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Settlement Patterns and Structure Types
Scientific Subject Review
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UDC 711.424.6:72.031.8 (72.728 Yucatan) “1-14”

Majanski gradovi Yucatana
Oblici naselja i vrste gradevin
Pregledni znanstveni članak
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Fig. 1 Characteristic structures of a Mayan city, Mayapan
Sl. 1. Znakovite građevine majanskog grada, Mayapan
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MAYAN CITIES OF YUCATAN
Settlement Patterns and Structure Types

MAJANSKI GRADOVI YUCATANA
Oblici naselja i vrste građevina

The research results on prehistoric Mesoamerican settlements in Mexico are presented through the planners’, rather than the archeological, point of view. Numerous settlement types and sizes were analyzed by comparing the archeological data and the personal experience gained during the research in situ. Even though the cities were unplanned, derived results proved the astonishingly high level in the construction of structures and buildings in relation to astronomical phenomena.
INTRODUCTION

UVOD

This paper represents preliminary results reached during the scholar research on prehistoric Mesoamerican settlements development in Mexico, that was conducted during scholar visits to the Universidad Juárez Autónoma de Tabasco, Villahermosa, Tabasco (2016) and Anahuac-Mayab University, Merida Yucatan (2018).

The Mesoamerica covers the area of today’s countries of Mexico, Guatemala, Belize, western parts of Honduras El Salvador, Nicaragua and Salvador (Fig. 2). The human presence within the area can be observed ever since some 22,000 years ago: numerous singular groups of humans, not yet connected to anything larger than a tribe. The first Mesoamerican large cultural group that can be called a civilization are the Olmecs whose members built settlements in tropical lowlands of south-central Mexico, today’s states of Tabasco and Veracruz.

PRE-MAYAN EPOCH

PREDMAJANSKO DOBA

The oldest known Olmec site is San Lorenzo (Veracruz state), occupied around 1,500 BC, and which is considered to be one-of-the-oldest populated places in both Americas. Besides this one, there were two other Olmecs’ settlements: La Venta and Tres Zapotes (Fig. 2). The site of San Lorenzo itself, originally an island within a river, was naturally elevated above the river flow level on a secure height enough to protect it from frequent flooding and the attack of the enemy. The site itself had a very diverse shape: several small hilltop villages ruled by San Lorenzo urban center government, which faced its decline at 900 BC. The most recognizable remnants of the Olmecs culture are the colossal stone heads (Fig. 3) up to 3 meters of height, representing human heads that might represent the ruler’s heads. The other structures found and considered to originate from Olmecs are stone aqueducts built of hundreds and thousands of basalt carved blocks (brought from nearly a 100 km distance) laid in a continuous slope that provided the constant flow of water from the source to the final point. San Lorenzo is not as a famous as some of the Mayan sites in Mexico, but surely is a significant historical and cultural center and archaeological site as the Olmecs are considered to be the “parent” culture that Mayas arose from.

The other site – La Venta (Tabasco state), was inhabited between 1,200 BC and 400 BC and served as a civic and a ceremonial center (proved by a large number of buried offerings, tombs, stelae and altars dispersed among the earthen mounds and platforms on the site. La Venta is considered to be the first “planned” pre-Hispanic settlement. The dominant structure is a conic mound (which initially might have been a stepped pyramid that changed its shape due to the erosion), 30 meters of height (Complex C). This mound is considered to be one of the oldest earthen pyramids in Mesoamerica. North of it, there is a Complex A consisting of two ridge mounds...
forming central plaza with a certain number of tombs, three smaller mosaics representing jaguar masks and a small round-shaped mound – a tomb (Fig. 4). South of the mound, there is a Complex B – a larger plaza (100 by 400 m) with numerous small platforms (with noble residents’ houses or for ceremonial or ritual purposes), stelae and altars. The main structures (ridge mounds, plazas...) in La Venta have a deviation of some 8 degrees in correspondence to the north-south axis (like most of Olmecs’ sites), the reason for which is still unclear.

Another pre-Mayan culture, Zapotecs, built their capital Monte Alban on a hill slope, near-by today's city of Oaxaca in Oaxaca valley (Fig. 5) some 200 km SW of San Lorenzo and populated between 500 BC and 800 AD. The site was a result of vast earthwork labor that transformed the hill slopes into a flat-topped mountaintop (some 400 meters above the valley) for the construction of stone structures (pyramids, temples, and palaces) around large ceremonial plaza of a size 200 by 300 m, overlooking the valley. The whole complex was nearly 20 hectares large. The site position suggests that it was meant mainly for the upper class, while the rest of the residents lived down in the valley. Scholars estimate that it was a home for nearly 15,000 people in 200 BC, and almost 25,000 residents at around 800 AD when the decline of population occurred. North and south of the main plaza, there are two platforms that could be accessed along the wide stairways. The North platform has a sunken patio and four structures (Building B, D and E), and a small Temple – Temple of the two Columns. The South platform looks like a huge flat-topped mound with a small one of the same shape on the top. Along the plaza east edge, there are five structures atop an elongated platform, while on the plaza west edge there are three structures (Building of the Danzantes and two structures K and M), but without a platform. The shape of a structure within System IV (a stepped flat-topped pyramid) has similarities with Teotihuacán architecture – stepped pyramid with curved sloping sides. Within the plaza itself, there are 4 structures: three are a part of the Triadic group (Buildings G, H and I) while the fourth one, Building J is a very enigmatic one because of its shape and orientation: an irregular pentagon that is rotated for 45° compared to the direction of all other buildings. It was built around 275 BC, but its purpose and reason for its orientation is still a mystery.

Today, many scholars consider the Olmecs to be the mastermind who “invented” the ritual practice like human sacrifice and blood-letting, ballgame, astronomy, writing system (lately developed into Mayan glyphs) that are Mayan culture well-known attributes.

**MAYAN EPOCH**

**MAJANSKO DOBA**

Opposed to the highly centralized power and urban centers of Olmecs, the Mayans from Mexico had several "kingdoms" established over today’s Mexico states (Yucatan, Campeche, Quintana Roo, partly Tabasco and Chiapas) and Belize, Guatemala, El Salvador and west Honduras. They were the largest group in this part of the World at that time. They were spread over the area of nearly 350,000 km² (Fig. 2) and organized in smaller groups.
divided by different customs, languages, and historical background, but still had much in common. That’s why the scholars observe them as a single cultural group. This region can be divided into two different relief areas: Highlands and Lowlands but following the geographic attributes, there are three distinct areas: Southern, Central and Northern one (Fig. 6). On the other hand, Mayans’ history can be observed through 3 principal periods (more chronological, rather than based on cultural evolution degree): the Preclassic, Classic, and Postclassic, preceded by the Archaic Period (during which the first settlements and early agriculture development could be noted).

**Preclassic period (1,800 BC – 250 AD)** – The Mayan civilization started around 2,000 BC in Cuelo (Belize), but the first sedentary settlements were established around 1,800 BC in Chiapas state (Mexico) when nomad groups commenced with the cultivation of maize, beans, squash. Around 1,000 BC, some growing villages became urban centers, and by 400 BC in the Southern Area a large ritual center Kaminaljuyu (Guatemala) was established, on both sides of a longitudinal plaza having several flat-topped pyramids with temples atop. Much of the art-work (stelae, altars) expressed a considerable similarity with Olmecs. In the Central Area (northern Guatemala), between 200 BC and 150 AD, a city of El Mirador was built, having a population of nearly 100,000 at its peak. Around the large central square, there were many structures, out of which a large central pyramid with two adjacent structures is worth mentioning. El Mirador was connected with other cities in the region by numerous sacbes.

**Classic period (250-900 AD)** – This period was marked by the large-scale construction, urban planning, and cities with a population between 50,000 to 120,000. Teotihuacan had a significant influence over the first cities (like Monte Alban or Tikal in Guatemala). Owing to this influence, Tikal became one of the most powerful cities in Central Lowlands (200-900 AD). Besides cities and large stone structures (built without any machinery – using just the manual labor), the Mayas learned how to cultivate maize, beans, squash and developed a complex understanding of astronomy. They introduced one of the world’s first written languages – a language made of 5-600 glyphs, that was used up to the arrival of the Spaniards. The Mayan texts were inscribed on stone monuments, lintels, stelae, and ceramics, but it was also “painted” on a paper produced from tree-bark. Set of these “writings” are known as Codices. Even in mathematical skills, the Mayans were one-of-a-kind civilization.

Along with other Mesoamerican civilizations, they used a numerological system with a base of twenty. The digits were shown in a bar-and-dot presentation, but in the Late Preclassic period (350 BC – 250 AD) the Mayans added another symbol, a symbol for a zero. They "measured" time using two complicated calendars. Unfortunately, during the 9th century AD, the Central region suffered major political collapse (abandonment of cities, ending of dynasties...) followed by warfare, overpopulation, and drought. These developments increased the urban activity in

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7 All Mayan languages (nearly 70 of them) belong to a sizeable linguistic family originating from the one spoken in the western Guatemala region, some 5,000 years ago and some of them are still in use today.
8 PHILIPS, 2007: 46
9 HELMKE, KETTUNEN, 2005: 12. Each glyph represented a word or a syllable and could be combined with the others in an almost infinite number of ways. That is why each Mayan word could have been written in many different ways.
10 GARZA, 1994: 31. Three symbols presented all digits: a dot (value of 1), a bar (5) and a (turtle-like) shaped shell (0). The numbers were written in horizontal lines in a vigesimal system. Numbers between 20 and 399 were shown in the second line, numbers between 400 and 799 in the third line (from the bottom line upward), etc.; e.g., the number 2018:

<table>
<thead>
<tr>
<th>2005</th>
<th>5</th>
<th>5×400</th>
</tr>
</thead>
<tbody>
<tr>
<td>205</td>
<td>0</td>
<td>0×20</td>
</tr>
<tr>
<td>15</td>
<td>18</td>
<td>18×1</td>
</tr>
</tbody>
</table>

11 Along with the Babylonian numerical system, this was the earliest known appearance of an explicit zero sign worldwide. At first, zero served to explain something that was absent in a particular calendar count, but later it got the numerical meaning used in calculations for more than 1000 years.
12 Calendar Round was based on two overlapping annual cycles: Divine calendar or tzolk’in (260 days = 20×13 days) and a Solar calendar or Haab (365 days = 18×20
the northern Yucatan Peninsula — cities like Uxmal and Chichen Itza began to grow.

Postclassic period (900-1539 AD) — Changes from the preceding Classic Period marked this Period. The cities across the highlands and the Pacific coast were relocated or abandoned after a continuous inhabitation of almost 2,000 years, apparently due to the warfare. New city locations were on hilltops, with a kind of “ditch-and-wall” defense system and/or near-by permanent drinking water resources — the urban activity shifted to the northern lowlands and highlands. Cities like Chichen Itza and others in Puuc region, after a sudden growth, faced a dramatic decline in the 11th century and thus gave a chance for the city of Mayapan to rise in the 12th century (abandoned Puuc sites). Other new towns were established by the Caribbean coast initiating new road and trade networks. Political, social, and environmental turbulences were the primary cause of the urban collapse of the Southern region. The city abandonments occurred along with a period of long wars, diseases, and natural disasters that hit the Yucatan Peninsula. After the arrival of Spaniards the coastal and inland cities were abandoned and conceded to the power of nature — the sites became ruins and covered by dirt and vegetation (Fig. 7). This process of natural decline continued for another three centuries until they were re-discovered.

Mayan society was sharply divided into several social groups: nobles, commoners, serfs, and slaves. The first one was for rulers, administration officials, military commanders, high priests, traders, and they lived in “urban” centers. The second group embraced farmers, workers, and servants who lived outside the center borders, close to their land. The serfs were people who farmed the land that belonged to the ruler or local town leaders. The last group covered the people who were, either punished for crimes or were the prisoners of war. Anyway, the population “distribution” was highly ordered, and the number of each social group would cause the settlement grouping and pattern.

Following Willey’s and Smith’s research on the New World settlement pattern, the spatial configuration of Mayan settlements should be observed through the occurrence of spatial clustering of houses and space in-between in relation to centers that had the most important structures and buildings (pyramids with temples, palaces...). Accordingly, the Mayan settlements can be observed within three major groups:

A – houses built close to the center
B – houses widely dispersed around the center
C – few houses grouped around a building or a structure in small clusters, spread within a certain distance from the center.

But the American archeologist, W. Bullard suggested more contemporary and functional differentiation of the Mayan settlements setting them into two major groups: archeological remains (house ruins, minor ceremonial centers, and particular purpose features) and ruin groupings and settlement organization (clusters, zones, and districts). The first subdivision, in a larger scale, may be compared to Willey’s group C. Which-ever division we consider as the most appropriate there is something in common for each of them: types of structures and buildings within and that distinguish a settlement from one to another.

There are thousands of Maya settlements spread across five previously mentioned today’s countries. The six sites, with particularly outstanding architecture or plan-layout chosen to be presented in this paper are in Mexican states of Yucatan and Quintana Roo (Fig. 8, and) and visited and experienced by the author in 2018. In alphabetical order, they are as follows: Tulum in Quintana Roo, and Chichen Itza, Dzibilchaltun, Ek Balam, Mayapan, Uxmal, and Sayil in Yucatan (Figs. 9-11).
Structures Types within a Mayan City

Structure Types within a Mayan City

The Mayan architecture was far more diverse in its appearance and size than the architecture of Olmecs. The construction and shape are mostly in a tight connection with astronomical events. The most remarkable structures in Mayan architecture (Fig. 1) are pyramids (with a temple on the top), palaces, ballcourts, observatories, sacbes, city-walls, E-groups, triadic groups, platforms. Most of these structures were of a near-to-rectangular shape (the Pyramid of a Magician in Uxmal, Observatories in Chichen Itza and Maya-pan are the exception).

The pyramids are step pyramids (like zigzugs in Mesopotamia) and their construction commenced in the late Pre-Classic. Two types of pyramids were built: the ones used for religious and sacrificial rituals, while the others did not have any function except to be noticed as a strictly sacred (very steep) structure. The size ranged from just a few meters of height, up to the one like in Cholula (Fig. 13) that was more than 65 meters of height. The pyramids for the sacrifice had stairways (two or four) providing the access for the priest to the top temple (closer to the God). The pyramids were taller than the jungle trees and could have served as the orientation within space. In most cases, the pyramids were designed, built and positioned to serve specific astronomical issues – the point of the sunrise at the time of solstices and equinoxes. The most intriguing ones are the Pyramid of the Magician in Uxmal (with an elliptical floor plan), the Pyramid of Kukulcan (El Castillo named by Spaniards) in Chichen Itza, and the Pyramid of Nohoc Mul in Coba, Quintana Roo (Fig. 12). Some of the pyramids housed the tomb of a ruler (like the sarcophagus of Pakal found inside the Temple of Inscription, atop a pyramid in Palenque, Chiapas state).

Palaces were large buildings, with highly ornamented facades (painted or with relief)
and used to house the elite population. They had many chambers within up-to-three floors above the ground, and had one or more courtyards. These buildings were used as a burial place for palace residents. In front of the palaces, there are platforms – large squares for public gatherings. Some of the palaces, worth mentioning, are the ones in Uxmal (Governor’s palace) and Sayil (a three-floor high building, nearly 85 meters long) that create a unique appearance at the site (Fig. 15).

The circular temples dedicated to the God Kukulcan (like the one in Chichen Itza and Mayapan) are often considered to be the observatories (Fig. 14), but there is no exact proof for that. As mentioned previously, many of the Mayan buildings and structures were built to record some astronomical features.\(^2\) For this reason, the label “observatory” can be applied to any Mayan structure regardless of their primal function.

A ballcourt is an unavoidable part of the Mayan settlement. The ritual ball game was inherited from the Olmecs and played with a solid rubber ball (30 cm in diameter), on a play-field bordered firstly by sloping sides (Coba) and later by vertical sides like the one in Chichen Itza (Fig. 16).

One of a structure that was of the great importance for Mayas is a sacbe (causeway), an elevated paved road bordered on both sides, with a function of enabling the Mayans to travel within and out of the cities.

The final structure, worth mentioning is a city wall that cannot be found at every site in Yucatan. The most significant ones are at Tulum (Quintana Roo), Ek Balam, and Mayapan (Yucatan).

Other characteristic Mayan settlement buildings were residential houses – huts\(^2\), built of wooden poles and thatch, plastered with mud, set atop a low-height mound-base and covered with hay that protected from sun and rain.

**CASE STUDIES**

**PRIMJERI GRADOVA**

Hereafter, a short description of the chosen sites in Yucatan and Quintana Roo is given, preceded by some general data for each of them.
The town of Tulum (in the Mayan language it means "wall") was built on a 13 meters tall cliff near-by the Caribbean Sea. It is one of the last cities built before the Spaniards’ arrival and was an important port through which the Mayans made most of their sea trade. The town had a rectangular shape that was conditioned by the walls (3-5 meters tall and up to 8 meters thick) along three sides, while by its fourth side was next to the cliff. The main gate was within the west wall, while the other two walls had several secondary gates. On both corners towards the mainland, there were two watch-towers. The city had its peak between the 13th and 15th century and was still inhabited for some 70 years after the Spaniards commenced their conquest of the land. The most vivid structures in Tulum are El Castilo, the Temple of Descending God (Fig. 17) and the Temple of the Frescoes. The last-mentioned structure might have served as the observatory, too. Other, worth noting, structures are House of the Columns and House of the Chultun.

The area of Chichen Itza ("Mouth of the Itza Well" in the Mayan language) has been occupied ever since the first millennium BC, but as the Mayan settlement it was mentioned in the 8th century when the first structures were built between two cenotes (natural sinkholes with drinking water). Around 600 AD it became a ruling (political, economic and religious) center for the northern Yucatan. The most dominant structures were built between 625-800 AD, but between 800-900 the settlement was abandoned and used for religious rites, only. The next revival occurred in the mid of 10th century when the Itza people returned to the site. By the end of 10th century, the Toltec king and his army came to Chichen Itza. That was the beginning of the Toltec influence over the site (construction of vast colonnades and other structures with carvings of serpents and deities). The shape of the city was irregular, hard to define. The beginning of a decline is dated by a transition between the 12th and 13th century when no major structures were built. The most important structure of Chichen Itza is the nine-step Pyramid of Kukulkan built between 11th and 13th century for the Feathered Serpent God, named by the Spaniards El Castillo because of its size and appearance. The pyramid was upgraded in several phases, reaching the height of 30 m and the floor size of 55×55 m. It has stairways on 4 sides with 91 steps, each. When the step in front of the temple built atop is added, a number of 365 is reached – the number of days in a year. The orientation and design have astronomical issues (solstice and equinox). Next structure worth mentioning is a circular building – observatory El Caracol (snail in Spanish because of the spiral stairway inside of it) some 14 m of height, built over a platform. It was rebuilt several times to calibrate its astronomical observation of the Pleiades, the Sun, Venus movements). The site contains many other structures like Ballcourts, Temple of the Warriors (Fig. 18), Court of the Thousand Columns, Temple of the Big Tables, Temple of the Wall Panels, Nunnery, Osario and numerous platforms of different sizes. The site is crisscrossed by more than 30 sacbes, out of which the one connecting the site with the
Sacred cenote is the best preserved. Today, Chichen Itza, along with Uxmal, is on the UNESCO WHL.

Dzibilchaltun ("writing on flat stones" in the Mayan language) was one of the largest Mayan cities, close to the northeast shore of Yucatan, still populated at the time of the Spanish arrival. During the excavations, the archeologists have discovered over 8,000 structures, out of which the most outstanding one is the Temple of the Dolls (Fig. 19). It was built on a terraced platform, with three small buildings west of it, and a blank Stela 12 which might have been used for astronomical viewing along with the openings of the Temple of the Dolls (autumn and spring equinox sunrise). The temple was connected with Central Plaza (105×135 m) with a 650 m long sacbe 1. On the north side of the plaza, there is a 10 m high four-tiered small pyramid (structure 36) with a central stairway, while along the south edge a plaza there is nearly 130 m long building (structure 44) with numerous chambers and doors facing the plaza and a continuous stairway, 5 m high. Within the plaza there are ruins of a chapel built by the Spaniards. There are some more buildings and ruins near-by that have not been reconstructed yet. The area south of sacbe 1 is filled up with numerous irregular residential stone houses.

Ek Balam ("black jaguar" in the Mayan language) was "discovered" in the late 1980s, but the first comprehensive research was performed in the 1990s. Ever since, 45 structures have been discovered and mapped. The smaller area (some 100 hectares) is surrounded by a double defense wall (3 m wide and 1.5 m high), with entrances through which a Central Plaza can be reached by a sacbe (set in cardinal direction). Inside the walls, on the north side, there is the major building – Acropolis that has a temple (called El Trono – the Trone) in which the ruler (Ukit Kan Lek Tok) was buried. The size of the Acropolis is 162 by 68 meters in floor plan and 32 m in height. Its south facade is a highly decorated – not in a carved stone but in stucco and limestone mortar that could be easily modeled, and then painted. Along the east and west side of the Central Plaza, there are large platforms II and III (more than 120 m long, and 20 m high), and a small ballcourt on a south edge. By the south edge of the South Plaza, there is a structure – the Oval Palace (Fig. 20), which orientation seems to be connected with some astronomical features. On the west edge of a plaza there, a structure XVII or The Twins having two mirroring temples on each side, while on the east side there is a structure X. Structure XVIII is a small entrance Arch that was probably used for ceremonial purposes. Outside the walls, in the forest, there are many smaller structures/ruins waiting to be cleared.

Mayapan city was a part of a triple alliance with cities of Chichen Itza and Uxmal, but it managed to exist in later days than the other two cities. Mayapan architecture is a mixture of Mayan and Toltec architectural elements. The main square is bordered by government-
The whole area within the city walls (with 12 entrances, out of which 7 had vaulted gates) is bustling with structures and buildings (Fig. 21): temples, altars, platforms (there are more than 4000 structures). The inner-walls area is dominated by a 9-tiered pyramid, which reminds very much on the pyramid in Chichen Itza (not only by the same name). Many buildings within the city-walls have collapsed vaulted roofs (what is not the case in Chichen Itza and Uxmal). Besides, there are three circular buildings that might be used as observatories (compared to just one in Chichen Itza and none in Uxmal), and only structure that is missing, compared to Chichen Itza and Uxmal, is a ballcourt. The Mayas abandoned the Mayapan around 1448, after a period of political, social and environmental turbulence.

Uxmal ("thrice built" in the Mayan language) is one of the most attractive archeological sites connected with Mayan culture. Main structures cover the area of approximately 60 hectares where some 25 structures and buildings are worthwhile seeing. The main structure is a 35 m tall stepped pyramid (Pyramid of a Magician) built over an oval-shaped floor-plan (instead of more accepted rectilinear one) between 600 and 950 AD. The final version of a pyramid is a result of the construction of five pyramids, each larger and built over the one beneath. On the rear (east) side there is a wide stone staircase leading to the summit where a temple was built. The opposite side is fully decorated (Chaac God masks, latticework panels, and stone mosaics), with some additional structures (temples) by the bottom of the pyramid. In the vicinity, there is a House of the birds (named after the birds decoration found at the friezes) and a group of four elongated buildings around 80 by 65 m patio – the Nun’s Quadrangle (Fig. 22). The name was given by Spaniards, probably because of 74 rooms that are within this complex (reminding of the nuns’ chambers). Both building facades are elaborately carved and decorated.

There are some more buildings southward like the Governor’s Palace, Ballcourt, House of the Turtles, Dovecote group, Pyramid of the Old Woman and the Great Pyramid (nearly 80 m of a base size). Among the structures west of the Nun’s Quadrangle and the Governor’s Palace stands, so-called a Cemetery group (the elongated temple standing on a low base platform and a ruined pyramid west of it).

The Governor’s Palace is one of the best examples of the Puuc style\(^25\): three-parts building stands atop a 9 m high terrace, with stairways along the whole facade. It has a 90 m long mosaic having more 100 Chaac God masks. In front of the Palace, there is a Plaza with a two-headed jaguar throne. The city of Uxmal was closely connected with three smaller towns: Kabah, Labna, and Sayil.
CONCLUSION
ZAKLJUČAK

The history of making cities in pre-Hispanic World is a very long one – over 3,000 years. After the Olmecs and Zapotecs, the Mayan civilization expressed their knowledge, not only through their tangible heritage (colossal buildings and structures) but also through the intangible heritage (mathematics, writing-system, time-recording) that prove they were a civilization rather than just groups of aboriginals. Through three significant periods (Pre-classic, Classic, and Post-classic), starting with huts and small camps they created great towns and cities. Their settlements
were never laid out on a grid, but rather in an unplanned way, although most of the buildings or structures were built (oriented) following some astronomical issues (solstice, equinox, or towards some visible stars or constellations). That's why it is complicated to define the city size and its pattern. Examples of the Mayan city layout (Fig. 23) with the mark-down of the characteristic structures (Table I) presented in this paper prove that. The central settlement core was a home for ritual, administrative and other elite residential buildings or structures (pyramids, temples, palaces, observatories, ballcourts, markets, elevated platforms), but not that every city had it. The buildings were gathered around plazas used for ceremonial and public gatherings. Some of the cities had city-walls. The residential area needs were fulfilled by constructing houses “huts” inside the rainforest or over the clear-cut rainforest land. Residential areas for the nobles occupied the best land around the city center, while commoners had their residences grouped in the second “belt” from the city core (sometimes around several larger structures). The living places for serfs were within a scattered second belt – dispersed further away from the ceremonial center. This created three significant types of Mayan settlements (A, B, and C), making it difficult to estimate the city population, but some of the cities had reached numbers that were much larger than the ones of the European cities at the same time.

[Written in English by the authors]

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**Sources**

**Izvori**

**Izvori ilustracija**

Fig. 1, 3, 9-22 Photo: Lipovac, N.
Fig. 2, 6, 8, 23 Sketch: authors
Fig. 4 https://peopleofonefire.com/something-else-is-really-bothering-me-about-the-track-rock-petroglyphs.html/comment-page-1 [12.11.2018.]
Fig. 5 Descriptive photo: authors
Fig. 7 Bourbon, 1999: 184

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26 Observation was performed on fieldtrips in November 2016 and October 2018, during scholar visits to Universidad Juárez Autónoma de Tabasco – UJAT, Villahermosa, Tabasco, and Anahuac-Mayab University – AMU, Merida, Yucatan, Mexico.
Majanski gradovi Yucatana
Oblici naselja i vrste građevina

U ovome radu predstavljeni su početni rezultati istraživanja prapovijesnih naselja Srednje Amerike, odnosno Meksika, ovaj put s naglaskom na pođuču poluotoka Yucatán. Istraživanje je provedeno tijekom znanstvenih gostovanja na Universidad Júdrez Autónoma de Tabasco, Villahermosa, Taba- 
saco (2016.) i Anahuc-Mayab University, Merida, Yucatan (2018.). Predstavljeni tekst temelji na istraživanja prof. dr.sc. NeNad Lipovac u njegovu znanstvenom i profesionalnom radu od 1979. godine. Prof. Lipovac je istraživao najvažnije prapovijesno naselje na Yucatanu, San Lorenzo Tejas (1000.-900. pr.n.e.), koje je poznato u veličini otprilike 100.000. Ovo naselje ima ponegdje neznačajne građevine i koncentraciju stanovnika, koje su se nosile na obliku nevjerovatno složenih, situiranih u mnogo različitih kompaktnih centerima.

Prof. Lipovac je istraživao i potaknuo izučavanje ovog naselja u okviru konačne stupačke i arheološkog izvora za istraživanja prapovijesnih naselja. On je istraživao složenost i strukturu ovog naselja, koje je imalo dužinu oko 3000 godina, a koja je bila zasnovana na različitim građevinskim strukturama. Ovo naselje je također smatrao za jedan od najznačajnijih naselja na Yucatanu, koje je bilo zasnovano na složenim građevinskim strukturama.

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Biografije

Prof. NeNad Lipovac, Ph.D., commenced scholar research on History of Making Americas Prehistoric Settlements, during the Fulbright grant (2002) at CED UC at Berkeley. The derived results, always connected with his personal experience of the sites, have been published and presented worldwide. NIKOLINA GRAĐECKI graduated at the Faculty of Architecture in Zagreb (2014) and has been Prof. Lipovac’s collaborator in his scholar and professional work ever since.
