Plato´s Atlantis was in a River Delta

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ABSTRACT

Reading Plato´s two books about Atlantis and comparing the described facts with modern knowledge about geology, tectonics, archaeology and technology gives us new insights about how Atlantis looked. This is necessary before we can seek its proper location.

We know that around the Royal City of Atlantis lay an absolutely flat and even plain, irrigated by a widely-branched system of canals that drain into the sea. This plain was formed by alluvial land in a large river delta. To feed such a delta, the area of the whole country must have been at least 10 times as large as the plain. There must have been a chain of high sand dunes along the shore.

The hill with the central temple was formed by tectonic forces during the uplifting of a salt dome. The 3 circular ditches were formed by natural erosion, and the two springs on the central island brought water from the distant mountains.
For the irrigation of the fertile alluvial plain a central organisation was necessary, which led to the formation of the high culture of Atlantis, as was the case in most of the worlds´ other early cultures.

The canals in the alluvial plain were V-shaped. The excavated silt was used to build dams on both sides to protect the fields against flooding by the tides and from the mountains. The reported depth of the canals shows that Plato´s "stades" must be translated as Egyptian length units "Khet" (1 khet = 52,4 m), and so we get realistic dimensions for the plain (length 157 km, width 105 km) and the Royal City (diameter 6,6 km). Tables show the dimensions of Atlantis in comparison with buildings and canals in ancient and modern times.

1. INTRODUCTION

Atlantis has been written about for over 2000 years. The main source is: Plato´s dialogues " Timaeus" and "Critias". There have been many attempts to locate Atlantis, but no one has really been successful. Here is a new attempt to describe how Atlantis must have looked, using Plato´s descriptions and the knowledge of our times. This description of Atlantis will be a useful condition for determining its location.

2. THE HILL IN A FLAT PLAIN

What do we know from Plato´s descriptions? *(I used Bury´s translation /1/; the numbers show the references (Stephanus-Pagination) in Timaeus and Critias;)*

1. The residence of Atlas and his royal palace was situated not far from the sea on a hill, low on all sides (*Crit.113C*), in the centre of the city, which was laid out in a circle *(Crit.116A*).

2. The circular central island was surrounded by 3 rings of water and 2 rings of land, alternatively *(Crit.113D; 115E)*. The water rings were used as harbours and had access to the sea by a canal *(Crit.115D)* and by passages connecting the water rings *(Crit.115E)*.

3. "The part about the city was all a smooth plain" *(Crit.118A),* highly fertile *(Crit.113C)*, stretching along the sea. Its width from the sea inland was 1,5 times smaller than its extension along the sea *(Crit.118A)*.

4. The plain was "rectilinear for the most part and elongated" *(Crit.118C).*

5. The plain was surrounded on all sides (save towards the ocean) by mountains that stretched toward the sea *(Crit.118A). T*hey sheltered the plain, which faced South, from the Northern blasts *(Crit.118B).*

6. The mountain streams drained into a ring canal round the whole plain *(Crit.118C)*, discharging from both sides into the sea near the city *(Crit.118D).*

7. There were parallel canals at regular intervals, as well as connecting canals throughout the plain *(Crit.118E)*, forming a canal grid. The canals were used by boats to carry wood from the mountains to the city.

What can we deduce from all this information?

Since the canals flow out into the sea and ships could enter from the sea into the canal system, the plain could not be far above sea-level, and was only slightly inclined from the mountain side to the sea side.

A regular, level plain, surrounded on all sides by a ring canal and covered by a grid of smaller canals for irrigation and draining, can only mean an alluvial plain. Either it must have been a big lagoon, which was filled with washed-up matter, or, most probably, it was the delta of a great river. When looking at an atlas, one will find that such large and even plains exist only in the delta regions of great rivers, and were formed by sedimentation from these rivers over thousands or millions of years.

This idea is further confirmed by the fact that, after Atlantis was flooded, the resulting mud was a hindrance to ship traffic *(Tim.25D)*.

A great river – and there is mention of rivers that flow from the mountains *(Crit.118D-E)* – must be fed from a large area. One must therefore contradict those who say that Atlantis was only slightly larger that the plain itself. If it were an island, it would have to have been 10 times bigger than the plain, if not more.

In an alluvial plain, the soil would have been very rich and fertile, as it is described in *(Crit.113C)*.

The construction and upkeep of the canals would be an enormous task, which Plato has mentioned as being almost unbelievable *(Crit.118C)*. Managing this task was probably the reason for the development of a central organization and thus the starting point of the state of Atlantis. At least, that is what we believe about other early highly-developed cultures that began in big river oases or deltas in order to organize of the necessary drainage and irrigation, e.g. in Mesopotamia, in the Indus Valley, the great river region of China, and the Nile Valley. One could almost surmise that the culture of Atlantis had its origins in roughly the same time period as these other archaeologically-studied high cultures, although I will not speculate about the time-frame here.

Plato described the plain as a rectangle *(Crit.118C), see Fig.1.* But a perfect rectangular plain, surrounded by mountain chains on three sides, exists nowhere on the globe. It seems that Plato, who never saw the site himself, imagined from Solon´s description that the whole plain was a rectangle, and therefore calculated the "consequent length" of the circumferential canal to be 2 x 3000 + 2 x 2000 (for the 4 sides) = 10000 stades *(Crit.118D).*

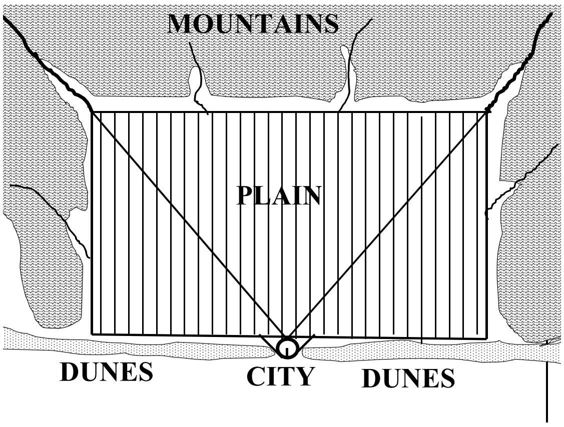

Figure 1: The Plain round the Royal City

But in some translations of *(Crit.118A)* is not spoken of a "rectangular shape", as Bury and Lee write, but of an "oblong shape" (Jowett) or of an "oblong triangular shape" (Spanuth). In *(Crit 118C)* we read that the plain was "rectilinear for the most part", that can mean that only a great part of the plain was rectangular and enclosed by the circumferential canal, but not all. And when Plato says in *(Crit.118A)* that the plain measured "3000 stades in length and at its midpoint 2000 stades in breath from the coast" (transl. Lee), then this seems to be the description of the normal Delta form of the plain, namely 2000 stades wide from the sea only in the middle, and smaller towards both ends.

3. SAND DUNES

We saw that the whole irrigated plain could not be much elevated above the sea level. On the other hand, in *(Crit.118A*) we read that "the whole region rose sheer out of the sea to a great height, but the part about the city was all a smooth plain, encircling it all about". Mountain chains were only on three sides of the plain, not at the sea side.

On the other hand, if the circular canal "received the streams which came down from the mountains, and after circling round the plain, and coming towards the city on this side and on that, it discharged them thereabouts into the sea." *(Crit.118D),* this would mean that the seaside branch of the canal runs all its length parallel to the seashore. In the case of a flat seashore it would be most probable that the water streams in the canals on both sides of the plain would discharge immediately when reaching the sea shore, especially when seasonal high floods were occurring, and not bend in an angle of 90 degrees toward the central water exit near the city.

Only a chain of high sand dunes along the coast could prevent the described behaviour of the water streams and lead them parallel to the coast (Fig1).

We know those dunes from many parts of the world, for example at the Atlantic coast of France near Arcachon (dune height 114 m), at the eastern coast of the Baltic Sea (dune walls 80 m high) or at the eastern coast of Lake Michigan/USA (Sleeping Bear Dunes, 120 m high).

The condition for the formation of these high sand dunes is a steady strong west wind vertical or in a small angle to the coast. Behind the dune wall is usually a chain of lagoons, and these lagoons could have been used by the Atlanteans to construct their canal along the seaside.

Such a high dune wall, seen from a boat near the coast, can look as if "the whole region rose sheer out of the sea". (Fig.2)

Figure 2: Sleeping Bear Dunes, Michigan

4. POSEIDON´S CIRCLES

Plato describes in (*Crit.113D),* that Poseidon married Cleito "and to make the hill whereon she dwelt impregnable he broke it off all round about, and he made circular belts of sea and land enclosing one another alternatively, . . , two being of land and three of sea, which he carved as it were out of the midst of the island, and these belts were at even distances on all sides, so as to be impassable for man, for at this time neither ship nor sailing was yet in existence."

It is said clearly that these circular canals were not made by man, but by a god or, alternatively, by natural forces, in very old times.

Which natural forces are able to form those regular structures?

We come nearer to a solution of this problem when we look at satellite photos of the "Guelb er Richat" in Mauretania :

Figure 3: Satellite photo from "Guelb er Richat", Mauretania. http://www.image-contrails.de/mauritania/mauritania-met-richat-1.html

This link shows fascinating pictures of regular circular structures, alternating between higher and deeper level, the deeper rings partially filled with water. The height difference is about 100 m, the diameter of the structure 35 km. The erosion resistant higher rings are of quartzite, while the central circle is of flat layers of limestone

It is clear that, in spite of the obvious similarity of this structure to Plato´s description of the Royal City, this cannot have been Atlantis. The "Guelb er Richat" is too great, too high above sea level (400 m), and 500 km distant from the sea coast.

But it is possible that the circular structure of the Royal City of Atlantis was formed by the same process: first the uplifting of formerly flat rock layers by endogenic forces to a dome-like hill, afterwards the erosion of the softer layers, so that the circles of the harder layers remain. (Erosion by water is a work adequate to a god like Poseidon)

"Salt Domes" can be found frequently, when internal tectonic forces press on salt layers (which behave plastically under high pressure), and therefore move upwards along an existing crack, thus shaping the overlaying sediment layers to a "dome" (Fig.4). The erosion of the sediment dome may be accelerated relative to its surroundings due to the many cracks formed during the uplifting and reshaping process.

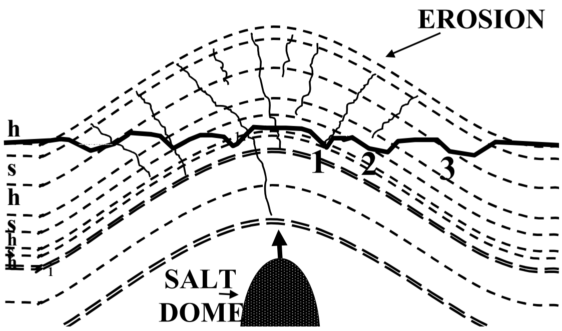

Figure 4: Formation of a salt dome and subsequent erosion of the previously reshaped, alternating harder **(h)** and softer (s) sediment layers. By this process the three circular water canals **(1,2,3)** were created. On top of water-impermeable layers = **=,** ground water from far distant mountains is led to the "dome"; the cracks bring it to the surface as springs.

The "Semsiyat dome", 50 km west-southwest of "Richat", is a second similar ring structure and has only a 5000 m diameter, which is nearer to Plato´s figures. Probably those multi-ring dome structures are not so rare and can also be found in other places on the globe.

But in the case of Atlantis, the overlaying silt from the deluge may have hidden the ring structures under the surface (The antique Greek city of Helike, destroyed by a great flood in Plato´s times, was found just recently under a layer of 4 - 15 m of silt /2/). Detection would only be possible, if it were on land now, by the use of magnetometer equipment.

5. THE SPRINGS

"And Poseidon himself set in order with ease, as a god would, the central island, bringing up from beneath the earth two springs of water, the one flowing warm from its source, the other cold," *(Crit.113E).*

These springs produced an "abundant volume" of water *(Crit.117A-B),* supplying many different baths for men and horses, watering the sacred grove of Poseidon, and delivering water also for the people living on the outer circles of the city.

It is impossible that the springs were fed only by the rain water obtained on the small central island of only 5 stades in diameter.

But as described in fig.4, due to the underground structure of different parallel rock layers, the ground water can flow over great distances on a water-impermeable layer from the mountains enclosing the plain to the central island on top of the uplifted dome, surfacing there through cracks in the overlaying rocks. It is the same phenomenon as with the "Artesian Wells" in the desert regions of the Sahara. Possibly, the warm water comes from a greater depth.

In this way, the existence of two great water springs on the relatively small central island of Atlantis confirms the above introduced model for the natural generation of the circular structure of the Royal City of Atlantis.

6. CHANNELS IN TUNNELS?

The most outstanding characteristics in Plato´s description of Atlantis are the many channels distributed round the city and all over the surrounding plain.

While Poseidon has created the 3 water rings round the central hill only to provide protection for Cleito´s home *(Crit.113D)*, their son Atlas and his heirs connected these water rings and dug a canal from the outermost water circle to the nearby sea coast *(Crit.115D-E):*

"They bored a channel right through the outermost circle, .. and thus they made the entrance to it from the sea like that to a harbour by opening a mouth large enough for the greatest ships to sail through."

The connections are described as follows: "they opened out a channel leading from circle to circle, large enough to give passage to a single trireme, and this they roofed over above so that the sea-way was subterranean; for the lips of the landcircles were raised a sufficient height above the level of the sea."

The land circles were not made of earth, but of rock, as is obvious from the above mentioned generation model, and also because Plato states that "the stone they quarried beneath the central island all round, and from beneath the outer and inner circles, some of it being white, some black, and some red; and while quarrying it they constructed two inner docks, hollowed out and roofed over by the native rock." *(Crit.116A-B)*

If the Atlanteans could construct underground docks for their ships, they could as well make the connections between the water rings in the form of tunnels! Plato, who did not see the place and was not an engineer, imagined that they dug out an open canal of the whole depth of the rocky rim (similar to the modern canal through the "Isthmus of Corinth" in Greece), and afterwards roofed it again by bridges to provide a subterranean passage. This would have been a most illogical expense of effort. Much quarrying could be avoided by boring a tunnel for the ships!

Ship tunnels were known in antique times. Near Naples/Italy a ship tunnel can be visited, 3,8 m wide and of a height between 4 and 21 m, which connected the

Roman military harbour in the volcanic "Lago d´Averno" with the sea coast near Cuma. The ships were not rowed in the tunnel, but punted or sailed (in the tunnel there is always a natural wind movement due to temperature differences between the entrances).

7. DEPTH OF THE CANALS

Back to the canal between the outermost water ring and the sea: According to *(Crit.115D)*, it was "three plethra in breadth, one plethron in depth, and fifty stades in length"; it had the same depth as the circumferential canal round the whole plain *(Crit.118C),* which was one stadion wide.

The length of one Greek stadion was (depending on time and region) between 165 m and 213 m, the most used value being 185 m. One stadion contains 6 plethra or 600 feet.

These figures for length and breadth may be reasonable, but a canal depth of 1 plethron = 100 feet = 30,8 m seems not credible. We must remember: the canal had do be dug into an alluvial plain near the sea. In the wet soil the canal flanks would have slipped down continuously.

A canal dug in the soil cannot have vertical sides. This observation was already made by the Persian king Xerxes in 480 BC (described by Herodotus /3/) during the digging of a canal in northern Greece :

"I will now describe how the canal was cut. A line was drawn across the isthmus from Sane and the ground divided into sections for the men of the various nationalities to work on. When the trench reached a certain depth, the laborers at the bottom carried on with the digging and passed the soil up to others above them, who stood on ladders and passed it on to another lot, still higher up, until it reached the men at the top, who carried it away and dumped it. Most of the men engaged in the work made the cutting the same width at the top as it was intended to be at the bottom, with the inevitable result that the sides kept falling in, and so doubled their labor. Indeed they all made this mistake except the Phoenicians, who in this -as in all practical matters- gave a signal example of their skill. They, in the section allotted to them, took out a trench double the width prescribed for the actual finished canal, and by digging at a slope gradually contracted it as they got further down, until at the bottom their section was the same width as the rest."

Xerxes´ canal, which was found again 1991-2001 by a British-Greek team with geophysical survey methods /4/ , was 35 m wide to let two battle ship pass, but only 4 m deep. It lies now under a 15 m thick alluvial layer.

For what purpose would the Atlanteans make their canals so much deeper? Their ships - triremes or comparable ships with 200 seamen – with a draught of 1 – 2 m, could very well navigate on canals of 3-4 m depth! (compare the trireme in Fig.5):

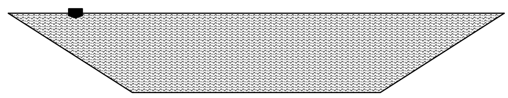

Figure 5: Cross Section of a Canal
185 m wide, 30,7 m deep
with one trireme
(5,5 m wide, 4 m high)

The cargo ships in ancient times were not as big as battle ships. A relatively big cargo ship from Roman times was recently found in the Netherlands. It was 25 m long and 2,7 m wide, with a draught of 0,7 m. These cargo ships used on rivers and canals were not rowed, but had sails and were also punted or towed.

Table 1 shows the dimensions of some ancient and modern canals.

Table 1

Canals	depth m	width m	length km
Xerxes-Canal 480BC	4	35	2
Necho-Darius Canal	5,5	45	180
Modern Suez-Canal	12	45/120	160
Panama-Canal 1887	12,8	100	81

Not until 10 years ago, in 1995, was it possible with modern excavators to make the Panama-Canal 1,5 m deeper! Each meter more of depth increases tremendously the difficulties for the engineers, especially if the soil is alluvial.

And the Atlanteans are supposed to have dug canals more than twice as deep as the modern Panama-Canal? Moreover, the circumferential canal round the plain, 1850 km long, would have been nearly 23 times the length of the Panama-Canal!

This is indeed unbelievable, even if the Atlanteans had our technology instead of the technology of their age (the time of horse-driven war chariots, of stone-shooters and slingers) ! Plato was right when he doubted this information *(Crit.118c)*, but he knew nothing about the construction of canals and therefore did not know that the reported dimensions were not only incredible, but impossible from a technical point of view.

8. DIMENSIONS IN ATLANTIS

If we doubt the correctness of Plato´s information about the dimensions of the canals, we should have also a look to the other dimensions cited in the “Critias”. Table 2 shows a synopsis of all these data given in stades (column 1), together with their translation into the metric system , using 1 stadion = 185 m (column 2).

If the plain of Atlantis had a size of 555 x 370 km, it would not be possible to recognize from its centre that it is encircled by mountain chains, due to their great distance.

The total area of the royal city of Atlantis (443 sq.km) would have been so great that it exceeded that of today´s London with 303 sq.km and 3,2 millions of inhabitants. Atlantis - a city greater than today´s London?

The racecourse for horses (185 meters wide and 10,5 kilometers long) is extraordinarily large, compared with our courses for horse races with lengths between 1 and 3,2 kilometers.

The bridges over the canals have an – unnessecary- breadth of 30,7 m. (The famous “Carolus Bridge”, built 1375 in Prague, the then capital of the German Empire under Carolus IV, to connect the two parts of the city, is 516 m long and 9,5 m wide).

To come to terms with these incredible figures, some authors have made different proposals to divide Plato´s figures by 2 (McCullough /5/) or by 10 (Galanopoulos and Bacon /6/). Does Plato or Solon have something mixed up?

9. “KHET” INSTEAD OF STADE

We have, indeed, an example that a famous Greek author gave wrong information by transforming Egyptian length units into Greek "stades". This was Herodotus, the "father of history" , who gave all distances in Egypt (in stades) much longer as they are in reality, while he reported all the distances in Greece correctly. The usual explanation for this error is that he has mixed up the Egyptian units of measurement, obviously taken from an Egyptian itinerary, before he transformed them into stades.

A similar error could have taken place while the Egyptian priest narrated the Atlantis story to Solon. It is self-evident that the priest gave all the distances in Egyptian units of measurement, as they were written in the ancient texts, and Solon wrote them down as he heard them for later transformation into Greek stades. When he returned to Greece he had no opportunity for this calculation or forgot it. His heirs (Dropides, Critias the Elder and Critias the Younger) found in Solon´s notes only the figures without the units of measurement and obviously thought it

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Table 2 Dimensions in Atlantis according to Plato´s "Critias"

		Stades	1 std. = 185 m m	1 std. = 52,4 m m
Diameter Central Island with Royal Palace		5	925	262
Outer Diameter of Inner Water Ring		7	1295	367
" " " Inner Land Ring		11	2035	577
" " " Middle Water Ring		15	2775	786
" " " Outer Land Ring		21	3885	1100
" " " Outer Water Ring		27	4995	1415
Outer City Wall bordering the Sea	Diameter	127	24400	6655
	Length	400	74000	20960
Canal from Outer Water Ring to the Sea,	Length	50	9600	2620
	Width	0,5	93	26,2
	Depth	0,17	30,8	8,7
Circumferential Canal round the Plain	Length	10000	1850000	524000
	Width	1	185	52,4
	Depth	0,17	30,8	8,7
Parallel Canals across the Plain	Width	0,17	30,8	8,7
	Distance from Each Other	100	18500	5240
Bridge over Outer Water Ring	Length	3	555	157
	Width	0,17	30,8	8,7
Race Course on Outer Land Ring	Length	57	10545	2987
	Width	1	185	52,4
Temple of Poseidon	Length	1	185	52.4
	Width	0,5	92,5	26,2
Plain	Length along the Sea	3000	555000	157200
	Width across its Centre	2000	370000	104800

		Sq.stades	Sq.km	Sq.km
Plain	Area	6 Millions	205350	16475
City within the Outer Wall	Area	12668	443	35
Allotments in the Plain	Area	100	3,42	0,275

must be stades (especially since in their time, due to the busy trade with the Greeks, even the Egyptian people were using Greek stades in addition to their own units), and Critias passed this (erroneous) information on to Plato.

I feel that this is a very probable error in the long chain of tradition between the Saitic priest and Plato.

Which unit of measurement was commonly used by the ancient Egyptians? It was the "Royal Cubit" or "Meh" (0,524 m) and for longer distances the "Khet" = 100 "Royal Cubits"
(1 khet = 52,4 meters = 172 feet) /7/

When we take this "khet" for what Plato called "stade", we get much more probable dimensions for Atlantis than those mentioned before. (See table 2, column 3):

a) The size of the level plain is 105 x 157 km (16475 sq.km, a little smaller than the Peloponesos-peninsula in Greece).

b) The diameter of the central city of Atlantis is 6,7 km (The city of Rome in the late times of the Roman empire (Aurelian wall) had a diameter of 6 km and about one million inhabitants).

c) The racecourse for horses is 52 m wide and 3 kilometers long, like one of the larger modern racecourses.

d) The canal round the plain is 524 km long, 52 m wide and 8,7 m deep. (The forerunner of the Suez canal, built by pharaoh Necho and king Dareios of Persia about 500 BC, was 180 km long, 45 m wide and had a depth of 5.5 m; see table 1)

e) The bridges over the circular canals are 8,7 m wide, comparable with the breadth of medieval bridges.

f) The temple of Poseidon has a size of 26 x 52 m, a very reasonable size compared with the famous Poseidon temple in Paestum/Italy (24 x 60 m).

But couldn´t it be the case that with the introduction of the "Khet"-dimensions some measures were too small to be credible?

Was it possible that on the canal from the sea to the harbour with a width of 26,2 m two triremes could meet?

A Greek trireme from classical times was 37 m long, had an overall beam of 5,5 m and a height of about 4 m /8/. The oars had a length of 4,2 m, but due to their oblique position relative to the surface of the sea, and one third of their length being inside the ship, the horizontal space needed for using one oar is only 2,7 m .

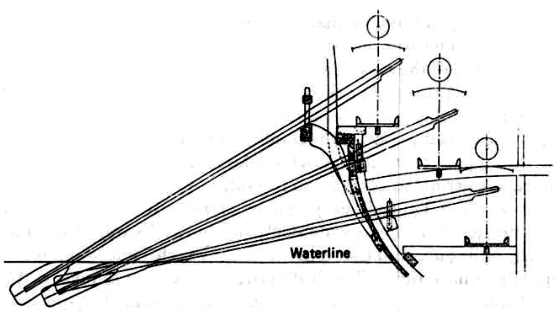

Fig.6 ; Oars on a trireme, from /8/

A rowed trireme needed therefore a space of 2 x 2,7 + 5,5 = 10,9 m. In a canal of 26,2 m width two triremes could easily pass (see fig.8).

Was the central island at 262 m diameter big enough to contain all the reported buildings: temple of Poseidon and Cleito, Royal Palace *(Crit.116C)*, separate baths for the kings, for private citizens and for horses, the guard-house for the most trustworthy spearmen *(Crit.117C)* and the sacred grove of Poseidon *(Crit.117B)* ?

Fig.7 shows a true to scale sketch of the central island. It is obvious that all these cited items could be placed there:

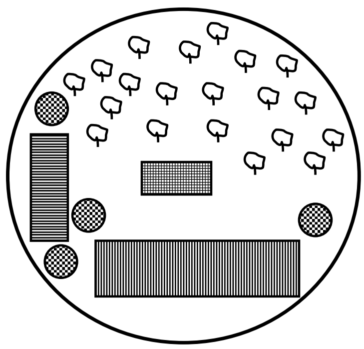

Fig: 7 : Central Island with Poseidon temple (centre), Royal Palace, barracks of the guards, baths (circles) and sacred grove (trees).

The Acropolis in Athens (120 x 280 m) has an area of about 30000 sq.m compared with 54000 sq.m for the central island of Atlantis.

We can conclude that it makes sense to take Egyptian "Khets" instead of Greek "Stades" for getting a better interpretation of the dimensions of Atlantis in Plato´s "Critias".

10. DAMS ALONG THE CANALS

As the canals in the plain of Atlantis lead to the sea, and the sea outside the "Pillars of Heracles" (Crit.24E) is the Atlantic Ocean, we must take into consideration the tides. The average turn of tides can be 2 – 4 m, and the canals , at least near the estuary, had to be provided with dams on both sides. The material to build the dams could be taken from the excavated material, and from the cross-section of the canal we can therefore also calculate the height of these dams.

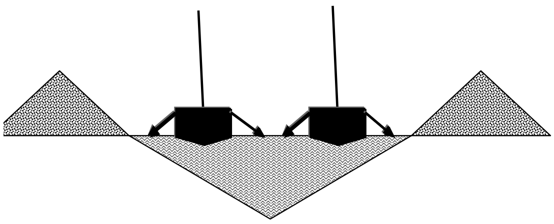

Fig. 8 : Canal with dams and two passing Triremes

The triangular cross-section of a canal with 8,7 m depth and 26,2m breadth is 114 sq.m . Each dam has a cross-section of 57 sq.m ; and with a side angle of 45° its breadth could then be calculated at 12,7 m and its height 9 m. With a side angle of 30° the breadth of the dams is 15,2 m and their height 7,5 m.

This dam height would be sufficient also in the case of a spring tide. When due to heavy rains in the surrounding mountains the rivers were in flood, the height of the canal dams would perhaps not be enough, but in case of flooding the great plain could serve as a reservoir to accomodate the abundance of water. It is therefore probable that the houses of the farmers in the plain were situated on artificial hills (wharfs).

The parallel irrigation canals in the plain had a width of 8,7 m; their depth is not mentioned, but could be 2,5 m. Their cross section would then be 10,9 sq.m . The dams on both sides with 30° side angles would have a breadth of 6,6 m and a height of 3,3 m.

11. MOUNTAINS IN ATLANTIS

“And the mountains which surrounded it (the plain) were at that time celebrated as surpassing all that now exist in number, magnitude and beauty; for they had upon them many rich villages of country folk, and streams and lakes and meadows which furnished ample nutriment to all the animals both tame and wild, and timber of various sizes and descriptions, abundantly sufficient for the needs of all and every craft.” *(Crit.118B).*

“They conveyed to the city the timber from the mountains and transported also on boats the season´s products ..” *(Crit.118E).*

“And the number of the men in the mountains and in the rest of the country was countless ..” *(Crit.119A).*

The first citation is normally interpreted as if the mountains of Atlantis must have been higher than the highest mountains now existing. But I wonder how these Himalaya-like mountains could have had many villages with much country folk, forests, meadows, lakes, food supply etc.. The Cuban linguist Diaz-Montexano wrote that the Greek word “megathos” had not only the meaning of “height”, but in the above context can also mean “greatness” or “extension”, and only this interpretation makes the whole story logical.

In high mountains like the Himalayas rich villages with “countless inhabitants” couldn´t have existed, producing “ample nutriment for every animal and timber abundantly sufficient for the needs of every craft”.

The rich supply of timber would rather speak for mountains of medium height. Not only high mountains, but also highlands are able to shelter the bordering regions from the Northern blasts *(Crit.118B),* as we can see it in the case of “Rheingau”, one of the warmest regions of Germany with its famous “Riesling” vineyards, which lies near Frankfurt Airport on the Southern slopes of the wooded Taunus hills (maximal elevation 880 m above sea level),.

It seems that (Crit.118B) means:
the whole mountainous landscape was praised for its versatility and its rich settlements and was not surpassed by any other for its scenic beauty.

Here mining in the mountains is not mentioned as a source of wealth of the country folk, but Plato writes about “metals, to begin with, both the hard kind and the fusible kind, which are extracted by mining, and also that kind which is now known only by name but was more than a name then, there being mines of it in many places of the island – I mean orichalcum, which was the most precious of the metals then known, except gold.” *(Crit.114E)*.

Mines are mostly situated in mountainous regions, and the rich deposits of a metal nearly as precious as gold must have made the inhabitants of these regions nearly as important as those living in the Royal City of Atlantis.

It cannot be ruled out that in greater distance from the plain there were also high mountains with perpetual snow on their peaks. It was already mentioned in chapter 2 that the catchment area of the rivers arriving at the plain must have been at least 10 times as large as the plain itself.

And Plato´s note in *(Crit.118E)* that the Atlanteans “cropped the land twice a year, making use of the rains from Heaven in the winter, and the waters that issue from the earth in summer, by conducting the streams from the trenches”, suggests, that the rivers feeding the irrigation canals got their water in summer from the perpetual snow of the high mountains.

What about the opinion of some authors that all the high mountains sunk completely under sea level during the destruction of Atlantis, without remainder? It is disproved by the statement in *(Tim.25D)*, that “Atlantis in like manner was swallowed up by the sea and vanished, wherefore also the ocean at that spot has now become unpassable and unsearchable, being blocked up by the shoal mud which the island created as it settled down”. The reported “portentous earthquakes and floods” *(Tim.25C)* , greater than the Tsunami of Dec.26th, 2004 in Indonesia, flooded the Royal City together with the whole plain, leaving behind a shallow sea region, where the plain had sunken for some meters. But the mountains could not sink during a catastrophe like this more than the same number of meters! They must still exist today.

12. IRRIGATION SYSTEM

Colonization of Atlantis began first on the hill, “low on all sides”, near the sea coast. *(Crit.113C-D)*: “Thereon dwelt one of the natives originally sprung from the earth, Evenor by name, with his wife Leucippe”

There were two springs, used for irrigation the fertile soil , “producing out of the earth all food in plenty” *(Crit.113E)*. And they led them to the “plantations of trees such as suited the waters” *(Crit.117A)*. It is very probable that the first Atlanteans soon began to cultivate vegetables and cereals in gardens and fields.

Round the hill stretched the plain, highly fertile as well *(Crit.113C)*, but naturally first without any installations for draining or irrigation. So, when the population increased, it became necessary to use also this land for agriculture, by digging trenches.

This was practically the same situation as in the beginning of most of the known high cultures: People began to build irrigation canals in suitable places and that way increased tremendously the productivity of their agriculture. Because for this task a well-planned team-work was necessary, a central authority became indispersable. In this way, the hereditary kingdom was settled. Plato indicates this in *(Crit.118C)*: “Now as a result of natural forces, together with the labours of many kings which extended over many ages, the condition of the plain was this:”

But where did the many people come from, who were necessary for the first creation of the sweeping canal system described by Plato?

When the plain was a river delta (see chapter 2), and originally marshy for the most part, not many people could have dwelt there except some fishermen. But in the surrounding hills and mountains there were certainly settlements of men living there as hunters and gatherers or farmers, perhaps also as miners.

The king, intending to begin the great project of the irrigation of the plain, could have prompted them with the chance of rich farmland and greater wealth to participate in this task. Each village in the highlands could then have a claim to a certain area in the fertile plain, and the respective leader of the works and the most hard working participants could settle on the newly created ground, together with their families.

This order of events is suggested by the quote in *(Crit.118E-119A)*:

"As regards their manpower, it was ordained that each allotment should furnish one man as leader of all the men in the plain who were fit to bear arms; and the size of the allotment was about ten times ten stades, and the total number of all the allotments was 60,000; and the number of the men in the mountains and in the rest of the country was countless, according to the report, and according to their districts and villages they were all assigned to these allotments under their leaders."

This shows clearly that in later times as well there existed a close connection between a certain village in the mountains and a certain allotment on the plain, and one leader was responsible for both places and had to recruit 20 warriors alltogether from these two geographically separate sites.

This means that the supposed 200 people being able to call up 20 warriors would not all have to live on the allotment in the plain having 0,275 sq.km (=68 acres) in size. If only half of this population lived on the allotment in the plain, and the other half in the mountain village assigned to it, we get a population density for the plain of 363 per sq.km, the same as in the Netherlands, a likewise level country near the sea, famous for its irrigation system.

13. CONCLUSIONS

It is fascinating how detailed a picture of Atlantis can be found by thoroughfully reading the texts in Plato´s "Timaeus" and "Critias", considering what they really could mean, and comparing the results with well-known examples from our time. In this way we have acquired a nearly complete description of the general geography of Atlantis, which can now be used to locate the sunken city.

A new and amazing result is that we have to divide all measures given by Plato by the factor 3,5, or in other words to replace the Greek "Stade" in his narration by the Egyptian "Khet". All the newly calculated dimensions are credible and probable.

In a similar way it should be possible to find out the exact location of the sunken Atlantis, and the time of the catastrophe that destroyed it.

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