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The Possible 50ft Columns of the Pantheon Lost in Transit

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Abstract

This paper investigates the transportation, labor, quarrying, and time expenses of the 50ft column shafts that possibly were ordered originally for the famous Pantheon in Rome, Italy. The Pantheon currently includes 40ft column shafts though there is evidence showing that it may have been meant for 50ft column shafts as other parts of the monument are set up as so for the insertion of it; for example, as seen when looking at the pediment, there is a second one three meters higher behind it, displaying that the pediment is thought to originally be supported by a larger portico, hence using larger column shafts. A plausible explanation for this is that the 50ft column shafts were the original choice, but were lost in transit while being transported from the quarries in Egypt to Rome. And due to the loss of such expensive labor costing components and likely imperial budget issues, there is an order of 40ft column shafts instead. Assuming that the explanation is true, calculations made using the works by those such as Wilson Jones, Simon Barker, Ben Russel, and Justin Leidwanger are found for comparisons, analyses, and conclusions. Through the evaluations and results, one can interpret the rather great effect the loss had on the entire project and the display of a sense of importance that the Pantheon has during the Hadrian reign and even now.

Keywords: pantheon, columns, costs

1. Introduction

The Pantheon, built during Emperor Hadrian's reign, 125 A.D., is a monument that stands the test of time and reveals many aspects of Roman architecture as well as its strengths and flaws to it. Designed by the emperor himself and Apollodorus of Damascus, an architect and engineer famous for designing several projects for Trajan, it is a structure that has its triumphs—such as its rotunda— and the arguable mistakes: one that is debated on by numerous critics and historians is whether the sixteen column shafts of the portico (seen in front of the monument) were intended to be made as 40ft or 50ft. It currently stands in Rome, Italy with shafts of 40ft, though through what Wilson Jones would describe as "clumsy handling of the junction between them, as manifest in the failure of major elements to align with one another," (Jones & Marder, 2015) many would speculate the relatively large possibility of 40ft not being the original desired measurement for the column shafts. More specifically, for example, when observing the pediment on the intermediate block of the rotunda from the piazza, a second almost identical pediment can be seen around three meters higher behind it (Roma Experience, 2016) With the rather surprising number of faults to the monument, some decide to overlook or avoid mentioning it due to how much of a "hallowed building" (Jones & Marder, 2015) it has long been considered as.

Adding on to the pediment error, it is noted how during the construction process, before the columns were completed, the rotunda walls would have been already built, hence a designed and finished pediment as well which leads to the deduction that there is a column-related reason for why there is a second pediment to match the smaller columns (Muench, 2015). Many speculate that it is a mistake that came from cutting at the quarry or that the original columns simply broke. Previous works bring attention to this controversy by mentioning that the reason for the creation of 40ft column shafts was because it was "shipped overseas, [which] ended up shorter by 10 feet and had to be accommodated by a lower porch" (Jones & Marder, 2015). Assuming the original order was 50ft, such a relatively large error of 10ft would not have been expected since this was not the first time the Romans ordered columns through the quarries used to create the Pantheon's columns. The quarries, both known to recurringly provide granite for the Romans time and time again for preceding projects such as Hadrian's Villa at Tivoli, the Temple at Venus, and Diocletian's Palace for the quarry of Mons Claudianus, and Basilica di San Giovanni in Laterano and Temple of Jupiter for the quarry in the Aswan Region. These examples disprove the rather unlikely scenario of the common supplier making such a significant error and that there is in all likelihood, another explanation for an order of 40ft columns instead of 50ft.

To this end, this paper explores the cost and reason for a scenario where a shipwreck happened during the transportation of the shafts from the quarries in Egypt to Rome that led to a new order of 40ft column shafts. It contributes to the popular argument regarding the Pantheon on whether the 50ft columns were actually the original order and the feasibility behind it.

The original order of quarrying 50ft column shafts were relatively large, a challenge during that time of Roman construction and engineering that would have been a feat if accomplished. Assuming that the 50ft column shafts did not make it to Rome, possibly due to natural disasters such as floods and earthquakes from the Nile or Alexandria, this loss would have been a hit to the imperial budget which forced them to order smaller shafts.

Through calculating the cost of creating and transporting sixteen 50ft and 40ft column shafts, these calculations can present another perspective of how the Pantheon should be viewed in terms of its general importance and glorious image in the eyes of many. It creates many implications in terms of its monumentality as well: it offers the thought of the great extra effort put through to try to obtain almost the same columns from Egypt. The Pantheon may not be that perfectly beautiful structure that many come to see it as, but it shows the praiseworthy labor and work that make it something beautiful in its own right.

2. Procedure

The process of finding the cost of 50ft columns and 40ft columns first starts at finding the logistics of them, which includes their material, density, weight, height, and diameter, leading to information on the volume and surface area. This information helps with finding the column shafts' labor process done from the quarries to their destination. The step process decided on includes: quarrying, squaring, roughing out, rough dressing (curved), rough dressing (flat), and smooth dressing and polishing combined. Calculating the labor process of the two sizes allows an understanding of how much went into creating them. Then, the costs of transportation from the quarry, Mons Claudianus and Aswan Region, to Rome, is found, which completes finding the costs of creating the 50ft columns then replacing it with 40ft columns. Assuming that the 50ft columns are proportional to the 40ft columns, Table 1 displays the approximate measurements of the three parts of the columns used to find the surface area and volume.

Table 1. Measurements of Bases, Capitals, and Shafts of 40ft and 50ft Columns

Measurements (Roman feet):				
40ft Columns:	Total	Capital	Base	Shaft
Surface Area	927.2409906	156.2753166	138.6219777	632.344
Volume	944.7247616	145.0695858	90.83333333	708.822
Height	48	5.5	2.5	40
Weight (tons)	86.71675892	13.33071869	8.346846847	65.0392
50ft Columns:	Total	Capital	Base	Shaft
Surface Area	1515.826026	218.6757648	271.6990763	1025.45
Volume	1974.420856	239.888088	249.2466667	1485.29
Height	60	6.5	3.5	50
Weight	181.2325536	22.04377025	22.90374775	136.285
SA&Vol Proportions:	Total	Capital	Base	Shaft
Volume (40ft to 50ft)	1:2.09	1:1.654	1:2.744	1:2.095
SA (40ft to 50ft)	1:1.635	1:1.399	1:1.96	1:1.622

Table 2. Measurements

	40ft Column (roman feet)	50ft Column (roman feet)
Capital Height	5.5	6.5
Capital Top Diameter	7	8.3
Capital Bottom Diameter	4.5	5.3
Base Height	2.5	3.5
Base Top Diameter	5	7
Base Bottom Diameter	7	9.8
Shaft Height	40	50

In Table 2, it displays the calculation results of finding the surface area, volume, and proportions. These are based on the assumptions that the capitals are calculated as truncated cones, bases as truncated square pyramids, and shafts calculated as cylinders. These are not the exact geometries and will not produce exact results, but are relatively appropriate approximates for both the 40ft and 50ft calculations. In addition, the weight of the shafts, capitals, and bases are shown, calculated through using the density formula which requires the mean density of their respective materials and the volume of each. The shaft, made of granite, uses a mean density of 2.716 gm/cm^3 (Clark Jr., 1966), while the marble capitals and bases use a mean density of 2.72 gm/cm^3 (CAMEO). In addition to multiplying by the volume, a conversion factor (centimeter to roman feet is around 0.0338) needs to be multiplied because the densities are based on cm^3, but the volumes are based on roman feet.

Table 3. Labor Constants

Labor totals for the production of one column shaft.

Location	Work	Constant (person-hours)	Quantity (m, m^2 or m^3)	Labor (person-hours)
quarry	quarrying	40 / m^3	volume of block = 1 m^3	40 = 80 for 1 skilled[a]
	squaring	12.50 / m^2	surface area of block = 8.09 m^2	101.13
	roughing-out	298.70 / m^3	volume to remove = 0.33 m^3	98.57
	rough dressing of curved surfaces[b]	23.69 / m^2	area of curved surface = 5.34 m^2	126.50
	rough dressing of flat surfaces	8 / m^2	area of flat ends = 0.39 m^2	3.12
	Completed labor			**409.32**

a Pegoretti's labor totals for quarrying are for 1 skilled and 2 unskilled workers.
b This total is based on the calculation a(2+0.50/x) provided by Pegoretti, where a = 8 and x = the diameter of the curve.

Labor totals for the production of one column base.

Location	Work	Constant (person-hours)	Quantity (m, m^2 or m^3)	Labor (person-hours)
quarry	quarrying	40 / m^3	volume of block = 0.22 m^3	8.80 = 17.60 for 1 skilled
	squaring	12.50 / m^2	surface area of block = 2.40 m^2	30.00
	roughing-out	298.70 / m^3 (profile)	volume to remove = (volume of block, 0.22 m^3) – (volume of base, 0.10 m^3) = 0.12 m^3	35.84
	rough dressing of curved surfaces[a]	28.03 / m^2	area of curved surfaces = 0.40 m^2	11.21
	rough dressing of flat surfaces	8 / m^2	area of flat ends = 0.95 m^2	7.60
	Completed labor			**102.26**

a This total is based on the calculation a(2+0.50/x) provided by Pegoretti, where a = 8 and x = the diameter of the curve; in this case the value applied for the diameter of the curve is an average of the various diameters of the different elements of the base.

Labor totals for the production of one column capital.

Location	Work	Constant (person-hours)	Quantity (m, m^2 or m^3)	Labor (person-hours)
quarry	quarrying	40 / m^3	volume of block = 0.29 m^3	11.60 = 23.20 for 1 skilled
	squaring	12.50 / m^2	surface area of block = 2.66 m^2	33.25
	roughing-out	298.70 / m^3	volume to remove = (volume of block, 0.29 m^3) – (volume of capital, 0.14 m^3) = 0.15 m^3	44.81
	rough dressing of curved surfaces	27.11 / m^2	area of curved surfaces = 1.02 m^2	27.65
	rough dressing of flat surfaces	8 / m^2	area of flat surfaces = 0.63 m^2	5.04
workshop	finishing (80%)	—	—	408.84
	Completed labor			**542.79**

Russel-Liedwanger 2020 (Marz Energetics)

In Ben Russell and Justin Leidwanger's work, *The Energetics of Lost Cargoes: A New Perspective on the Late Antique Marzamemi 2 Wreck*, it explores the lost cargo of the Marzamemi 2 shipwreck, including logistics on parts of the cargo such as the marble shafts, capitals, and bases dimensions, and labor constants for each stage of production. Through using the labor constants offered in their paper, seen in Table 3, the cost of the labor process for each stage in person-hours can be found through multiplying the respective constants at each stage by either surface area and volumes of each capital, base, and shaft shown in Table 2 depending on what the labor stage involves (Russel & Liedwanger, 2020).

However, due to the material differences between the shafts and the capitals and bases—the bases and capitals were made of marble and shafts were made of granite, which was a much harder material to work with—a multiplier of eight is applied to the granite in addition to the labor constants in order to create a more accurate calculation on the amount of labor that went into carving the shafts.

Table 4. Pegoretti Manual

Labour estimates for the sawing of 1 m^2 panel of stone in man-hours.				
Source	Porphyry	Granite	White marble	Limestone
Pegoretti 1844–5	461.4	184.4–218.4	21.3–30	8–17

The multiplier comes from Giovanni Pegoretti’s manual, Manuale pratico per l’estimazione dei lavori architettonici, stradali, idraulici e di fortificazione per uso degli ingegneri ed architetti, showing that it takes around eight times more man hours to work on a panel of stone of granite than one of white marble (seen in Table 4); so by multiplying by the labor constant for marble shafts then multiplying by eight, it would offer an more appropriate estimate for the amount of person-hours that went into each stage of carving the granite shafts (Pegoretti, 1843).

Table 5. Labor Costs

Labor Process (person-hours):				
40ft Columns:	Capital	Base	Shaft	Total
Quarrying	5802.783431	3633.333333	226822.99	236259.106
Squaring	1953.441458	1732.774721	63234.3696	66920.5858
Roughing Out	43332.28527	27131.91667	1693800.67	1764264.88
Rough Dressing (curved)	4236.623834	3885.574035	14980.2222	23102.42
Rough Dressing (flat)	1250.202533	1108.975821	5058.74957	7417.92792
Smooth Dressing/polishing	2109.716774	1871.396699	22764.3731	26745.4865
Total	58685.0533	39363.97128	2026661.38	2124710.4
50ft Columns:	Capital	Base	Shaft	Total
Quarrying	9595.523521	9969.866667	475291.553	494856.943
Squaring	2733.447061	3396.238453	102545.119	108674.804
Roughing Out	71654.5719	74449.97933	3549239.67	3695344.22
Rough Dressing (curved)	5928.299985	7615.725108	24292.9386	37836.9637
Rough Dressing (flat)	1749.406119	2173.59261	8203.60948	12126.6082
Smooth Dressing/polishing	2952.122825	3667.93753	36916.2427	43536.303
Total	94613.37141	101273.3397	4196489.13	4392375.84

Note. Through using the labor constants and the multiplier for the granite shafts, the labor cost for each stage of carving out the shafts, bases, and capitals is calculated.

With the labor costs of carving out the shafts calculated, the next steps are to find the cost of supporting the workers at the quarries, Mons Claudianus and the Aswan Region, and the transportation costs for both sixteen 40ft and 50ft shafts from the quarries to Rome. The support costs were found through understanding the conditions at the quarries and how the workers were supplied with food. In Mons Claudianus and assuming the same in the Aswan quarries, there were 900 workers with one artaba supporting each of them every month; an artaba is a unit represented as wheat that provides enough caloric intake for one worker (Adams, 2001). 900 artabas a month to support 900 workers would accumulate to 10,800 artabas a year.

The first five steps of carving the shafts were done at the quarry sites, so by adding the number of person-hours it took for each of those steps (seen in Table 5), it allows for the calculation on how many years it took for the workers to work on the shafts and how many artabas needed to support them. As seen in Table 6, it divides up the total number of person-hours in the first five steps of the labor process among the 900 workers. Then, it divides it up into days and how long it would take to work on 12 shafts; by multiplying the annual amount of artabas needed to support the workers to the number of years it would take to finish working on the shafts, it would arrive at the total number of artabas needed. Using a conversion rate of one artaba to eight drachmas (Adams, 2001), the total number of artabas arrives at the Roman currency of drachmas. Instead of using a unit of food to show that cost even though it is easier to be converted to other Roman currencies, using a currency, drachmas in this case, gives a better understanding of the cost and therefore used instead. The same process is done with the four shafts in the Aswan Region.

Table 6. Worker Support Logistics

Worker Support:										
1 artaba feeds 1 worker; 10,800 artabas per year for 900 workers										
Mons Claudianus						Aswan Region				
Quarry to RD flat (person-hours):				2003897		# of days till 900 workers finish 4 shafts:				371.092
# of days till 900 workers finish 1 shaft:				92.77301		Years till Quarry to RD flat on 4 shafts:				1.030811
# of days till 900 workers finish 12 shafts:				1113.276		# of artabas needed:				11132.76
Years till Quarry to RD flat on 12 shafts:				3.092434						
# of artabas needed:				33398.28						
Total artabas needed:			44531.04							
Total drachmas needed:			356248.4		1 artaba = 8 drachmas					
Mons Claudianus						Aswan Region				
150 camels; 1 camel load holds 6 artabas						Total artabas needed to support camels:				5566.381
5400 artabas annually to feed 150 camels						Total drachmas needed:				44531.04
Total artabas needed to support camels:				16699.14						
Total drachmas needed:				133593.1						

Additionally, there would also have to be animals that would transport the wheat. If there was monthly delivery of wheat, that meant there needed to be 150 camels in service. A camel load was able to take six artabas, so 1,800 camel loads were necessary to support the workers at the quarries annually. In order to support the camels, since they each needed 1/10 of artaba per day, it gives a figure of 5,400 artabas a year. If the camels were in service to supply the workers of Mons Claudianus for around 3.09 years, then the camels would have needed around 16,699.14 artabas, or 133,593.1 drachmas. The same process is done with the camels and workers of the Aswan Region. During the second century, there was an average rate for hiring camels; two drachmas per day. For 150 camels, the animal requisition rate would be around 108,000 drachmas a year, so the cost for around 3.09 years of hire would be around 333,720 drachmas.

For Mons Claudianus specifically, there is 141km of land distance between its quarry and Coptos (Scheidel, 2013), before it would be sent down the Nile River and to the port of Alexandria. To cover the transportation cost of this distance, there needs to be 70 camels to carry around 65 ton 40ft column shafts and around 140 camels to carry around 136.2 ton 50ft column shafts. Camels can carry around 1000 kg (Adams, 2001), but assuming that there were camels with less physical physique, higher approximates were made. Using the realistic period of twenty days to transport one column shaft from Mons Claudianus to Coptos and ten days to prepare the transportation for a single column, since there were 12 (Adams, 2001), transporting them simultaneously would take about half a year, though it is approximated to a year when including the extra work of loading and unloading, wind factors, and weather factors such as haboobs and monsoons. To supply food for the camels that would transport the column shafts, since they need 1/10 artabas a day, it would take 210 artabas per month (2,520 artabas per year or 20,160 drachmas per year) to feed the 70 camels moving the 40ft column shafts and 420 artabas per month (5,040 artabas per year or 40,320 drachmas per year) to feed the 140 camels moving the 50ft column shafts. In addition, there was the animal requisition rate cost to add in; 70 camels for hire would cost 50,400 drachmas per year and 140 camels would cost 100,800 drachmas per year.

For the quarries in Aswan Region specifically, there was a river distance between the region and Coptos. The cost, calculated using the rate of 4.75 drachmas per 100 artabas per 100 km, would be 393.68 drachmas. The distance, around 259 km, is divided by 100 to get 2.59, multiply by 800, then divide it by 100 (based on the cost rate above) and multiply it by 4.75 to get 98.42, which is the cost of one column's journey from the Aswan Region to Caenopolis; there were four columns, so it would cost have cost around 393.68 drachmas.

With the journey from Coptos to the port of Alexandria, where it would then be transported to the port of Ostia, the distance would be around 879 kilometers, and using the river cost rate from before, it would lead to a cost of 304 drachmas to transport one column and 4864 drachmas to transport 16 of them. In addition, it would most likely also cost to unload and load the columns onto the boat before being transported down the river. Since the 40ft columns were around 65 tonnes (65,000 kilograms) and knowing that the Romans used the treadwheel crane to lift heavy objects (where four men could lift around 3000 kilograms), this would show that there is a need of around 86.66… people (Matthies, 1992). To account for those with illnesses, different physique, or other reserves, this number can be approximated up to 100 people. Assuming that it took these people around a week to load and unload the 65 tonne column, then if it were for 16 columns, it would take four months. Four months and 100 people would get 400 artabas per month, which is converted to 3200 drachmas per month for loading and unloading sixteen 65 tonne 40ft columns. If it were for the approximately sixteen 136 tonne 50ft columns, it would take 200 people to load and unload one, meaning 4 months to carry 16 columns, coming to around 6400 drachmas.

The last part in finding the transportation cost is to obtain the cost of the sea and river transport from the port of Alexandria to the port of Ostia to Rome. The distance needed to cover by sea is 2564 kilometers and through ORBIS, it explains that the wheat cost for this transport is two kilograms of wheat per kilometer, so multiplying 2564 by two would get the cost of 5128 kilograms of wheat, or around 171 artabas after the conversion of one artaba equaling 30 kilograms of wheat (Minnen, 2007). For 16 columns, it would cost around 2736 artabas or 21888 drachmas. Regarding the 23 kilometer distance between Ostia to Rome's river transport cost, by using the same rate of 4.75 drachmas per 100 artabas per 100 kilometers from before, it would come to a cost of 8.74 drachmas after multiplying 2.3 (from 23 kilometers) and eight (from 800 artabas burden); for 16 columns, this would lead to a river transport cost of 139.84 drachmas.

In total, the transportation cost from the quarries of Mons Claudianus and the Aswan Region to Rome with variables from unloading and loading to the amount of food the workers needed, came down to a cost of around 396026.12 drachmas. When converting it to sesterces, which was the currency at the time of the Pantheon's construction, it would be the cost of around 380794.35 sesterces. In Adams calculation on transportation cost in his entry "Who Bore the Burden," it shows 304600 drachmas is equivalent to 73221 denarii which gives the drachma to denarius conversion of 4.16. Understanding that the conversion from denarius to sesterces is four (Dennis, 2006), 396026.12 is divided by 4.16 and then multiplied four to get 380794.35 sesterces.

To compare the work that differed the most between the creation of the 40ft column shafts and the 50ft column shafts, which were solely in transportation, smooth work, and rough work, these costs would need to be added up for both orders in man-hours since smooth and rough work is calculated in man-hours. To convert transportation cost in sesterces to man-hours, the cost in drachmas is divided by two showing because in *The Works of Xenophon* (Xenophon, 1890), it explains how half a drachma per day gave a comfortable amount of subsistence for the workers. This calculation will give man-days since the conversion rate is in per-days, so another conversion rate is needed to find the cost in man-hours in order to suit the comparison. From Delaine's *The Pantheon Builders: Estimating Manpower for Construction* (Delaine, 2015), she mentioned how workers worked ten work hours per man-day, therefore, the transportation cost in man-days is multiplied by ten in order to get the cost in man-hours; this will result in a cost of 312427.6 man-hours for 16 40ft column shafts in transportation only. For the 16 50ft column shafts, the cost would be 344427.6 man-hours.

In total cost, the rough work (320623.7 man-hours), smooth work (364229.9 man-hours), and transportation cost (312427.6 man-hours) of 16 40ft column shafts is 997281.2 man-hours. For 50ft column shafts, its rough work (519944.7 man-hours), smooth work (590659.8 man-hours), and transportation cost (344427.6 man-hours) comes at a total cost of 1445032.2 man-hours.

Figure 7. Comparison

Note. The two pie charts display the total cost for 40ft and 50ft column shafts separately in the categories of rough work (blue), smooth work (orange), and transportation (gray).

3. Discussion

Through research, information on whether the existence of the order on 50ft column shafts has led to the conclusion that it was rather likely that it did exist and that something happened that led to the loss of the original order and the request for the new order of 40ft column shafts. Obtaining the calculation that it took around 1445032.2 man-hours to complete the original order from quarrying (smooth and rough) to transporting from the quarries to Rome, it would have taken around 1.67 years to have completed it; this is from dividing the total man-hours by 100, because around 100 people (approximated previously) worked on the shafts; then by 24, to get the number of days; then by 30, to get the number of months; and then by 12, to get the number of years. This brief calculation excludes the fact that four of the shafts were done at a different quarry with a different number of people, supporting the possibility that it might have taken even less than 1.67 years. Since the Pantheon's project may have begun around 118 AD (University of Washington, 2004) and finished around 126 AD (History.com Editors, 2018), this time span allows for a second order to happen and therefore, increases the chance of 50ft column shaft order's existence.

Besides the visible evidence seen physically at the Pantheon, there are also possible explanations found by the transportation paths taken when moving the column shafts from the quarry to the destination. This includes the likelihood of floods from the Nile River in Egypt, which may have caused a shipwreck; the columns were transported during the summer, which is when the "annual Nile flood from June to September" occurred (Adams, 2001). Another possibility for the inability to complete the transportation of the original order is due to the intense heat that may have happened during the summer which would preclude the transport of the shafts; this is especially true in the Aswan region.

In addition to where the transportation of the possible 50ft columns ended, another aspect in consideration would be when they were lost and how long it would have taken for people to realize before re-ordering the 40ft columns. For instance, if the columns were lost in the early stages of the transportation, in the Nile River, then the news of the loss of columns would be faster discovered and spread in comparison to if the columns were lost in transit across the sea to Rome. Since the river was used often for transportation of other goods by Egyptians and foreign merchants alike, logically, it would make sense for them to quickly find out or even witness the loss of the 50ft columns and reorder right away; however, this is less likely if the columns were able to make it to sea due to its vastness and other additional factors, creating more delay in transporting columns to Rome and making it more vague on the time span in which it took for people to discover the loss. This also raises the discussion regarding the possibility of the columns being broken in sea transit due to natural causes or human error, which would result in an immediate discovery and reordering process. These are all scenarios that may create additional delay and may fluctuate the costs of work and transportation; people would have to work longer, and there would have to be transportation back to Coptos to pick up the new columns.

4. Conclusion

Upon visiting the Pantheon today, it lacks all of its beautiful embellishments and decorations that were once there during the completion of it. Even so, its structures and bareness to it still shines as a monumental and impressive piece of work. The evidence presented here are not to make people see the Pantheon any differently from before or to look down upon it for its flaws and imperfections, but rather to see it in a new positive way for how much additional work and effort was put in it in order to complete it for those during the first century and even today to see it in awe in its closest to ideal form. It nonetheless still displays the raw visions of the architects, Apollodorus and the emperor himself, and the amount of passion behind this work, leaving behind a booming legacy and an exemplary mark on today's architecture. If it had been built in the way that it originally should have been, it would have lacked key aspects in terms of its monumentality in which that is the messages on grit, flexibility, and brevity to adapt in order to make the Pantheon still look as grandiose and idealistic as possible even with the major change to one of its crucial components.

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