

Giant stone buildings (II) - Pyramids, the most famous monuments in the world

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Abstract: Megalithic architecture is related to a series of ancient stone monuments of giant dimensions, which were constructed using almost untreated individual stones or stones grouped into certain structures, which was the subject of the previous paper of these authors, but also to numerous buildings of more recent cultures and civilizations, the so-called "more developed architecture", which are built entirely or partly from large stone blocks, most often of regular geometric shape, such as, for example, pyramids around the world, especially the stone ones, described in this paper.

Pyramids represent perhaps the most significant buildings of human civilization in which the ancient builders incorporated complex knowledge not only in construction and architecture. The techniques used to build them were developed over centuries, which is best seen with the Egyptian pyramids... Although we often like to draw comparisons between the Egyptian pyramids and the pyramids of Central America (and other pyramids in the world), with which we try to look for their "lost" connection, the pyramids are still very different in their age, shape, size, geographical distribution and function, even in the material from which they were built.

Keywords: Megalith, megalithic, architecture/building, pyramids, tombs, temples

Divovske kamene građevine (II) - piramide, najpoznatije građevine u svijetu

Sažetak: Megalitska (megalitička ili megalitna) arhitektura odnosi se na niz drevnih kamenih spomenika divovskih dimenzija, za čiju gradnju je korišteno gotovo neobrađeno pojedinačno kamenje ili kamenje grupirano u određene strukture, što je bilo tema prvog rada ovih autora, ali i na brojne građevine novijih kultura i civilizacija, tzv. „razvijenije arhitekture“, izgrađenih u potpunosti ili dijelom od velikih kamenih blokova, najčešće pravilnog geometrijskog oblika, kao na pr. piramide širom svijeta, posebno kamene, opisane u ovom radu.

Piramide predstavljaju možda najznačajnije građevine ljudske civilizacije u koje su drevni graditelji inkorporirali kompleksna znanja ne samo iz graditeljstva i arhitekture. Tehnike korištene za njihovu gradnju su razvijane stoljećima, što je najbolje vidljivo kod egipatskih piramida... Iako često volimo povlačiti usporedbe između egipatskih piramida i piramida Središnje Amerike (i drugih piramida u svijetu), kojima pokušavamo tražiti njihovu „izgublenu“ povezanost, piramide su ipak vrlo različite po svojoj starosti, obliku, veličini, geografskoj rasprostranjenosti i funkciji, čak i po materijalu od kojeg su izgrađene.

Ključne riječi: Megalit, megalitska, megalitička, megalitna, arhitektura/građevina, piramide, grobnice, hramovi

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1. INTRODUCTORY NOTES ON MEGALITHS AND MEGALITHIC ARCHITECTURE

Megaliths, "big stones", were used in different historical periods, individually or grouped in different megalithic buildings, without the use of binders ("drystone wall construction").

Megalithic architecture involves a series of ancient prehistoric stone monuments of giant dimensions, which were constructed using almost untreated stones, about which we wrote in the previous paper, but also numerous buildings of more recent cultures and civilizations, or "more developed architecture", which are built entirely or partly from large stone blocks, most often of regular geometric shape, weighing tons, tens of tons, even hundreds of tons. These are Egyptian, Central American and other pyramids (with tombs and temples) around the world, described in this paper, while the so-called "cyclopean buildings" of the Mycenaean civilization, as well as similar buildings in South America and beyond, will be the subject of the next paper. In most of these buildings, the surface of blocks is dressed, mainly from limestone rocks, but also from solid volcanic, hardly workable rocks. Quite often, preserved parts of megalithic buildings were used by later civilizations as a foundation for their own buildings, which can be clearly seen in the Lebanese Baalbek, where the Roman temples were built on a "stone base" with an area of more than 45 ha, in which about 5 million m³ of stone were built, including 3 huge stone blocks (the famous "Trilithons"), ones of the largest ever.

For many megalithic buildings that have been there for thousands and thousands of years, and which are the subject of this paper, we have many doubts about the technology with which they were built, by builders who hardly or never knew the wheel, but that will be the topic of the fourth paper about the giant stone buildings of these authors.

2. PYRAMIDS (AND TEMPLES) AS MEGALITHIC BUILDINGS OF MORE DEVELOPED ARCHITECTURE

According to the Croatian encyclopedia, pyramids are "monumental four-sided stone tombs of Egyptian pharaohs, with sloping sides ending in a sharp point at a certain height", [1]. It is evident from the following text that this definition is only partially correct because there are other forms of the pyramid, of its association only with Egypt, because pyramids were built all over the world, and their purpose as the tomb of the Egyptian pharaohs, but also the purpose of other pyramids in the world, is questionable.

Pyramids are among the most significant buildings of human civilization in which their ancient builders incorporated complex knowledge of architecture and construction, as well as knowledge in sacred geometry, astronomy and mathematics, along with other, as yet undiscovered knowledge of stone buildings. The techniques used to build them were gradually developed over the centuries, which can be best seen through the "development" of the Egyptian pyramids.

The pyramids still impress with their monumentality, age, dispersion around the world and numbers, but also intrigue with their purpose, construction method, as well as the precision of their orientation. Despite numerous theories that try to explain the construction process and possible purposes of the pyramids, everything is still the subject of scientific debates, in which two numbers often appear, the "two treasures of geometry", the number Pi (π), and the Golden Ratio, i.e. the golden number Phi (ϕ). There are also numerous illusions related to the pyramids, especially the Egyptian pyramids, which are neither the largest nor the most numerous ones, and probably were never "tombs of the pharaohs" (!?).

Although people often like to draw comparisons between the ancient Egyptian pyramids and the pyramids of Central America, as well as other pyramids in the world, looking for their

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"lost connection", the pyramids are very different in age, shape, size, geographical distribution and function, even the material from which they are built.



Figure 1. Distribution and estimated number of pyramids (ancient and recent commercial ones) in the world, [2]

Figure 1 shows the distribution of modern pyramids, which are not the subject of this paper, and ancient pyramids around the world and their approximate numbers: Egypt - 118, today's Sudan, Central America - 1,000 (Mexico - 300, Guatemala - 400, Honduras, El Salvador and Belize), Peru - 10, China - 200, Cambodia - 10, Indonesia – 10, [2].

Although this map is interesting as an orientation map for the locations and numbers of the pyramids, it should be noted that there are also pyramids in other locations, e.g. on the islands in the Pacific (Tahiti), as well as on the islands surrounding Africa (Mauritius, Canary Islands and Sicily), where the construction technology, material, design and geometry of the pyramids are surprisingly similar. They were all built from local volcanic stone, they have a stepped shape, like one of ancient Sumerians, Babylonians and early Egyptians, but also the Central American peoples on the other side of the Atlantic. They are smaller or medium in size, with regular geometry, a plateau on the top that is reached by climbing stairs, and an identical orientation. A logical question follows, is a maritime civilization the author of these pyramids on the islands that surround the African continent on 3 sides?

In Greece, eight pyramids have been preserved with a height of 3.5-8.5 m, at an angle of 60°, estimated to date from 3,000 to 400 BC. It is interesting that, according to the most recent research, they originated around 2,700 BC, like the oldest pyramids in Egypt, [3].

On a stretch of 500 km between Japan and Taiwan (1995-2005), underwater sites with pyramids were discovered at depths from 7 m to over 35 m. The largest discovered

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underwater building is located near Yonaguni Island, 80 m long, 30 m wide, and 15 m high. Finely cut stone blocks form a pyramid with a temple on top. Everything points to the existence of an ancient developed civilization, [4]?!

Since this paper is concerned with ancient pyramids made of stone, we will leave out modern pyramid buildings, as well as pyramids built from other materials.

The story begins with the ziggurats in the Euphrates and Tigris basin (today's Iraq), which were built from the end of the 5th millennium BC until the 3rd century BC. Since there were no large deposits of stone, they were built of brick, namely the inner, invisible layers of sun-dried brick, and the outer, visible parts were of baked brick.

Smaller brick pyramids were also built in the Middle and New Kingdoms of ancient Egypt. In the New Kingdom, the pharaohs gradually stopped building pyramids, [1].

The largest Peruvian pyramids were built from unbaked bricks, as the basic construction material in the south and north of Peru: the Pyramid of the Sun and the Pyramid of the Moon, as well as 26 huge pyramids near the village of Tucume, among which the Pyramid of the Sun, with a number of smaller buildings, the largest complex of monumental structures built from bricks in the New World.

The pyramids in China are built of hard clay, and their architecture is similar to the stepped pyramids in Central America with a plateau on top, where the remains of temples are visible on some of them. In the Chinese province of Shensi, around the city of Xian, there are over 100 giant pyramids completely unknown to the wider world public. The so-called "White Pyramid", a pyramid with an estimated base of 485 m and a height of 300 m, was recorded in 1945. The recording was shown only 45 years later. If it really exists, it is the most massive building in the world, twice as tall as Cheops' ("Great") Pyramid in Egypt, [5]. Over 100 pyramids 25-100 m high, mainly made of hard clay, with many in a ruined state, are recorded on the video recording from 1994, [4]. Unfortunately, they are all shrouded in mystery.

2.1 Pyramids of Egypt (and Sudan)

It is believed that the Egyptian prehistoric custom of building a symbolic house on an underground grave first took the form of a mastaba, an elongated building with a flat or shallow vaulted roof, and later a stepped pyramid, as a series of square mastabas, in a stepped manner one above the other, thus forming a building in the form of a staircase with stairs to the top that make the way for the pharaoh's soul to heaven. The most famous and largest of the 8 stepped pyramids is Djoser's (2,630-2,611 BC) pyramid in Saqqara, the largest cemetery of the city of Memphis. Its appearance is reminiscent of the buildings of Babylon and Central America. According to some researchers, the misconceptions of Egyptologists are related to the time of its construction, and another possible misconception is related to the purpose of the pyramids as tombs, because not only is the "burial chamber" too small for a human body, but neither this nor any other stepped pyramid throughout Egypt has a burial chamber, nor have sarcophagus or mummified bodies been found in them, [4].

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Figure 2. Djoser's stepped pyramid, the oldest pyramid in Egypt (around 2,610 BC), [6]

In the earliest period, during the 3rd and 4th dynasties, the pyramids were built only of stone. After Djoser's pyramid, pyramids changed over time, with more or less success. The first two successful attempts to build a real pyramid in the world were the pyramids of Pharaoh Sneferu (around 2,550 BC). The Red (Northern) Pyramid, is the largest of the three pyramids in the Royal Necropolis in Dahshur, at the same time the largest pyramid in Egypt until the construction of the pyramids in Giza (volume 1.69 million m³, base 220 m and height 104 m), and the Curved (Bent) Pyramid, officially named "Southern Shining Pyramid" (volume 1.237 million m³, base 188.6 m and height 101.1 m), which rises from the desert at a steep angle of 55°, which suddenly changes to a shallower angle of 43°, [7]. There are no indications that the pharaoh was buried in these pyramids either, although human remains were found in the Red Pyramid, as well as in Djoser's, but this does not prove that the pyramids were originally built as tombs, [4]!



Figures 3-4. The first two "real" pyramids: the Red (Northern) Pyramid and the Curved (Bent) Pyramid, [7]

With the kings of the 4th dynasty, the pyramids get a regular geometric appearance of buildings with simple shapes, with a square base and with sides that are regular isosceles triangles (Cheops, Khafre and Menkaure's pyramids near Giza, pyramids near Abusir, Abu Rawash and Meidum, in Faiyum, etc.). The height of the pyramids is from 15 m to 147 m, which was the initial approximate height of the Cheops pyramid, [1].

The pyramids on the Giza Plateau (Giza Necropolis), as the most famous pyramids, are among the oldest and even the most important buildings in the world, and since 1979 they

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have been on the UNESCO World Heritage List. Thanks to a slightly steeper slope (from 51° 52'), they gained in monumentality and height. They were built during the 26th century BC by pharaohs Khufu (Sûphis or full name Khnum-Khufu, best known by the Greek name Cheops), his son Khafre (Khephren) and king Menkaure (Mykerinos). Next to the pyramids of Cheops and Menkaure there is a group of smaller, so-called "Queens' Pyramids", and in front of the pyramid of Khafre, the largest monolithic statue in the world was erected, a 20 m high statue of the sphinx, which "guards" these pyramids.

One of the greatest mysteries of these pyramids is the question of how they are so perfectly aligned with the cardinal directions, with a deviation of only 0.06%, which is only possible with the help of modern laser devices and a good knowledge of astronomy, [8]!?

The pyramids were built from different types of stone from different parts of Egypt, sometimes from very long distances. They were built mainly from yellowish limestone blocks, while the interior rooms are made of granite. The outer surfaces of the pyramid and the inner passages are made of more than 50,000 blocks of highly polished, very smooth, white limestone, with gilded tops. Thus, they were visible from a distance, which made them a perfect reflector of light. The blocks on the tops were made of granite or basalt coated with gold, silver or an alloy of gold and silver, [8]. Unfortunately, that layer disappeared over the years due to the harsh Saharan climate, Khafre's pyramid is the only one on which there are still remains. The white limestone was transported from Tura by boat across the Nile, while the granite was probably brought from Aswan

According to Robert Bauval's work "The Orion Mystery", the layout of the pyramids at Giza depicts the positions of the three main stars in the Orion constellation, the two twin stars and a small star, the so-called "white dwarf". And what is especially interesting, their disposition and areas are identical to the pyramids in the capital of ancient Mexico, Teotihuacan (the pyramids of the Sun and the Moon, along with the smaller pyramid of Quetzalcoatl), [4]. Thanks to the protective shiny layer, it is assumed that the pyramids could be seen from the mountains in Israel, and maybe even from the moon, [9] !?

Although we usually think of them as tombs of the pharaohs, according to numerous researchers, they are not so, because not a single mummy from the time of their construction was found in them, neither in the stepped pyramids, nor in the three largest pyramids in Giza. [4] What is a fact is that all the Egyptian pyramids were built, without exception, on the west bank of the Nile, which, as the site of the setting sun, is associated with the realm of the dead in Egyptian mythology, [10].

It is fascinating that the pyramids at Giza still exist, structurally identical, after four and a half millennia. Even when the Kurdish ruler Al-Aziz tried to destroy them in the 12th century, he failed, so he gave up, having damaged the northern face of Menkaure's pyramid.



Figure 5. The pyramid complex in Giza, Egypt, with 3 large and 3 small pyramids, [11]

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The Cheops ("Great") pyramid is not only the oldest and largest (volume 2.58 million m³) of the three pyramids in Giza, but it is also the oldest and only remaining of the 7 wonders of the ancient world. Although Herodotus estimated that it was built by 100,000 slaves in the 26th century BC, recent findings have shown that it was built by "well-supplied and cared for workers", [12], [13] and that the workforce could have been around 20,000, [14]. Between 2.3 and 2.6 million limestone blocks were used for construction, with a total mass of about 6 (5.75-6.3) million m³. Some blocks were 2 m high, up to 5 m long, and weighing between 2 and 4 t (on average 2.5 t). Large blocks of granite from Aswan, mostly weighing more than 1 t, and some over 50 t (a total of 8,000 t) were used for the construction of the royal crypt and for closing the entrance. The block that adorns the royal chamber in the heart of the pyramid weighs about 80 tons. When it was built, the pyramid had a base length of about 230 (229.0-230.45) m, or a base area of 5.3 ha, and a height of about 146 (145.75-146.7) m, by which it was the tallest building in the world for millennia. Today's height is about 138 (137.2-138.8) m because it lacks the specially decorated top. Each side is carefully oriented to one of the four cardinal directions. The horizontal section of the building is always square, in any part, [14],[15],[16],[17],[18].

The Khafre pyramid is the second largest pyramid in Giza (volume 2.21 million m³). Although due to the higher level of the ground on which it is located, it visually appears to be higher than the Cheops Pyramid, it is nevertheless several meters lower, with an original height of 143.5 m, and now 12 m shorter, with a base length of 215.5 m. The most distinctive feature of the Khafre pyramid is the topmost layer of remaining polished stone on the surface of the pyramid, [7].

Many centuries after the end of the pyramid period in Egypt, construction continued in Nubia, today's Sudan, where Egyptian influence left an indelible mark in the form of royal pyramid tombs, between 200 and 255 of them, which is more than Egypt's 138. The dominance of the Kushite kingdom with its center in Napata in Egypt was relatively short, but the cultural influence of Egypt was exceptionally high, so from the 7th century BC Ethiopian kings and Napatan rulers built pyramids as their tombs. During the last Sudanese kingdom of Meroe (300 BC-300 AD), more than 200 royal pyramid tombs were built in three places, which served as the tombs of the kings and queens of Napata and Meroe, [19]. Their dimensions differ significantly from the Egyptian ones. They are built from stepped layers of horizontally placed stones, and their height is from about 3 to 30 m, while the average Egyptian pyramid is about 138 m high. The side of the base rarely exceeds 8 m, i.e. it is five times smaller than the Egyptian ones, so the pyramids are much narrower and steeper, with a slope of about 70° (for the Egyptian ones - 40°-50°), [19].



Figures 6-7. Nubian pyramids in Meroe, [20], [21]

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2.2 Pyramids and temples of Latin (Central and South) America

According to numerous researchers, the constructed pyramids of Latin America are comparable with Egyptian pyramids in terms of size and construction skills. Unlike the Egyptian ones, these pyramids have not only a different shape, with a plateau on top (many with temples), to which stairs lead, but also a huge difference in the time of construction (Djoser's stepped pyramid in Egypt was built around 2,650 BC, as compared to the Mexican pyramid La Venta built from 800 to 400 BC).

Most of the Latin American pyramids are smaller in size than the Egyptian pyramids, with much larger mutual differences in size, thus the Great Pyramid of Cholula in Mexico is the pyramid with the largest volume in the world. However, it should be reemphasized that in addition to stone, other materials were used for their construction.

In relation to the Egyptian pyramids, the pyramids of Latin America are distributed over a wider geographical area and were built by different cultures. Although there are some indicators that point to their much older age, official archeology believes that the Olmecs (around 1200-400 BC) built the first pyramids (in present-day Mexico), that the Maya built the highest and most extreme pyramids (present-day Mexico, Guatemala, Honduras, Salvador and Belize), and that pyramids were also built by other cultures (Teotihuacán, Toltecs, Zapotecs and Aztecs).

Unlike in Egypt, where it is commonly believed that the pyramids served as tombs for kings, the pyramids of Latin America primarily served as temples, where human sacrifice rituals were often performed, [22]. Some archaeologists claim that the pyramids were resonators or storehouses of energy (!?), so the logical question is "for what was this energy used and how did the architects know that the pyramids could be used in such a way", [9].

The Valley of Mexico, in the southern part of the Mexican Plateau, at about 2,200 m above sea level, was the stage of dramatic rises and falls of many cultures for several millennia. The most important centers of civilization were Teotihuacán, Tula and Tenochtitlán, [23].

Teotihuacán (in the Nahuatl language: "City of the Gods"), the capital of ancient Mexico, the oldest (known) urban center on both American continents, which dominated Central America for centuries. The Aztecs called it "the navel of the world", [23]. A civilization unknown to us carefully built a magnificent capital in the middle of the jungle, where several hundred thousand people lived, so at that time it was one of the largest cities in the world. Hundreds of pyramidal buildings, but also numerous other buildings, were built from stone blocks weighing up to several tens of tons, extracted from a quarry about 80 km away and cut with extreme precision, [4].

The Teotihuacán pyramids can be compared to the Egyptian pyramids in terms of size and extraordinary construction skills, and its high culture strongly inspired all the cultures and civilizations that later grew in this area, [23].



Figure 8-9. Model and illustration of Teotihuacán, [24]

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The Pyramid of the Sun, the Pyramid of the Moon and the third, smaller, pyramid of Quetzalcoatl (Temple of the Feathered Serpent) correspond in surface to those in Giza, Egypt. The two very distant pyramid complexes correspond to the star belt of Orion in the night sky, which consists of two twin stars and one small star, the so-called "white dwarf", [4].



Figure 10-11. Teotihuacán: Pyramid of the Sun (left) and its model (right); Although it is half as tall as Cheops' ("Great") pyramid, with the approximate dimensions of sides (225 m), the number of over 2.5 million tons of stone blocks is exceptionally respectable; The mathematical number " π " was used in the construction of the Pyramid of Cheops, and the root of the number " π " was used in the construction of the Pyramid of the Sun, [25]; It is assumed that it was built for 30 years, [26]



Figures 12-13. Teotihuacán: The Pyramid of the Moon (sides 145 m), surrounded by 15 smaller ones, is located at the northern end of the kilometers-long, 150 m wide "Avenue of the Dead" (left); The huge city plaza is dominated by the temple of Quetzalcoatl (Feathered Serpent), built in the form of a third, smaller stepped pyramid, whose walls are decorated with figures of the Fire Serpent (symbol of the daily passage of the Sun) and the Feathered Serpent (the divine being of Quetzalcoatl, symbol of the unity of air and land, heaven and earth) (right), [4], [27], [28]

The city came to an abrupt end in the middle of the 8th century. Its fall was undoubtedly contributed by the incursions of the Chichimeca, barbarian tribes from the north. After a period of wars and political fragmentation, around 950 the capital was moved to Tollan, or Tula (in Spanish). The second wave of settlers (Nonoalca), who came from the southeast, was highly civilized, bringing their way of building magnificent cities, palaces, temples and pyramids. They called themselves the Toltecs, and the word "Toltecness" (toltecatoytl) denoted a collection of all virtues. When Tula was at its peak (around 1,100 AD), around

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40,000 people lived in it. Vivid Aztec legends speak of a "wonderful city with beautiful buildings, whose walls were covered with gold, silver, corals, shells and quetzal feathers", of which only stone columns and reliefs remain today, [23].

With a quick conquest, they built an empire and took over the entire Central America. New cities, cultural hotbeds appeared: Coatlinchan, Texcoco and Coyoacan. In 1,000, they also broke into the Yucatan and conquered cities where the late Maya civilization was still flourishing, among them the city of Chichén Itzá, strongly influencing the Maya. The Toltecs created a new, recognizable "mixed" Mayan-Toltec style. Chichen Itzá is a Mayan city, but many signs indicate that it was ruled by the Toltecs, [23].



Figure 14-15. Chichen Itzá: Pyramid of El Castillo (castle) or Pyramid of Kukulcán, 30 m high, including the temple on the top, chosen in the 7 new wonders of the world; The perfectly symmetrical building contains elements of the sophisticated Mayan calendar, related to the number of steps, terraces and panels, [4], [29]

Three main ceremonial centers have been identified to date in Tula: Little Tula, Plaza Charnay, and the Acropolis, the ceremonial center, which is the most impressive. It consists of a large central square on the eastern side of which is the largest structure, known as "Pyramid C", which has only been partially excavated. On the north side lies the more famous "Pyramid B", that is, the Pyramid of Quetzalcoatl or the Pyramid of the Morning Star. It is a five-story structure similar to the Temple of the Warriors in Chichen Itza, [26].



Figure 16. Tula: Pyramids C (right part of the figure) and Pyramid B with giant stone warrior columns, which once supported the roof of the temple on top of the pyramid, [30]

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The Mayan civilization extended over the territory of today's southern and northern parts of Central America. In recent decades, age limits have been continuously moved back as much as 500 years.

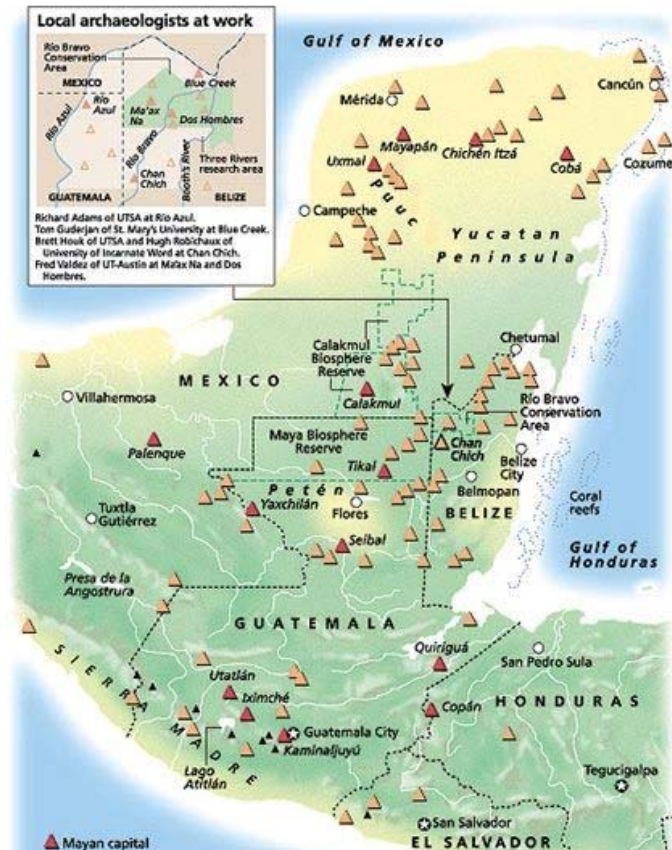


Figure 17. Map of Mayan cities and pyramids in Central America, [31]

The earliest monuments consisted of simple burial mounds, the forerunners of the spectacular stepped pyramids of the late Preclassic period and later. The powerful metropolis of Teotihuacán strongly influenced the Mayan cities of Tikal and Kaminaljuyú. The Classic period (250-900 AD) brought the flourishing of Mayan cities throughout eastern and southern Central America with monumental architecture and urban buildings. Many of these structures had a platform on which a smaller temple was built, associated with a particular Mayan deity. Mayan pyramids were also built as burial places for powerful rulers.

Mayan pyramidal structures appear in a large number of different forms and functions, limited by regional and periodic differences in localities, specifically in Mexico (Chichen Itza, Cholula, Coba, Bonampak, Calakmul, Comalcalco, Edzna, El Tigre, Palenque, Uxmal, Yaxchilan,...), Guatemala (Aguateca, Dos Pilas, El Mirador, La Danta, Kaminaljuyu, Yaxha,...), Honduras (Copan) and Belize (Altun Ha, Caracol, Lamanai, Xunantunich,...).

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Figures 18-19. Maya buildings in Caracol - the Caana Tower is the tallest building in Belize at 41 m, [32]



Figures 20.-21. Cholula - model of the Church on top of the hidden, partially reconstructed Great Pyramid of Tepeapala, with sides about 450 m, height 65 m, the largest volume in the world, which surpasses both the Cheops Pyramid and the Pyramid of the Sun in Teotihuacán, [33]



Figure 22-23. Coba: Great pyramid with a temple on top, the highest preserved pyramid of the Yucatan region of Mexico (left), [4]; Lamanai: High temple, height 33 m, one of the 4 great temples (right), [34]

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Figures 24-25. Palenque bears the epithets: "one of the largest Mayan cities", "the most impressive ruins of Mexico", "the most popular archaeological park", [4]; The stepped pyramid, with 9 stepped levels and the Temple of Inscriptions, represents a unique building in the Mayan world (left), [35]; A mysterious crypt with a massive stone sarcophagus of Pakal, weighing 50 t, is hidden deep inside (right), [36]



Figures 26-28. Tikal, the "capital city of the Maya", once the largest city of the Maya, resplendent with magnificent buildings, lakes and stone bridges; Building number I - Temple of the Great Jaguar (left), Building number II (middle) and Building number IV (right), 96 m high and probably 15 m below the surface - "the highest building built by Indian hands in America", [4], [36]

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Figure 29. Uxmal: A nunnery complex with the Pyramid of the Magician, built in 5 phases, 35 m high, with rounded sides and steep staircase on both sides - one of the most beautiful in the world, [36]; The eastern staircase, with 89 steps, has an identical slope to the Pyramid of Khafre in Egypt, [4]



Figures 30-31. The circular pyramid of Cuicuilco, which archaeologists claim is the oldest stone structure in Central America and the first monument in both Americas, constructed in a period not older than 600 BC (left); Oaxaca: Monte Alban (Spanish: "White Mountain"), officially the second largest "ceremonial" center on Mexican soil after Teotihuacán (right). This building complex is located on a mountain top that is leveled to perfection (22.3 ha), similar to the plateau for the pyramids in Giza, [4]

3. CONCLUSIONS

Megalithic architecture is related to a series of prehistoric stone monuments of giant dimensions, which were constructed using almost untreated stones, individually grouped into some structures, but also to numerous buildings of recent cultures and civilizations, the so-called. "more developed architecture", built entirely or partly from large stone blocks, most often of regular geometric shape in the drystone wall technique, weighing tons, even hundreds of tons. This applies not only to megalithic buildings of the so-called "Mediterranean circle", but also to those around the world, above all, to the Egyptian, Central American and other pyramids, tombs and temples around the world, which are the subject of

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this paper, as well as to the megalithic structures ("cyclopean buildings") of the Mycenaean civilization, and similar buildings, especially those in South America.

Pyramids are undoubtedly one of the most significant buildings of human civilization because the ancient builders incorporated in them complex knowledge not only in construction and architecture, but also sacred geometry, astronomy and mathematics, as well as other (undiscovered) knowledge.

The pyramids still impress with their monumentality, age, dispersion around the world and numbers, but also intrigue with their purpose, construction method, as well as the precision of their orientation. Despite numerous theories that try to explain the construction process and possible purposes of the pyramids, everything is still the subject of scientific debates, in which two numbers often appear, the "two treasures of geometry", the number Pi (π), and the Golden Ratio, i.e. the golden number Phi (ϕ).

Ancient pyramids are found all over the world, from the most famous ones in Egypt, Latin America (Mexico, Guatemala, Honduras, Salvador and Belize in Central America, and Peru in South America), China, Cambodia and Indonesia, to pyramids in other locations in the world, such as for example on islands in the Pacific (Tahiti), on islands that surround Africa from various sides (Mauritius, Canary Islands and Sicily), Sudan, Greece, Japan,...

The techniques used to build the pyramids were gradually developed over the centuries, which can be best seen through the "development" of the Egyptian pyramids, from mastabas, to stepped pyramids, as a series of added square mastabas, the appearance of which is reminiscent of the buildings of Babylon and Central America, to the Curved (Bent) Pyramid, up to pyramids with a regular geometric appearance, with a square base and with sides that are regular isosceles triangles. The height of the pyramids ranged from 15 m to 147 m, which was the initial approximate height of the Cheops ("Great") Pyramid, the oldest and largest pyramid at Giza, the oldest and only remaining of the 7 wonders of the ancient world. One of the greatest mysteries of the Egyptian pyramids is the question of how they are so perfectly aligned with the cardinal directions, especially the three largest and most famous pyramids on the Giza plateau, which are among the most famous and oldest buildings of mankind. Even today there are many unknowns and misconceptions about the Egyptian pyramids. As a misconception of Egyptologists, some researchers question their purpose as the tomb of the pharaoh.

Research has shown that the Egyptian pyramids are neither the largest nor the most numerous, and they were probably never "tombs of the pharaohs" (!?). Although we often like to draw comparisons between the ancient Egyptian pyramids and the pyramids of Central America, as well as other pyramids in the world, looking for their "lost" connection, the pyramids are nevertheless very different in age, shape, size, geographical distribution and function, even in the material from which they are built. The largest Peruvian pyramids were built from unbaked bricks. The pyramids in China are built of hard clay, and their architecture is similar to the stepped pyramids in Central America with a plateau on top, where the remains of temples are visible on some of them. The similarities of the pyramids on the remote islands surrounding Africa on three sides (Mauritius, Canary Islands and Sicily) are instantly noticeable in terms of their construction technology, materials used, and design and geometry. Particularly interesting is the fact that the Pyramid of the Sun, the Pyramid of the Moon and the third, smaller, pyramid of Quetzalcoatl in Teotihuacán, Mexico, which dominated Central America for centuries, correspond to the Cheops, Khafre and the smaller Menkaure's pyramid in Giza, Egypt, with regard to area, and that very distant pyramid complexes in Teotihuacán and Giza correspond to the star belt of Orion in the night sky, which consists of two twin stars and one small star, the so-called "white dwarf".

According to numerous researchers, the constructed pyramids of Latin America, especially those of Teotihuacán, are comparable with Egyptian pyramids in terms of size and construction skills. Unlike the Egyptian ones, these pyramids have not only a different shape,

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with a plateau on top (many with temples), to which stairs lead, but also a huge difference in the time of construction. Most of the Latin American pyramids are much smaller in size than the Egyptian pyramids, with much larger mutual differences in size (the pyramid with the largest volume in the world is the Great Pyramid of Cholula, Mexico). In relation to the Egyptian pyramids, the pyramids of Latin America are distributed over a much wider geographical area and were built by different cultures. Unlike in Egypt, where it is commonly believed that the pyramids served as tombs for kings and queens, the pyramids of Latin America primarily served as temples, where human sacrifice rituals were often performed.

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