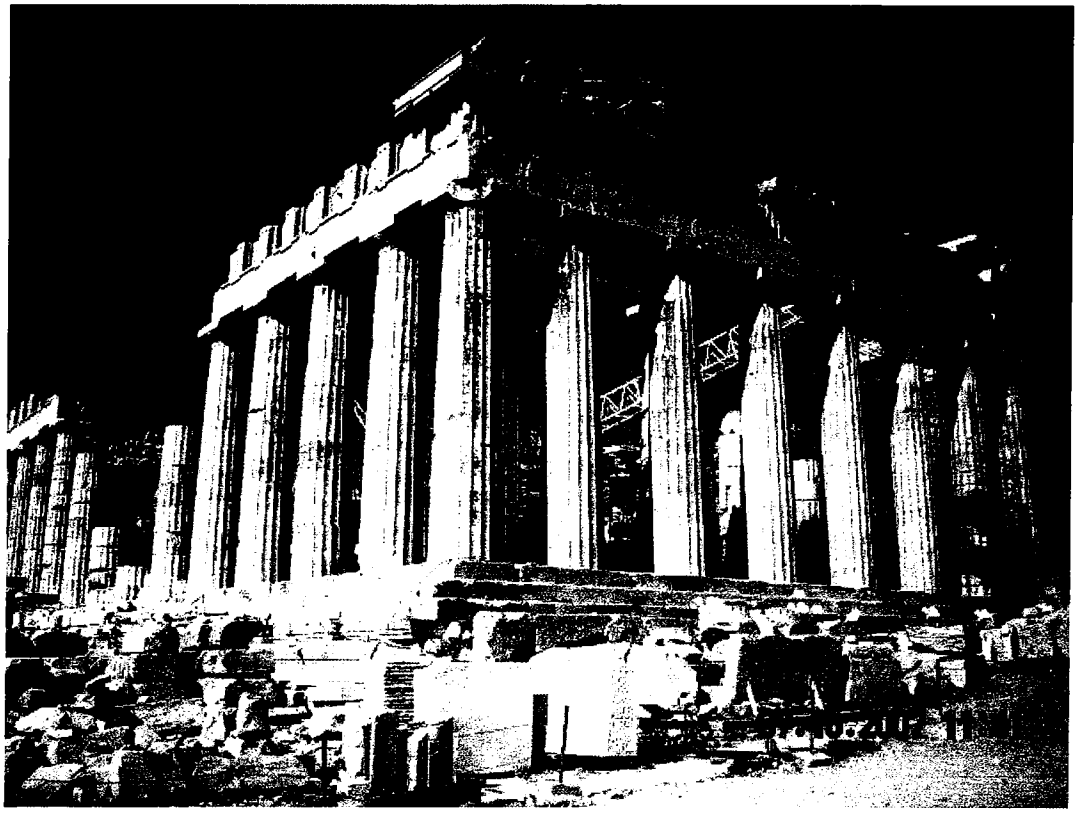
WEDNESDAY, JANUARY 12, 2011

PARTHENON



Measurements: 11-15 October 2002

The architecture of the Parthenon

The "Old Parthenon" on the Acropolis of Athens, made of poros stone, had been destroyed by the Persians in 480 BC. Thirty three years later, in 447 BC, Pericles ordered the construction of the new Parthenon, a Doric order, peripteral temple made of white Pentelic marble. The architects were Iktinos and Kallikrates and the sculptor, who supervised the work and the decoration, was Pheidias. Pheidias himself made the chryselephantine (gold and ivory) statue of Athena Parthenos that was standing on a pedestal inside the temple. Her head reached the roof of the sekos *(cella)* which was 12.45 m high.

In this photo, taken on October 12, 2002, we see that the "new" Parthenon was built almost exactly on the pedestal of the "Old Parthenon". The difference is about 1 m to the north. (This is the south side - looking east).

The pedestal consists of a small base and three steps. The third step, where the outer columns of the peristyle stand, is called stylobates. There are 8 fluted columns in the narrow sides and 17 in the long sides. Thus, the total number of columns around the temple is 46, or 2(6+17) = 2 x 23. (*The number 23 is the arithmetic value of the Greek words "H ΘEA" (the goddess) if we add the numbers that correspond to each letter - e.g. H=8, Θ=9, E=5, A=1). In general, if the number of the columns on the narrow sides of an ancient Greek temple is α, then the number of the columns on the long sides is 2α+1 (twice the first number plus one).

Each column consists of 10 spondyloi (round pieces of marble put one on top of the other) and a capital (11 pieces). The total height of the columns above the stylobates is **23** MC (10.4433 m - 23 = H ΘEA). Above the capitals are the *epistylia* (= on the columns) that connect the columns. Above these long stones are the metopes serarated by the triglyphs. There are 92 metopes around the Parthenon, 14 in the narrow sides and 32 along the long sides. Now, the arithmetic value of the name AΘHNA (Athena) is **69** (A=1 + Θ=9 + H=8 + N=50 + A=1). Thus, the words H ΘEA AΘHNA (the goddess Athena) are equal to 23 + 69 = **92.** Also, 69 is 3 times 23 and 92 is 4 times 23.

The height of the epistylia and the band with the metopes and triglyphs is **6** MC, and the height of the eaves and the pediment is **11** MC. Therfore, the total height of the Parthenon from stylobates is exactly **40** MC (23 + 6 + 11 = 40 MC = 18.162 m).

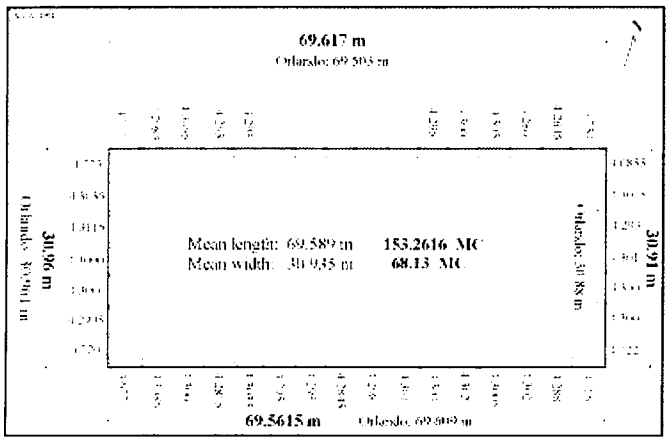
The entrances were on the east (main) and the west sides. After the first outer columns of the peristyle, there are two more steps and six smaller columns on the top of them and in front of the sekos (cella). The first part of the sekos on the east side - where the statue of Athena was standing - is called *pronaos* or *prodomos* and the second part on the west side *opisthodomos* (= back room). The total length of the sekos inside the walls is 44.166 m (29.7974 for pronaos + 13,2145 for opisthodomos + 1.154 for the wall between them). The width is **42** MC (19.065 m).

The dimensions of the sekos on its "stylobates" (including the walls and the 6 columns in the front and in the back) are 59.087 x 21.715 (m). The slabs of the frieze around the walls of the sekos were about 160 m in length and 1.05 m high. They were carved in situ and depicted the Panathenaic procesion.

The dimensions of the Parthenon

The width of the small base of the pedestal around the first step is 0.103 m and its height 0.30 m. The width of each of the next two steps is 0.70 m and their height 0.512 m. The height of the stylobates is 0.552 m.

The length of the base and steps on the four sides of the Parthenon is not exactly the same because the stylobates is not a perfect rectangular. The north side is 69.617 m, the south side is 69.5615 m, the east side is 30.9066 m and the west side is 30.963 m. The average is about **69.59** m for the long sides and **30.935** m for the short sides. In order to find the dimensions of the other steps and the base, we must add 1.40 m for each step and 0.206 m for the base.

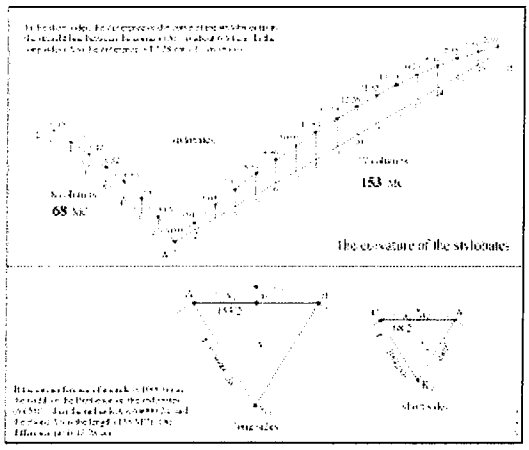


The center of each column - with the exception of the four in the corners - has been put exactly on the joints of two adjacent blocks of the stylobates, so most of my measurements are between these joints (or the centers of the columns). For the four corner columns, I measured from the corners to the center of the next column. Because of the restoration work at that time, part of the north side was covered and I was not able to measure there. However, I took one measurement of the whole side.

For comparison, John Pennethorn (1878) writes that the dimensions of the Parthenon are 228.141 ft (69.537 m) and 101.336 ft (30.8872 m). According to Anastasios Orlandos (1949), the mean length is 69.556 m and the mean width 30.9205 m.

The mean distance between the centers of the columns - except for those in the corners - is **3π** MC (4.28 m). In the corners, the distance is **10π/3** MC (4.755 m). Thus, the length of the east side is **65π/3** or 68.068 MC (30.9066 m).

In ancient times, the Parthenon was called "*ekatompedos neos*" (100-foot temple) because the narrow sides on the stylobates were 100 ft. The long sides were 225 ft, so the ratio is 9:4. In 1984, I made the observation that if the mean circumference of the Earth is 40,030,375 m (360 degrees), then 1" is equal to 30.8876 m. This was published in my first book *"Omphalos"* (Jan. 1986, p. 278). However, at that time I had not measured the Parthenon yet and I used the width we find in most books (about 30.88 m). But after my measurements in 2002, I found that this number was wrong and that the mean width is about 30.935 m. So, if we use the equatorial circumference of the Earth (40,075,161 m), 1" is equal to 30.92 m. Is this a ...coincidence?



According to these numbers, the true dimensions in megalithic cubits are about 153,262 x 68.13 (MC). But the measurements were made along the curves of the stylobates - not in a straight line - so they are a little longer. The difference, of course, is negligible.

In the short sides, the difference of the curve of the stylobates from the straight line between the corners AC is about 6.64 cm. In the long sides AB, the difference is 12.28 cm.

If the curves of the stylobates are arcs of circles, the radii KA are 68000/2π for the long sides and 400π^2 for the short. This means that the circumference of the first circle is 68000. But the number 68 is the width of the short sides.

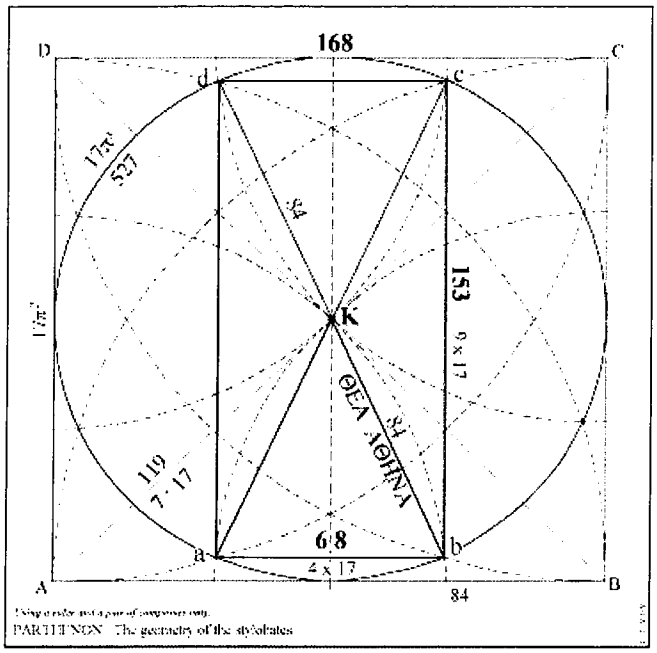
► 2012 (50)
► 2016 (72)
► 2017 (58)
► 2018 (22)

ABOUT ME

Athang1504

Athanasios G. Angelopoulos (Username: Athang1504)- I was born in Athens, Greece, on August 19, 1953 and I have studied mathematics, astronomy and ancient Greek language and history. I'm also an amateur painter, sculptor and photographer. In general, I like science, arts, music, sports and everything that is creative. I have spent the last thirty years of my life in research and writing. I have written and published (not self-published) 14 books and many articles that have been read by more than 100,000 people in my country since 1986 (in Greek). They contain only original work based on this research. I believe that I have found some interesting things and, obviously, this is the reason I'm presenting some of them here (in English).

View my complete profile

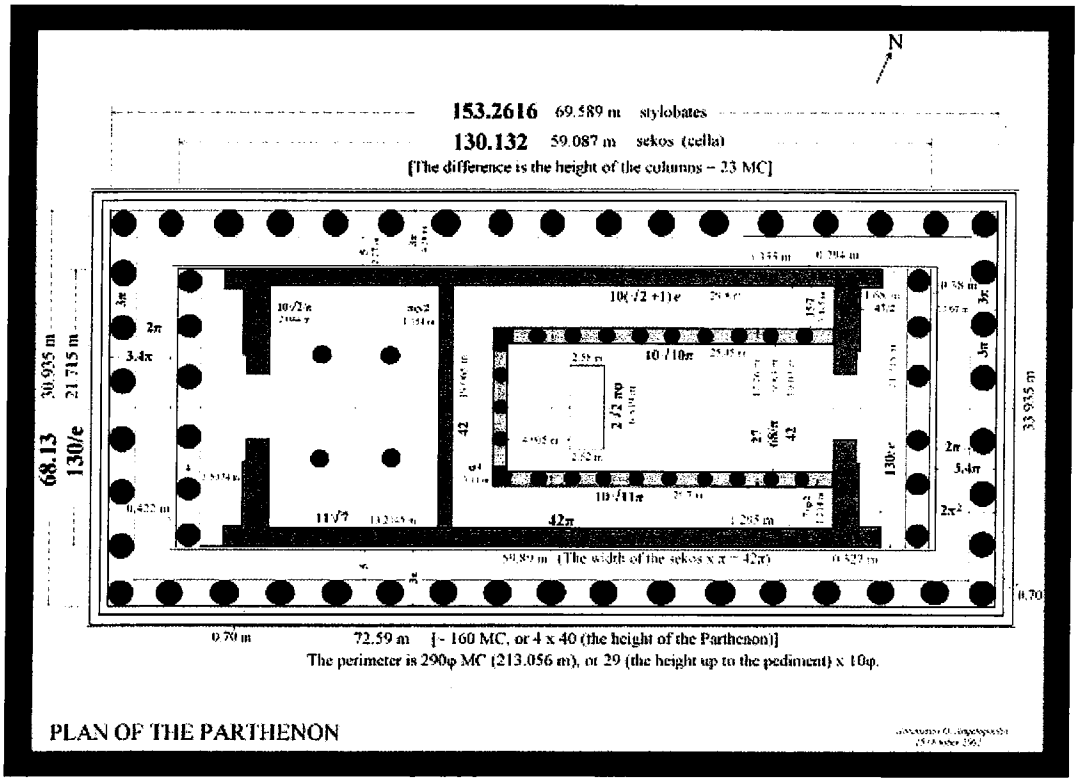


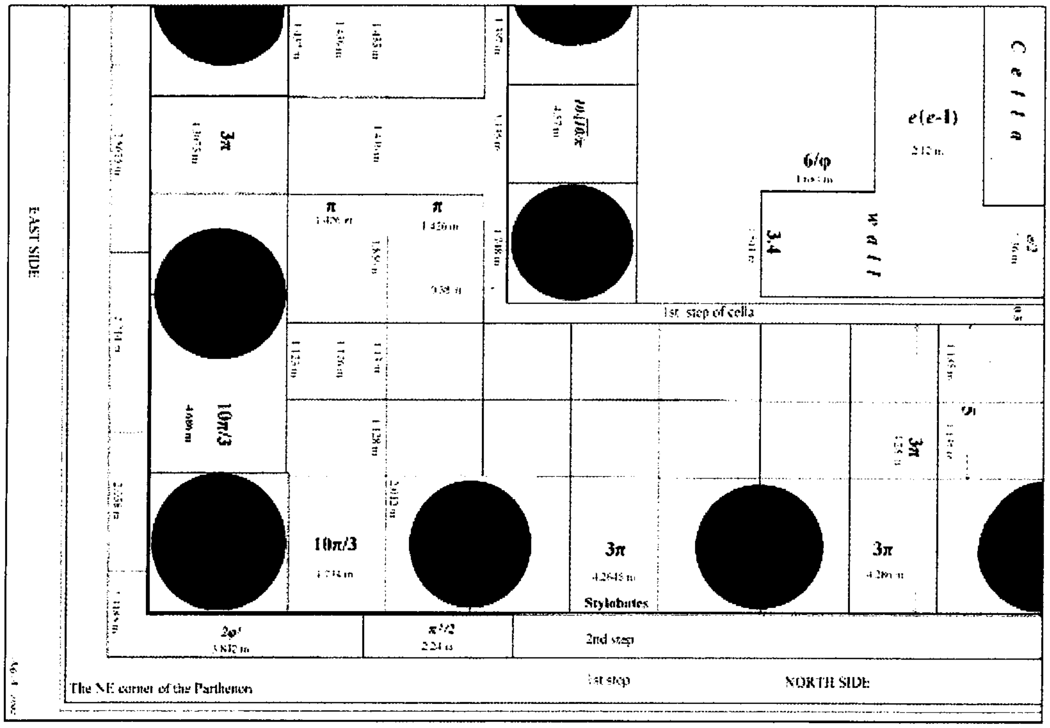
The geometry of the stylobates

We draw a circle of radius 84 MC. The number 84 is the arithmetic value for ΘΕΑ ΑΘΗΝΑ (goddess Athena). The diameter is 168 MC or approximately 17π^2 (167.8) and the circumference is 17π^3, or 527 MC.

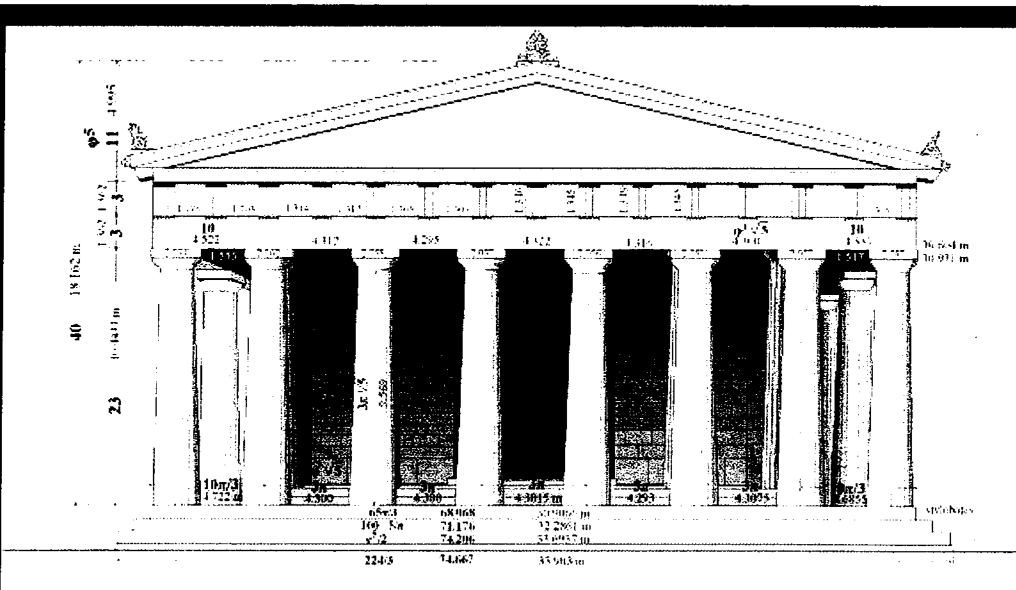
First we inscribe this circle in a square of sides 168 and we bring the diagonals and the perpendicular lines in the middle. Each diagonal is about 238, or 14 x 17, so AK = 7 x 17 = 119. But ΠΑΡΘΕΝΩΝ / Η ΘΕΑ ΑΘΗΝΑ (Parthenon/the goddess Athena) is 1095 / 92 = 11.9.

If we use the corners A, B, C, and D and write circles with radii 168 and 84, we get the points a, b, c and d. The dimensions of the rectangle abcd is 153 x 68 MC and the ratio 9 : 4.

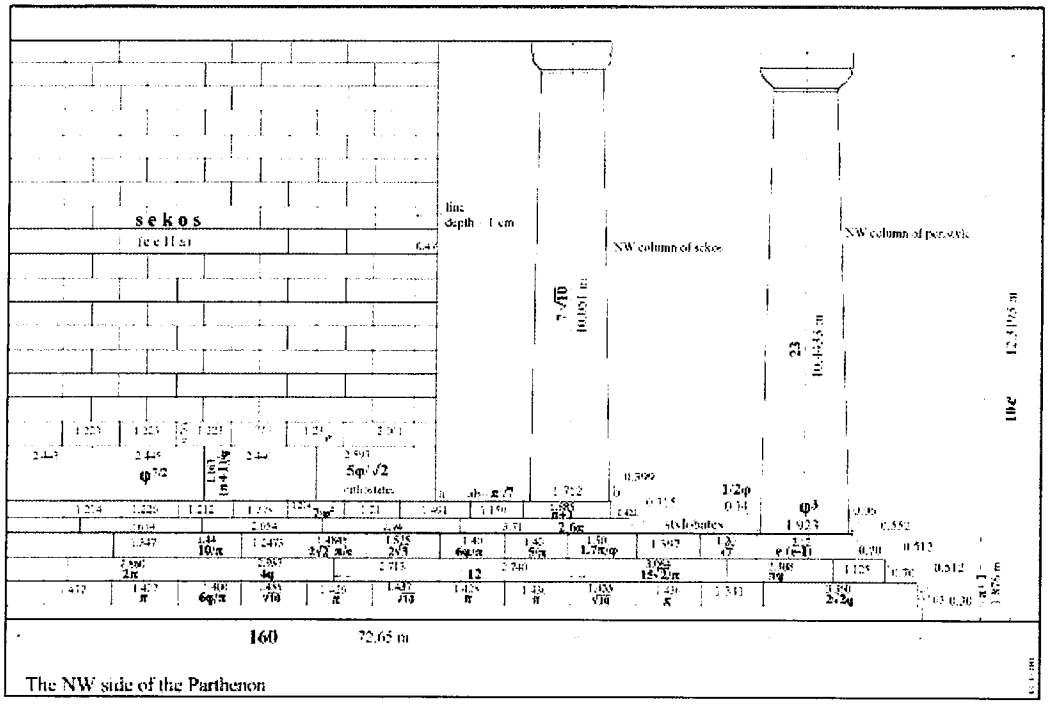




The NE corner of the Parthenon

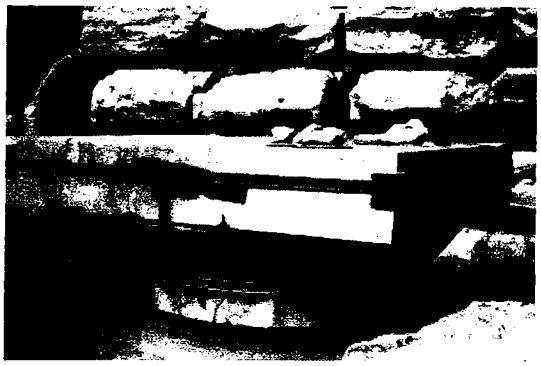


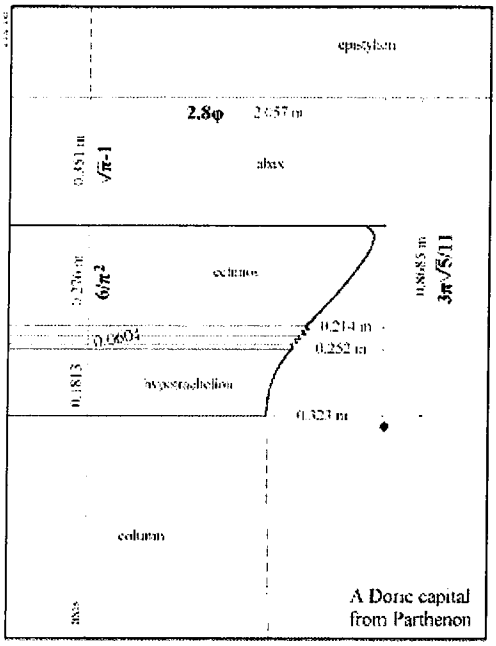
The eastern facade of the Parthenon



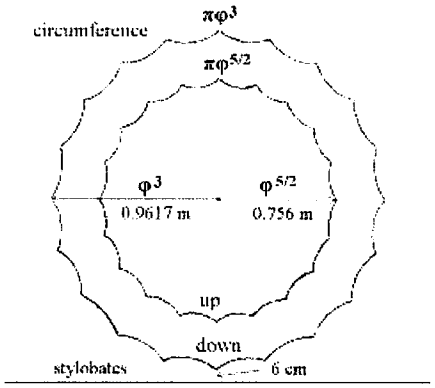
The NW side of the Parthenon

Restoration of a broken capital on the floor of the sekos (October 2002).

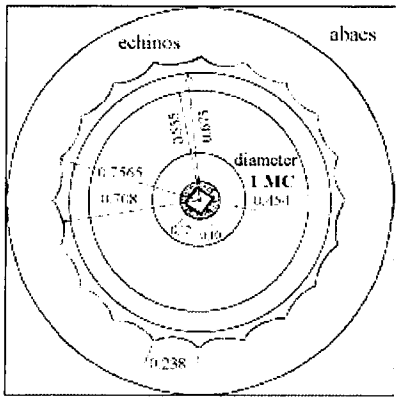




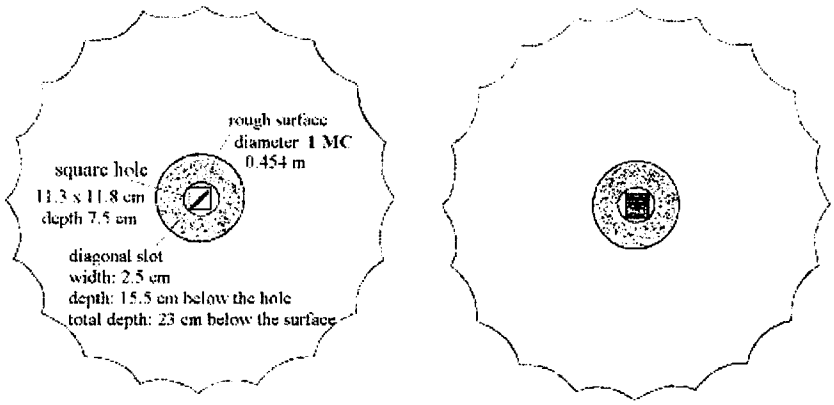
A Doric capital from Parthenon



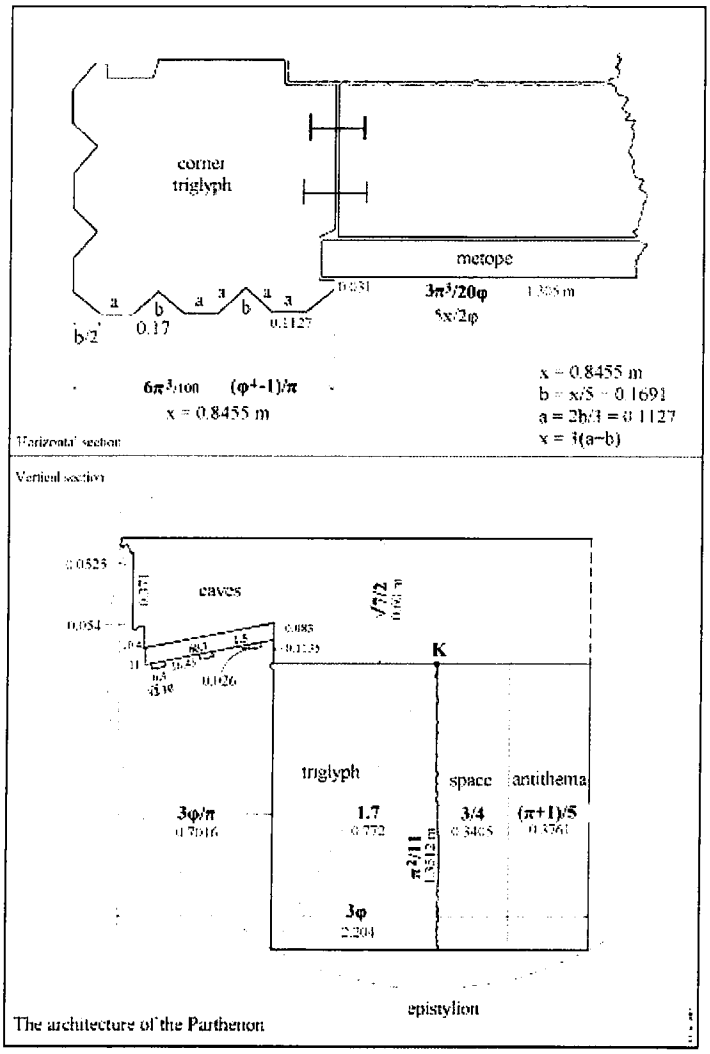
The radii of a column with 20 flutes on stylobates (down) and in the capital (up).



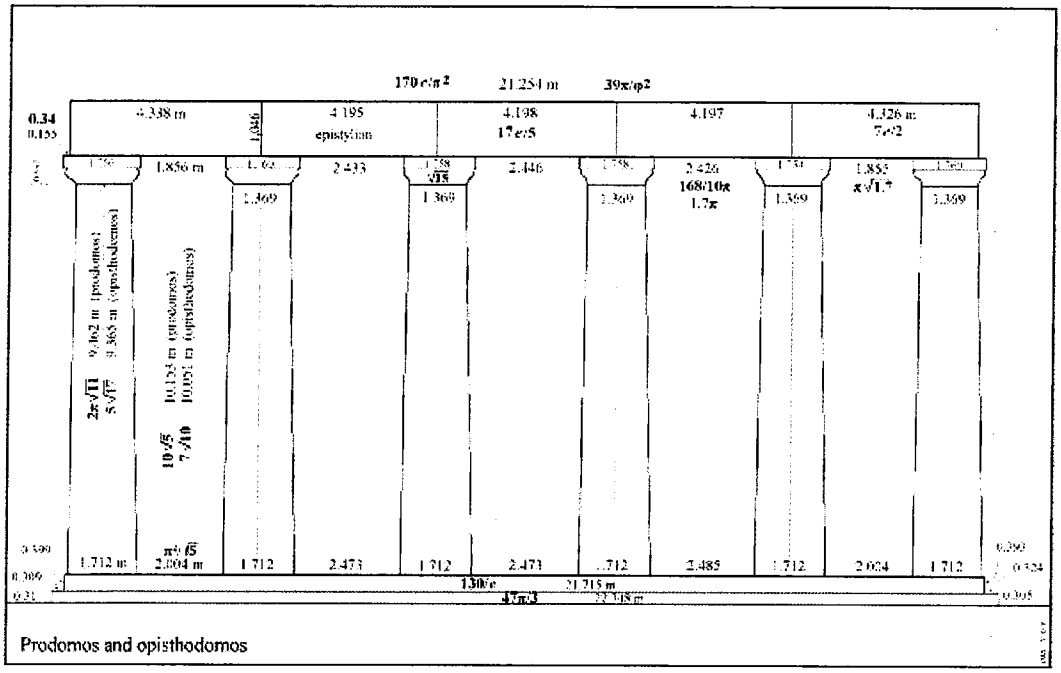
A capital of a column from stylobates seen from below. The four corner columns are a little larger.

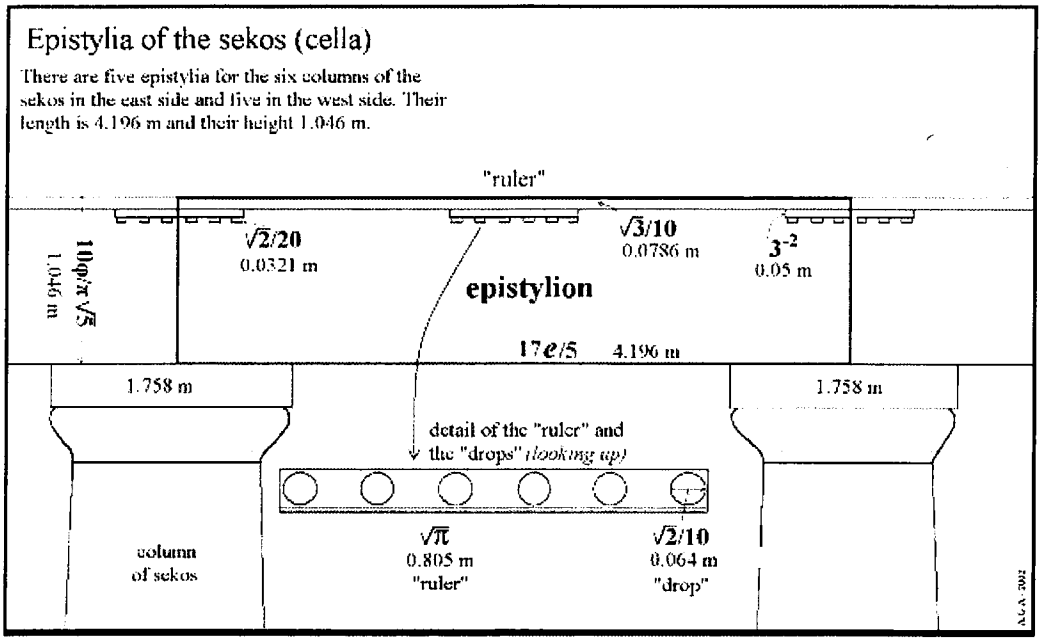


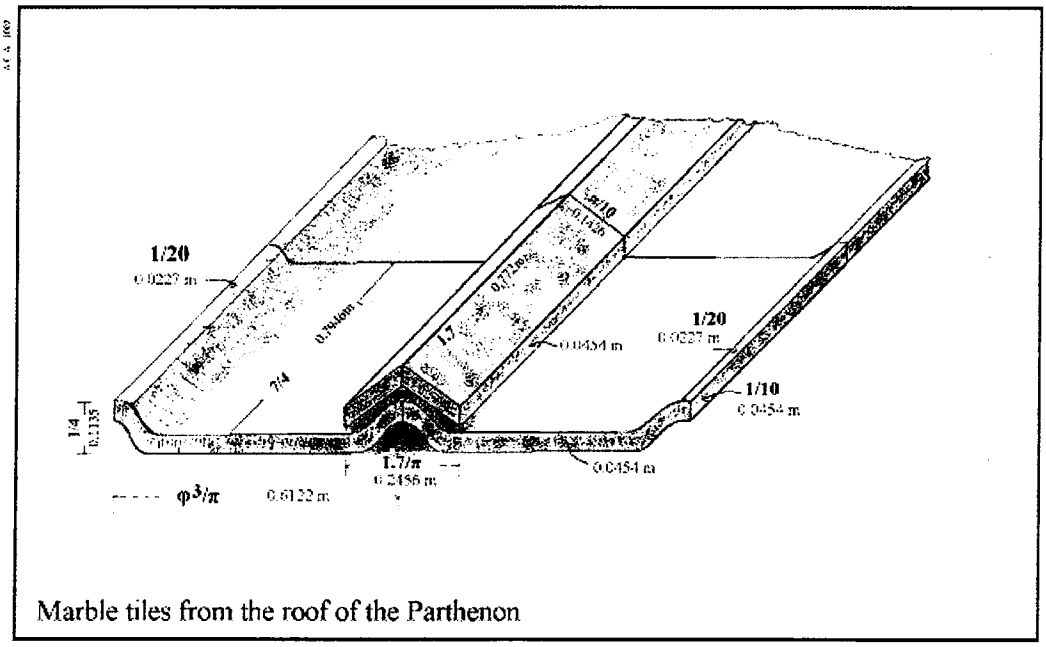
The two sides of a spondylos. The diameter of the circles in the center is **1 MC**.

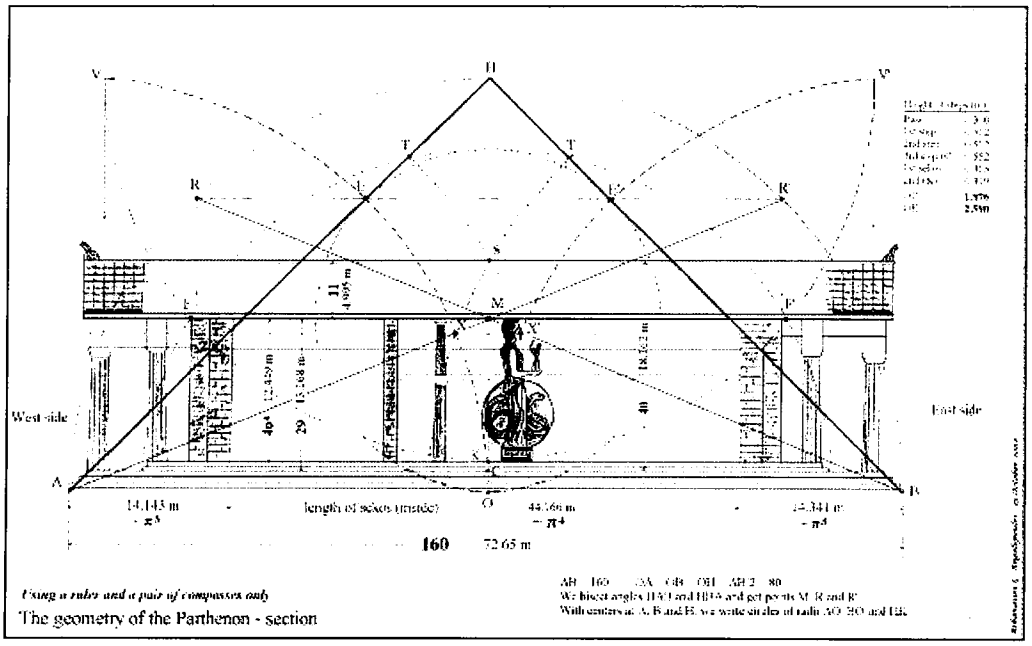


Metopes and triglyphs.




Epistylia of the sekos (cella)
There are five epistylia for the six columns of the sekos in the east side and five in the west side. Their length is 4.196 m and their height 1.046 m.
"ruler"
$\sqrt{2}/20$
0.0321 m
$\sqrt{3}/10$
0.0786 m
3^{-2}
0.05 m
epistylion
$17e/5$ 4.196 m
1.758 m
1.758 m
detail of the "ruler" and the "drops" (looking up)
column of sekos
$\sqrt{\pi}$
0.805 m
"ruler"
$\sqrt{2}/10$
0.064 m
"drop"


1/20
1/20
1/10
φ^3/π
0.6122 m
Marble tiles from the roof of the Parthenon



Using a ruler and a pair of compasses only
The geometry of the Parthenon - section

Posted by Athang1504 at 04:54

Labels: Acropolis, Athens, Greek architecture, megalithic cubit, Parthenon, Pheidias, units of length

11 comments:

Unknown April 30, 2011 at 11:27 AM

Hi Great Blog and You are a Great man.
But...;) Ill find you because I organize 3D conference and I want to show virtual tour in Parthenon (Brand New).
I use yours plans from 2002 because I want to build Parthenon stone by stone cm to cm and then convert to low poly. You can check curvature in WIP.
But on the Google I can find only part of the plans do you do Measurements of the all parts of Parthenon or only some spots ? Contact me if you interested in participation ;)
k.zwolinski.aka.blenderman@gmail.com

The test and the WIP links :
http://www.youtube.com/watch?v=QW5aR6rm1xg
http://www.blender.pl/index.php?
option=com_smf&Itemid=99999999&topic=9806.msg89019#msg89019

Reply

Replies

i February 24, 2018 at 4:57 AM

9

Reply

Athang1504 May 2, 2011 at 12:02 AM

Thank you for your comment and interest. I have just posted some more measurements that cover the whole east side of Parthenon and the west entrance.I hope you'll find them useful in