the Earth in the Pyramid.

The connection of the two passages, the Well Shaft and the Queens Chamber passage suggests a link between the death and degradation often associated with the Subterranean Chamber/Pit and the regeneration suggested by the Queens Chamber. The connection fits with the great Egyptian religious belief in mummification and resurrection. Just as the Well Shaft lower mouth is the end of the 29 meter measurement, its upper mouth is the beginning of the 45 meter measurement. The lengths of the upper mouth that were added to the measure of the

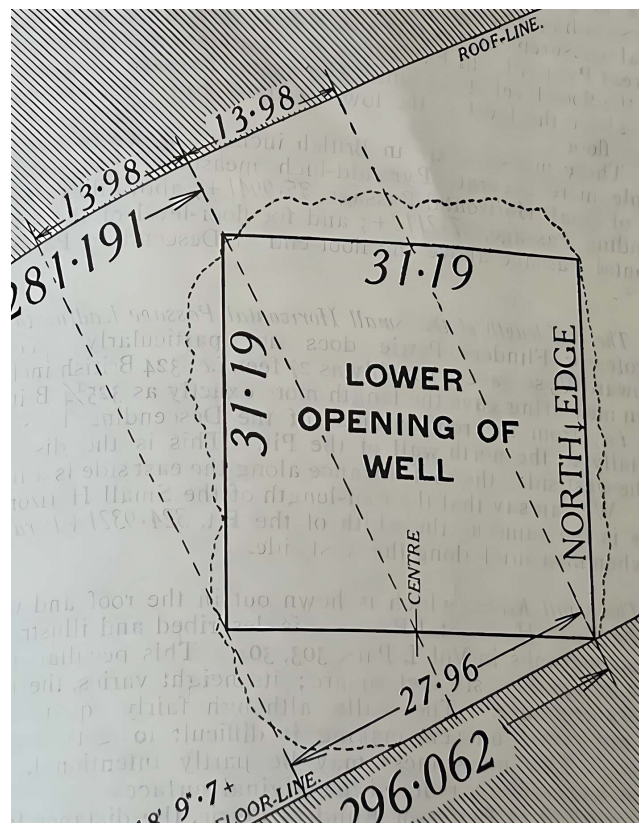


Figure 27. Edgar Brothers estimation of the original lower well shaft mouth.

Queens Chamber Passage floor, which might have seemed “forced” to come up with the 45 meters, simply followed the measuring principles used by Petrie, Rutherford and Smyth. You measure from the axis of a passage, you follow straight lines in measuring, sticking to the floor and taking the shortest straight route available. If there is indeed a connection between the Subterranean Chamber and the Queens Chamber and its passage, then it is fair to begin the measuring to Queens Chamber’s end at its south wall from the mouth of the Well that is connected to it architecturally and symbolically.

The two dimensioned ends of the dimensionless Well Shaft are like a parenthetical message from the architect saying, “There is a dimensionless Well Shaft between us, not included in the speed of light counting, but not being ignored—its starting point and ending point are associated with two major passageways and chambers, which are connected to the speed of light numbers”.

Thus, the derivation of this set of meter lengths, rounding to 45 to match the corresponding numbers in the speed of light in meters per second, suggests a new way of looking at the passage systems of the Great Pyramid. And as will be seen below this is not a new way of looking at these passage systems, it is revealed in the names the ancient Egyptians gave to these passages!

The pattern of the speed of light numbers arising so far points to two separate connected lines in the Great Pyramid.

1) The line from the Pit to the well opening (29)—the dimensionless Well Shaft—and the Queens Chamber Passage (45).

2) The line from the well opening to the original entrance (97)—the 1st Ascending Passage—Grand Gallery—Kings Chamber Passage (92)

The suggested association of the Queens Chamber system with the Subterranean Pit and the Well Shaft is not widely made, if at all, in the literature on the Great Pyramid. But the original Egyptian names for these passages do suggest this association. The junction point in the Great Pyramid where four major passages come together (First Ascending Passage, Well Shaft, Queens Chamber Passage and Grand Gallery) is called in the *Book of the Dead*, “The Crossing of the Pure Roads of Life” (Rutherford, 1974) (see **Figure 28**).

“Roads” is plural, indicating there are two roads of life that cross this point, apparently the two lines we are now considering. If these were four separate passages or “roads”, this would not be a crossing point, but an origin or ending point. But if this is a crossing point, the question becomes what are the two roads that are crossing? The Queens Chamber Passage system is called the “Path of the Coming Forth of the Regenerated Soul” (Rutherford, 1974). The question could be asked of this name, “From where does the regenerated soul come from?”. Symbolically, it would seem to come from the Pit of the Subterranean Chamber representing death and decay. So, this would indicate that one road is the connected system of Well Shaft and Queens Chamber Passage. This would indicate that the other “road” is formed by the First Ascending Passage and the Grand Gallery. The south facing diagram of the passages in the Great Pyramid

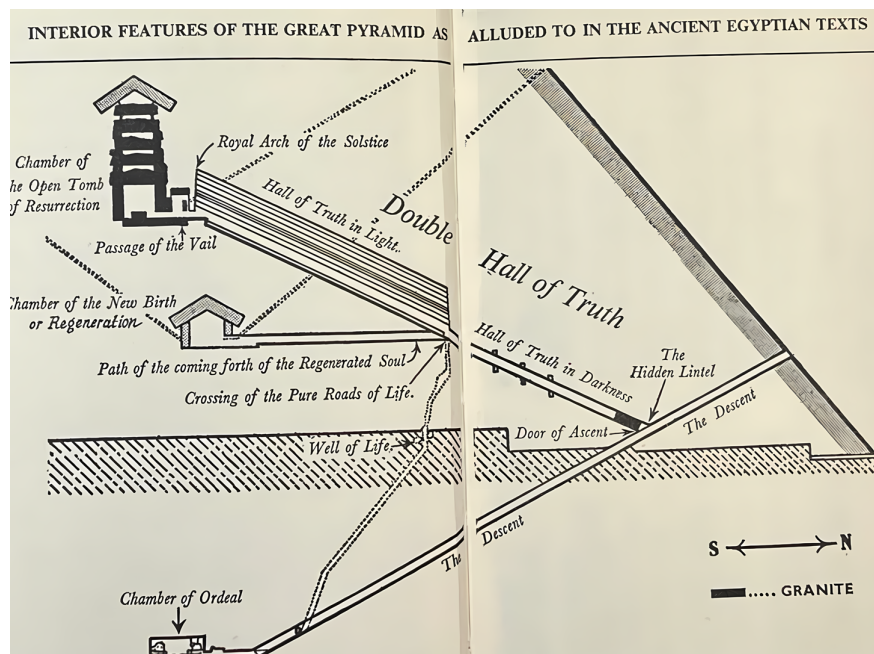


Figure 28. Original names for the Great Pyramid features according to Rutherford.

in **Figure 29**, a view not often seen, shows these two “roads” running parallel to one another. The Well Shaft (called in this diagram the “Service shaft”) runs directly from the Subterranean Chamber to the Queens Chamber in this view, parallel and distinct from the First Ascending Passage-Grand Gallery “road”.

The ancient Egyptian name, “The Crossing of the Pure Roads of Life”, indicating that there are these two distinct roads in the Great Pyramid passages provides a sound reason to join the Well Shaft mouth and the Queens Chamber passage to gain the 45 (meter) number in the speed of light sequence of numbers.

The association of the First Ascending Passage with the Grand Gallery is a more intuitive joining because of their shared floor line, and connection via the Great Step to the horizontal path to the Kings Chamber. A common element joining these passages with the Entrance Passage is their sharing of 26° inclines, one downward, the other upward. These two groupings seem to indicate that the First Ascending Passage is meant to be associated with the Grand Gallery, the former leading to the latter, and then to the Kings Chamber. Similarly, the Well Shaft leads to the Queens Chamber through its passageway. The two systems are distinct. They are each separately connected architecturally, apparently, and symbolically. See **Figure 30**.

It seems to the author that the way the Well Shaft is connected to the numbers of the speed of light in the Great Pyramid, is in harmony with its nature. It is “dimensionless”, except at the two spots where it starts and ends, and it is only these spots, its upper and lower mouth, that are involved in the count of the speed of light numbers, the first, 29 meters from the Pit, and the 45 meter measure

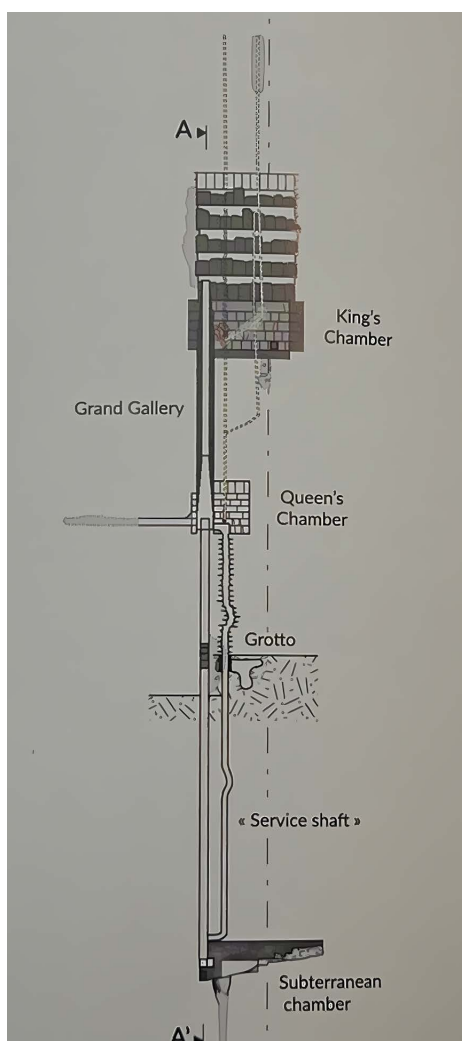


Figure 29. South facing representation of Great Pyramid passages.

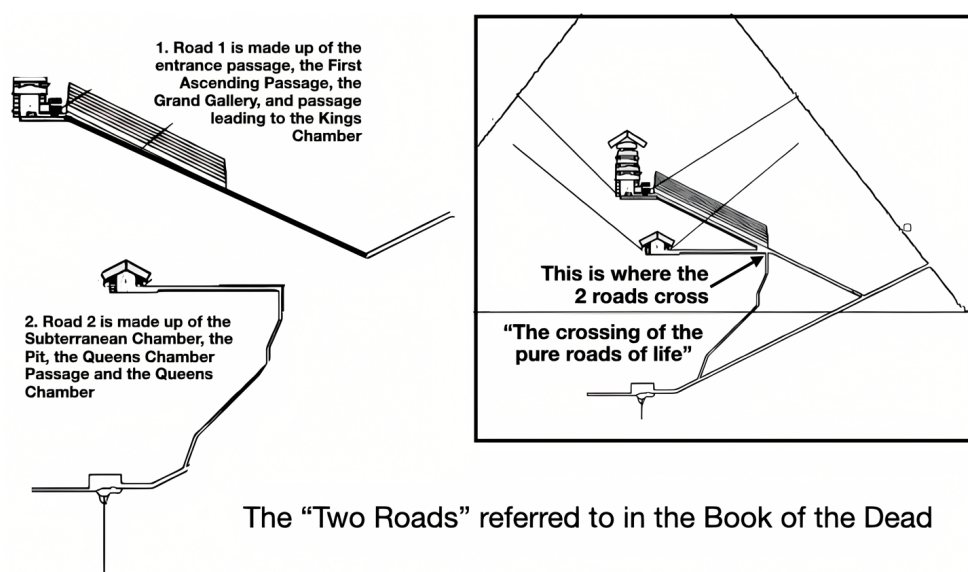


Figure 30. The "Two Roads" referred to in the *Book of the Dead*.

to the end of the Queens Chamber. The joining of the measure from the upper Well mouth to the Queens Chamber passage system seems to be an intended connection from the beginning, not a desperate attempt to force the speed of light numbers to “fit”.

Appendix below lists a few other ways that researchers have seen the speed of light appear in the Great Pyramid.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

In no special order, the following claims about the speed of light appearing in the Great Pyramid are offered for consideration.

1) Eckhart R. Schmitz, *The Great Pyramid of Giza: Decoding the Measure of a Monument*. From Section 45, "Equation for the Speed of Light"

<http://www.thegreatpyramidofgiza.ca/content/index.html#equation-for-the-speed-of-light>.

Schmitz uses "B" to refer to British, imperial inches, and "PI" to refer to Pyramid inches. He writes:

"Consideration may now be given to the elevation of the King's Chamber in its relation to the pavement level surrounding the base of the Great Pyramid. As stated earlier, the level of the passage that leads to the Chamber has an elevation of 1692 B" (1690.14 PI") above the pavement level. This elevation was used earlier in the calculation to determine the effective height of the chamber walls. It cannot be over emphasized that this elevation was not randomly chosen but rather, it is a fundamental element of the design criterion. If you multiply 1690.14 PI" times the Code Number of the Queen's Chamber which is 2400 you arrive at a value of 4,056,336. Now if you multiply this value by the height of the Pyramid which was calculated to have been 5813.0229 PI" ($36524.3/\pi$) you arrive at 2.3579574×10^{10} PI". If you multiply this figure by the scale of the Great Pyramid to the Earth which is 43,200 you arrive at 1.0186376×10^{15} PI" which equates to 2.5901833×10^{10} km. The distance light travels in a vacuum or space in a period of one day is equal to $2.590206837 \times 10^{10}$ km. If you divide the figure as given by the Pyramid's dimensions, which is 2.5901833×10^{10} km by 86,400 (seconds per day) you arrive at 299,789.7 km. The accepted value for the speed of light in a vacuum is 299,792.458 km/sec. The speed of light in air is notably slower.

"The calculation based on the elevation of the floor level leading into the King's Chamber amounts to an accuracy of 99.999%. If the elevation of the passage was 0.0154 B" or 0.39 mm higher than the calculation would be 100% accurate.

"In addition to this relationship there exists another which should be given due consideration, namely the elevation of the Horizontal Passage leading into the Subterranean Chamber. The elevation of the floor of this passage below the pavement level surrounding the Great Pyramid is 1181, ± 1 , British Inches as measured by Professor Flinders Petrie. Converted to metric, this is equivalent to 2,999.7 cm ± 2.54 cm. Multiply this value by 10,000,000 and one arrives at a distance of 299,970 km ± 254 km. It is conceivable, thereby, that the elevation of the Subterranean Passage Floor was purposefully designed to be equivalent to the distance light travels in 1/10 Millionth of a second to within an accuracy of 99.94% $\pm 0.08\%$."

2) There are many people who have claimed that the GPS coordinates of the

Great Pyramid equal the speed of light, but that is not true. But it is true that the latitude going through the Great Pyramid, just a little north of its exact center is 29.9792458 North which is exactly the sequence of numbers in the speed of light in meters per second in a vacuum: 299,792,458. I have produced a YouTube video reviewing these claims (Pahl, 2022). It is interesting that Robert Grant has also shown that the longitude of the Great Pyramid, $31^{\circ}8'3''$ is $10/\pi$ (3.183), thus giving the Great Pyramid a latitude of the speed of light, and a longitude value related to π .

3) Another claim about the Great Pyramid and the speed of light is that the difference in the circumference of the circle around the Great Pyramid base, minus the circumference of the incircle within the Great Pyramid base. See **Figure A1**. The difference, in meters, is very close to the speed of light numbers.

I thought I had discovered this when I took the circumference of the outer circle ($622.25rc \times \pi$) 1954.856rc and subtracted from it the circumference of the inner circle ($440rc \times p$) 1382.300 to get 572.556rc, which is 299.790321 meters. That renders a number over 99% accurately the value of the speed of light numbers (when multiplied by 100,000): 299.790321 vs 299,792,458. But then I found out I was not the discover of this method, that many others had done this. The most thorough record of the various values that can be obtained from this calculation is found in a work by Ian Douglas, comparing results when using various lengths for the cubit (Douglas, 2022a). Douglas shows that using 440 cubits as the Great Pyramid base, and 0.5235909 ($\pi/6$) as the conversion factor between cubits and meters and full values for π and $\sqrt{2}$ the result of 299.791250 is the closest to 299,792,458 that can be achieved.

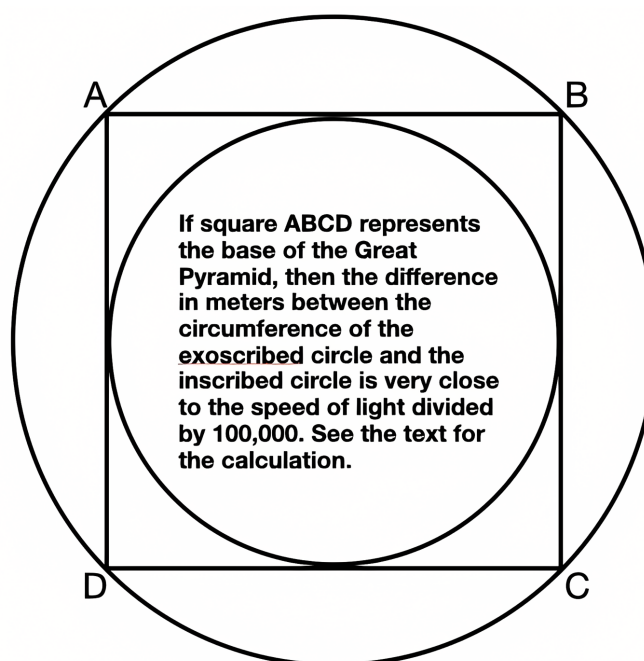


Figure A1. Circumference differences of circles inside and outside the Great Pyramid base indicate the speed of light.

4) Ian Douglas has also done some very interesting work in trying to understand and decode the blocks that make up the floor of the Kings Chamber in the Great Pyramid. He shows that the lengths and ratios of various blocks reveal many well-known constants, including π , ϕ , ϕ^2 , $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, $\sqrt{7}$, e , and the speed of light (Douglas, 2022b). **Figure A2** is the floor plan of the Kings Chamber blocks, with Douglas' labeling. It is noted that the length of block F2 is 8.988 royal cubits. Douglas is trying to show that as a number this indicates the speed of light squared. $2.99792^2 = 8.988$. It is the numbers that are important here, not the decimal placing or the units (cubits, meters, etc.). Douglas asserts that because so many of these relationships exist, it must be intentional. He uses this evidence as proof that the Egyptians could not have done this encoding because these constants were far beyond their knowledge base at that time.

Figure A3 shows a second way Douglas finds the speed of light number in the Kings Chamber floor blocks:

5) Former U.S. Meteorologist Julian Gray finds the speed of light revealed in the Great Pyramid through a comparison of its full height to the top of where an original pyramidion would have been, and the height of the base upon which that pyramidion would have sat (Gray, 1953).

If the base of the Pyramid be considered the earth, then Gray says the distance to the top of the Pyramid is the distance to the sun. See **Figure A4**. Today we call this one Astronomical Unit (AU). He then says the distance to the base of the Pyramid's topstone would represent the time required for light to pass from the earth to the sun. He takes the height of the Pyramid in inches, subtracts the height of the topstone (letting each inch represent one mean solar day of 24 hours), divides by a million to get "the value of the light equation, which is then expressed as the fraction of one day" (Gray, 1953). This number is 0.0057101986² which when multiplied by the number of seconds in a day gives 493.36 seconds.

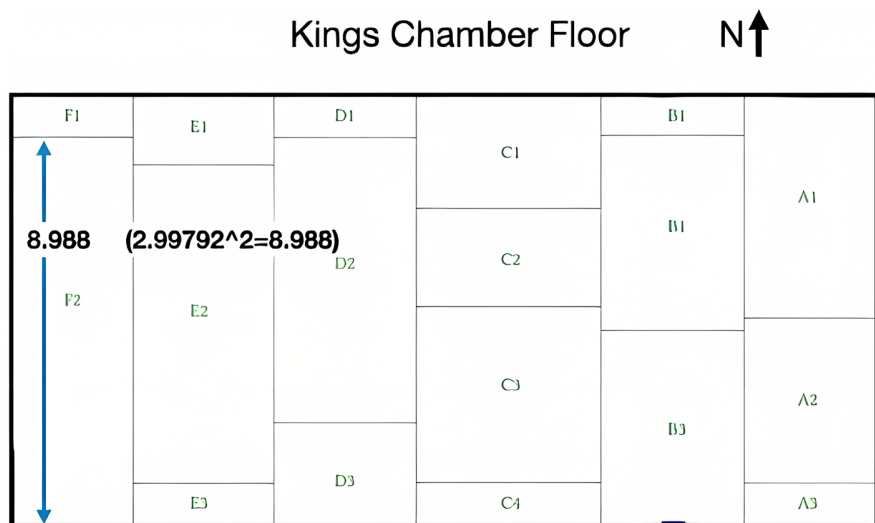


Figure A2. Douglas finding of the speed of light in the Kings Chamber floor.

Kings Chamber Floor

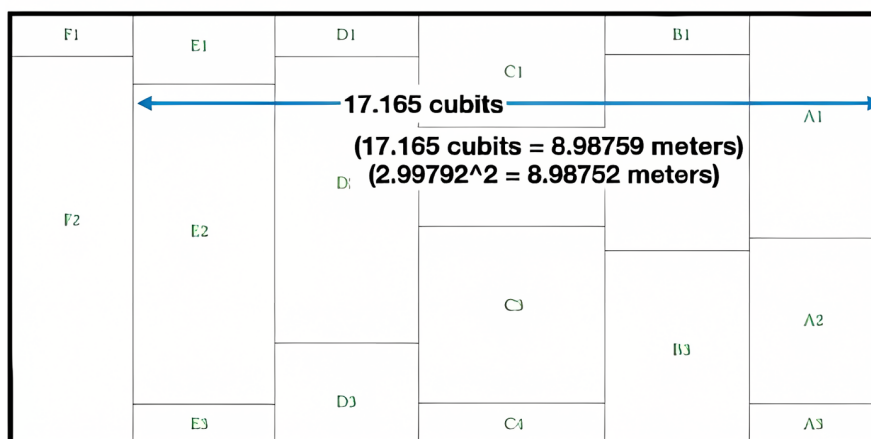


Figure A3. Douglas finding of speed of light in Kings Chamber.

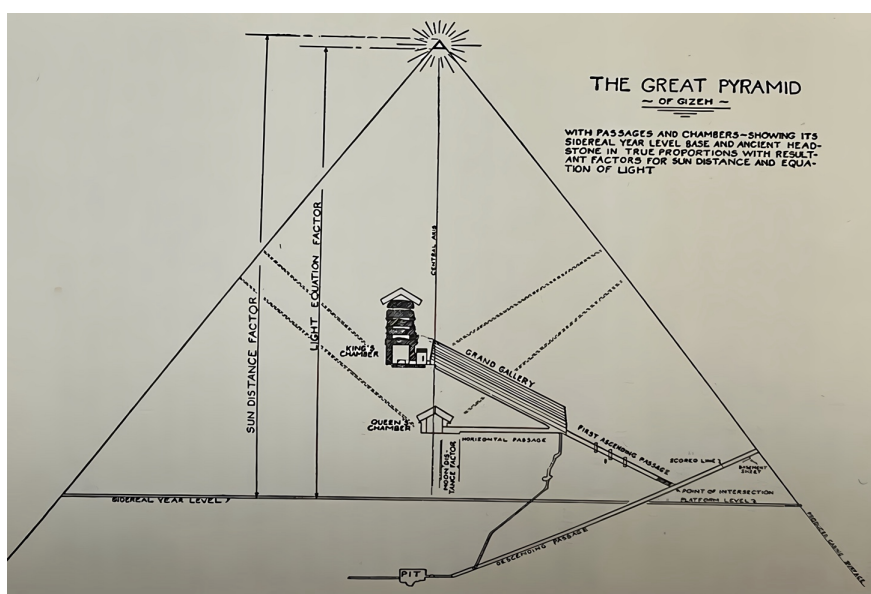


Figure A4. Julian Gray finding of speed of light in the Great Pyramid.

He then compares this to the work of Delambre who studied the eclipses of Jupiter's first satellite more than a thousand times to get the value of 493 seconds for the value of the equation of light. Multiplying this figure—493.36 seconds—by the generally accepted speed of light in miles per second of 186,000, and you obtain the approximate distance from earth to sun at perihelion, when they are closest, 91,764,960.

6) The chart below, **Figure A5**, is a graphic that will help explain a way to find the speed of light in miles per second in the Kings Chamber (Pahl, 2023).

If you start at the East Wall, you are at a wall with 18 blocks. So, 18 is the starting number. Now think of shooting a beam of light west from this starting point. It will pass along 6 rows of blocks on the floor, and 28 blocks that are on

Kings Chamber Plan

North and East Walls, Floor

The Blocks Reveal the Speed of Light

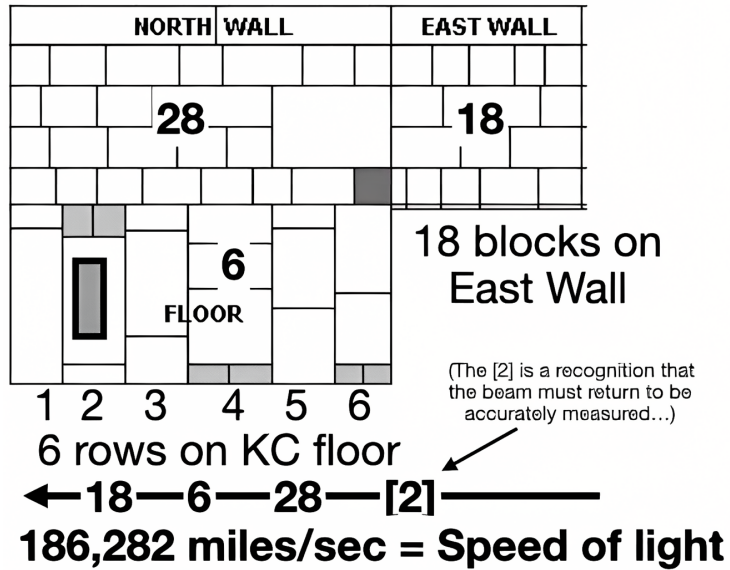


Figure A5. Speed light revealed in the Kings Chamber blocks.

the north wall. So, we have 18-6-28. But the beam must be reflected from the west wall back to the east wall to accurately measure its speed. This is because modern technology is incapable of measuring the one way speed of light (Muller, 2020). Measuring the speed of light in one direction requires clock synchronization (one clock measuring the time of the beam’s beginning and the other its end) that current technology is incapable of achieving. All current measures of the speed of light are based on averaging the two way speed of light, its initial sending and then return to the starting point after being reflected off a surface. The speed of light in miles per second is 186,282 (Stein, 2022), so the Kings Chamber numbers of 18-6-28 need another 2 to reflect that number. It is as if the numbers in the Kings Chamber are saying “18-6-28, you need to return back to the east wall, take a second [2] trip, to truly yield the speed of light”. It is as if the ancient message is twofold: not only did they know the speed of light, but they also recognized this physical limitation of modern science (and perhaps their ancient science?) to be able to accurately measure its one-directional speed.

And we cannot really know if we have indeed measured the true speed of light because it is possible that the initial speed of light to the reflection point is different than the speed of light in its reflected return. It could be, for instance, that the speed of light reflected, is twice speed of the light before being reflected. We don’t know. We only have the average of the two way speed of light. So, we really don’t perfectly know the speed of light. We just know the average of the speed of light going and returning from a certain point. The two speeds could be different.